Risking it all in the metaverse ecosystem: forecasting resistance towards the enterprise metaverse

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Abstract

Purpose – This study investigates organizations’ non-adoption intention towards the enterprise metaverse. The innovation resistance theory (IRT) is used as an underpinning theory to examine the impact of various risks on non-adoption intention towards the enterprise metaverse.

Design/methodology/approach – A total of 294 responses were collected to examine the proposed hypotheses. A structural equation modelling technique was used to investigate the hypotheses using SPSS AMOS and PROCESS MACRO.

Findings – The results of this study reveal that performance, security and psychological risks are significantly associated with non-adoption intention towards enterprise metaverse. Further, distrust significantly mediates the association between performance risk, social risk, technological dependence risk, security risk and psychological risk and non-adoption intention towards enterprise metaverse. Moreover, the results of moderated-mediation hypotheses indicate that the mediating effect of distrust on the association among performance risk, social risk, psychological risk and non-adoption intention towards enterprise metaverse is higher for individuals having high technostress compared to individuals having low technostress.

Originality/value – The study’s findings will enrich the metaverse literature. Further, it provides a deeper understanding of enterprise metaverse adoption from a B2B perspective using the underpinnings of IRT. The study helps organizations understand the risks associated with the adoption of the enterprise metaverse.

Keywords Metaverse, Innovation resistance theory, Technostress, Risks, Distrust, Enterprise metaverse

1. Introduction

With the advent of digital technologies, organizations are keener to integrate disruptive and innovative technologies to achieve competitive advantage (Shankar et al., 2023; Kumar et al., 2023a, b; Garrison, 2009). Disruptive technology refers to an innovation or advancement that fundamentally alters an industry by introducing a new approach, product or service that disrupts the existing norms and displaces established players (Danneels, 2004). Several immersive and disruptive technologies such as artificial intelligence, cloud computing, augmented reality, machine learning, virtual reality and digital twins were introduced for organizations to transform their processes from traditional to digital (Malodia et al., 2023; Mohanta et al., 2020; Rodriguez Bolivar et al., 2022). Innovative technologies offer organizations intriguing characteristics that help them differentiate themselves from their...
competitors (Kumar and Shankar, 2023b; Lyytinen et al., 2010; Madanaguli et al., 2022; Wei and Pardo, 2022). Therefore, early adoption of disruptive technologies will provide organizations with the potential to compete with bigger rivals, as reliance on old and declining technologies can leave the organization exposed and vulnerable (Dhir et al., 2023; Shankar et al., 2022; Ritter and Pedersen, 2020). However, upgrading to potentially new innovative technology may be challenging for organizations as it is difficult to believe the technology in the initial years due lack of established success stories in real-world use cases (Hastuti et al., 2022; Obal, 2017; Sharma et al., 2022).

One such disruptive technology is the metaverse, and organizations are looking for opportunities to explore how it can solve all their problems. The enterprise metaverse is a crucial application of metaverse that revolutionizes working in the virtual environment. Enterprise metaverse is a virtual ecosystem that mimics and integrates every element of an enterprise to enhance engagements and improve decision-making (McKinsey & Company, 2022a, b). Enterprise metaverse can be a game-changer for industries with manufacturing and production capabilities (Van et al., 2022). Further, the enterprise metaverse can benefit organizations if integrated with other emerging innovations, such as artificial intelligence, the internet of things (IoT) and machine learning, enabling advanced data analysis and automation (Hastuti et al., 2022; Wei and Pardo, 2022).

A report by McKinsey & Company (2022a, b) reveals that organizations have already spent over $120bn in 2022 on the metaverse. Further, about 25% of the organizations’ top leadership believes that metaverse will generate about 15% of corporate revenue by 2027. The metaverse market size in 2020 stands at $41.9bn, which is expected to reach $1,237.0bn by 2030 with a CAGR of 40% (Allied Market Research, 2022). Organizations such as Airbus and NVIDIA have already started to adopt enterprise metaverse by creating digital twins of their factories, which helped them increase their efficiency by up to 30% (Deloitte Insights, 2023). The above statistics reveal that the metaverse has also started to gain popularity among businesses.

However, despite the popularity and benefits that the metaverse offers businesses, the adoption of the enterprise metaverse remains very low. To achieve the objectives of Industry 4.0, organizations are building a phygital system that blurs the physical and digital world boundaries to make industrial operations automated and intelligent (Bagnoli et al., 2022). Therefore, immersive technologies such as AI-based CRM, digital twin, virtual reality, and augmented reality have been integrated into business operations to streamline processes (Chatterjee et al., 2021a, b; Egger and Masood, 2020; Leung et al., 2023; Ukko et al., 2022). The metaverse stands apart from other technologies by offering an immersive and embodied experience through avatars, interconnectivity across virtual environments, spatial computing for 3D interaction, and the hybridization of real and virtual worlds (Kozinets, 2023; Shin, 2022). These unique characteristics differentiate the metaverse, necessitating focused research to understand its specific dynamics and implications. Prior literature suggested that integrating metaverse with AI-enabled capabilities could help organizations collect operational data to fine-tune the system and achieve a competitive advantage (Chatterjee et al., 2021a, b). Further, as the metaverse platform can provide a combination of virtual, augmented and mixed-reality features, organizations are eager to explore the capabilities of metaverse technology (Hastuti et al., 2022; Li et al., 2022; Papagiannidis et al., 2017). Therefore, it becomes crucial to understand what risks and barriers play a significant role when businesses consider adopting such disruptive technologies. However, the existing literature reveals that scant efforts were made to explore the behavioural intentions towards enterprise metaverse from a B2B perspective. The above arguments highlight a significant literature gap.
Innovation Resistance Theory (IRT) offers a comprehensive perspective on resistance by considering multiple dimensions that can contribute to resistance behaviour (Kumari and Kumar, 2023; Migliore et al., 2022). The metaverse represents a novel and transformative technological innovation, and IRT recognizes that resistance can vary across different contexts (Kaur et al., 2020). Moreover, the literature on IRT suggests that the IRT framework has successfully examined individuals’ resistance behaviour in various contexts (Kumar et al., 2023b; Talwar et al., 2020), making it an appropriate theory to apply to this study. Therefore, this research uses the underpinnings of IRT to understand the non-adoption intention towards enterprise metaverse in the business-to-business (B2B) context.

To fulfill the above-mentioned gap, this study aims to answer the following research questions (RQs):

**RQ1.** Why do organizations represent non-adoption intention towards enterprise metaverse?

**RQ2.** How does distrust play an important role in framing non-adoption intention towards the enterprise metaverse?

**RQ3.** Does the organization’s non-adoption intention towards enterprise metaverse vary based on the technostress level of employees?

To answer RQ1, the present research examines how various risks, such as performance risk, social risk, infrastructure risk, technological dependence risk, security risk and psychological risks, are used to frame organizations’ non-adoption intention towards the enterprise metaverse. Further, the study examines the mediating effect of distrust and moderating effect of technostress towards enterprise metaverse to answer RQ2 and RQ3, respectively.

The present study also offers many theoretical and practical implications. Theoretically, this study contributes to the literature related to the metaverse. Further, this research enriches the literature pertaining to IRT. Further, the study uniquely investigates mediating and moderating effects of distrust and technostress to contribute to the literature. The present research also contributes to the risk literature in the technology adoption domain. Practically, the present study provides direction for organizations about the significant risks involved with enterprise metaverse adoption. Finally, this study will help top leadership of businesses to take a call on whether or not to adopt a disruptive technology such as enterprise metaverse.

2. Literature review and hypotheses development

2.1 Innovation resistance theory (IRT)

Innovation resistance is described as the reluctance of individuals to accept technology, either because it threatens to change the established order or because it clashes with their present convictions (Huang et al., 2021). Innovation resistance theory offers a 360-degree perspective for understanding how different barriers and risks influence individuals not to adopt a disruptive innovation (Ram and Sheth, 1989). Literature suggests that user resistance to new technology may be crucial in determining its success and failure (Kaur et al., 2020). Further, Ram and Sheth (1989) explain initial consumer resistance as a natural response to disruptive technologies as these technologies try to provoke changes in individuals’ lifestyles and status quo. Active and Passive resistance are the two types of consumer resistance (Joachim et al., 2018). Passive resistance causes technology to be rejected before it can be evaluated. Therefore, barriers such as image and tradition play a vital role in framing consumers’ passive resistance intentions. Further, active resistance occurs after the evaluation of the technology. Therefore, risk, usage and value barriers are crucial in framing consumer active resistance intention. Literature also suggests that evaluating negative factors such as risk
before introducing innovations in the market is essential to determine consumers’ behavioural intentions towards the innovation (Migliore et al., 2022). The IRT framework has been successful in examining the resistance or non-adoption intention of consumers in various contexts, such as mobile payments (Kaur et al., 2020; Migliore et al., 2022), fitness applications (Chakraborty et al., 2022), blockchain (Dwivedi et al., 2023), internet of things (Pal et al., 2021), online travel agencies (Talwar et al., 2020), online communities (Kumar et al., 2023b) and bookkeeping applications (Kumari and Kumar, 2023). However, no efforts were made to examine resistance intention towards enterprise metaverse. Therefore, the authors use the IRT framework as an underpinning theory to examine the non-adoption intention of enterprise metaverse using inhibitor variables such as performance risk, social risk, infrastructure risk, technological dependence risk, security risk and psychological risk (see Figure 1).

2.2 Performance risk
Performance risk refers to the potential loss or negative outcome an organization might experience if a product or service fails to meet its expectations (Verma and Tandon, 2022; Wang et al., 2019). Performance risk can affect organizations’ adoption intention and decision-making when considering whether to adopt or not an innovation (Kumari and Kumar, 2023; Yang et al., 2015). Performance risk can arise from various factors, such as uncertainty about the quality or reliability of the product or service, concerns about its usability or compatibility, or doubts about the effectiveness or safety of the product or service (Kumar et al., 2023b). For instance, Yang et al. (2016), in the context of wearable devices, found that performance risk was a significant factor influencing consumers’ decision to adopt wearable devices. They found that users who perceived a higher level of performance risk were less likely to adopt wearable devices. Therefore, the authors highlight the importance of addressing organizations’ performance risk concerns to increase the adoption intention of enterprise metaverse.

H1. Performance risk is significantly associated with non-adoption intention towards enterprise metaverse.

![Proposed framework](source: Authors’ own creation)
2.3 Social risk
Social risk is the potential negative consequences an organization may face regarding social image or reputation if they adopt an innovation (Featherman and Pavlou, 2003). This type of risk is associated with concerns about how others perceive the consumer’s behaviour, choices, or lifestyle and how it might affect their social relationships or status (Naicker and Van Der Merwe, 2018; Verma and Tandon, 2022). Social risk can arise from various factors, such as adopting a new technology that is not yet widely accepted, using a product or service associated with a specific social group or stereotype, or deviating from established social norms or values (Kumar et al., 2023b; Verma and Tandon, 2022). According to Limantara et al. (2018), social risk is positively related to consumers’ resistance towards mobile payment applications. The study found that consumers who perceive a higher level of social risk are less likely to use mobile payment applications. Therefore, the authors argue that social risk can be a significant barrier to organizations’ adoption of enterprise metaverse, and marketers should address organizations’ social concerns and build trust in the metaverse system to enhance their intention to adopt.

H2. Social risk is significantly associated with non-adoption intention towards enterprise metaverse.

2.4 Infrastructure risk
Infrastructure risk refers to the potential negative consequences that an organization may face if the necessary infrastructure for using new technology is inadequate or unavailable (Verma and Tandon, 2022). Infrastructure risk can arise from factors such as insufficient bandwidth, outdated or incompatible devices, limited network coverage, or unreliable power supply (Awan et al., 2020). Infrastructure risk is a crucial factor that can significantly affect organizations’ intention to adopt new technologies (Kapoor et al., 2022). Organizations may perceive a higher level of infrastructure risk if the necessary infrastructure to support a new technology is inadequate or unavailable (Tugtekin, 2023). For instance, Verma and Tandon (2022) reveal that infrastructure risk is a significant barrier to wearable technology adoption. Additionally, Trappey et al. (2017) reported that infrastructure risk, such as the lack of reliable internet connectivity, negatively affects consumers’ adoption intention of disruptive innovations such as the Internet of Things. Therefore, compatible infrastructure can help organizations reduce the perception of infrastructure risk and increase the adoption intention of enterprise metaverse.

H3. Infrastructure risk is significantly associated with non-adoption intention towards enterprise metaverse.

2.5 Technological dependence risk
Technological dependence risk refers to the potential negative consequences that organizations may face if they become too reliant on a particular technology or vendor (Mani and Chouk, 2018). Technological dependence risk can arise from various factors, such as the lack of interoperability, proprietary technology, or exclusive relationships with a particular vendor (Kumar and Shankar, 2023a; Lundin and Paridon, 2022). Grant et al. (1991) highlighted that understanding the effect of technological dependence risk on non-adoption intention is crucial in a society where individuals increasingly depend on mass media-controlled information resources such as the Internet to achieve specific objectives. Further, disruptive technologies such as smart technologies can create utilitarian and hedonic dependence on the technology, which may lead to non-adoption intention (Mani and Chouk, 2017; Pillai et al., 2023). Therefore, providing organizations with more choices and options can reduce their perception of technological dependence risk and increase the likelihood of adoption.
2.6 Security risk
Security risk refers to potential threats or vulnerabilities that new technologies may pose to users’ personal and sensitive information (Kleijnen et al., 2007). Security concerns are among the most significant barriers to technology adoption as organizations become increasingly aware of the risks associated with using new technologies (Mani and Chouk, 2018). If users perceive a high level of security risk associated with new technology, they may be hesitant to adopt it, or they may be more likely to abandon it if they encounter security-related problems (Wang et al., 2019). Therefore, it is crucial for technology providers and marketers to address security risks when promoting new technologies and to provide users with adequate information and tools to protect themselves from potential security threats (Kumar et al., 2023b). Literature also highlights a negative association between security and privacy risks on consumer intention to adopt a technology (Klobas et al., 2019; Naicker and Van Der Merwe, 2018). Therefore, the authors argue the importance of addressing organizations’ security risk concerns to increase the adoption intention of enterprise metaverse.

H5. Security risk is significantly associated with non-adoption intention towards enterprise metaverse.

2.7 Psychological risk
Psychological risk refers to the potential negative impact on individuals’ psychological well-being when they adopt an innovation (Verma and Tandon, 2022). Psychological risk can also be influenced by an organization’s characteristics, such as its level of innovativeness, risk tolerance and ability to cope with uncertainty (Kumar et al., 2023b; Hong et al., 2020). Literature suggests that organizations can increase the likelihood of successful innovation adoption by addressing psychological risk and minimizing the negative impact on psychological well-being (Klerck and Sweeney, 2007; Wiedmann et al., 2011). The authors argue that the effect of psychological risk on non-adoption intention towards enterprise metaverse is significant from an organizational perspective. To increase adoption intention, metaverse creators must establish trust, provide support and communicate the benefits of the technology. By addressing psychological risk, organizations can minimize the negative impact on employee well-being and ensure the successful adoption of the enterprise metaverse technology.

H6. Psychological risk is significantly associated with non-adoption intention towards enterprise metaverse.

2.8 Mediating effect of distrust
Distrust in the context of innovation adoption refers to a lack of faith or confidence in the safety, security, reliability, or efficacy of the technology (Liu et al., 2022). It can arise from various factors, including concerns about privacy, data security, ethical considerations, or fear of negative consequences (Sharma et al., 2020; Prakash and Das, 2022). Distrust can be a significant barrier to adopting new technologies, particularly in cases where the technology involves sensitive data or has potentially severe consequences if it fails or is misused (Cheng and Shen, 2020). Distrust can also result from prior negative experiences with the technology, such as data breaches, system failures, or other problems that can erode users’ confidence in the technology (Prakash and Das, 2022). Addressing these concerns and building trust through transparent communication, robust security measures and user-friendly design can
help to overcome distrust and encourage wider adoption of new technologies (Farooq and Sultana, 2021). Distrust has been identified as a potential mediator between the risks and non-adoption intention (Liu et al., 2022). Several studies have examined the role of distrust as a mediator between different types of risks and behavioural intention (Prakash and Das, 2022; Liu et al., 2022). For example, a study by Arora and Sahney (2019) found that distrust mediated the relationship between online risk perception and intention towards showrooming. The authors argue that distrust will mediate the association between risks and the non-adoption intention of the enterprise metaverse, as it reflects the scepticism and lack of confidence in the technology, hindering its acceptance and implementation within organizations. Therefore, we propose the following hypotheses:

H7. Distrust significantly mediates the association between (a) performance risk, (b) social risk, (c) infrastructure risk, (d) technological dependence risk, (e) security risk, (f) psychological risk and non-adoption intention towards enterprise metaverse.

2.9 Moderating effect of technostress

Technostress is a type of stress that is associated with the use of new technological innovations (Kumari and Kumar, 2023). With the increasing pace of technological innovation, individuals are being exposed to new technologies at an unprecedented rate (Mushtaque et al., 2022). While this can bring many benefits, it can also lead to various negative psychological responses (Mäntymäki et al., 2022). One key factor contributing to technostress is the pressure to keep up with the latest innovations (Hwang et al., 2022). This pressure can come from various sources, including social norms, workplace expectations and personal aspirations (Ozgür, 2020). Individuals may feel that they need to constantly update their skills and knowledge to remain competitive, which can be stressful and overwhelming (Sharma and Gupta, 2023).

Another factor contributing to technostress is the complexity of new technologies (Kumari and Kumar, 2023). Many innovations are highly complex and require significant effort to learn and master (Pullins et al., 2020). This can lead to frustration and anxiety as individuals struggle to keep up with the demands of these new technologies. Literature also suggests that the moderating effect of technostress was extensively examined (Hang et al., 2022; Lee and Kim, 2019). Therefore, the authors suggest that individuals who experience high levels of technostress are more likely to develop non-adoption intentions towards the enterprise metaverse.

H8. The mediating effect of distrust on the association among (a) performance risk, (b) social risk, (c) infrastructure risk, (d) technological dependence risk, (e) security risk, (f) psychological risk and non-adoption intention towards the enterprise metaverse is higher for individuals having high technostress compared to individuals having low technostress.

3. Research method

3.1 Measures development

The questionnaire was developed using items obtained from previous literature, however, we ensure that the items suit the context of the study. Specifically, the variables and the sources of items used to measure them were: performance risk (three items) and security risk (three items) from Wang et al. (2019), social risk (three items), infrastructure risk (three items) and psychological risk (three items) from Verma and Tandon (2022), technological dependence risk (three items) from Mani and Chouk (2018), distrust (four items) from Arora and Sahney (2019) and Cheng and Shen (2020), technostress (three items) from Kumari and Kumar (2023),...
3.2 Sampling and questionnaire administration
An online structured survey was created on Qualtrics (See Appendix). We have approached a market research agency for the list of production and operation managers with their email details. The sample units belonged to manufacturing firms. Further, we have used systematic random sampling for approaching every 5th manager through email from the list received. To ensure that the sample was relevant to our study, a screening question was asked: “Are you aware of enterprise metaverse?”, “Are you currently familiar with or actively engaged in any virtual reality, augmented reality, mixed reality, or metaverse experiences or applications within the context of business environments?”. Only respondents who answered “yes” to the screening question were permitted to proceed with the rest of the survey. The questionnaire was sent to 500 respondents, and 294 responses were received. Further, we discarded 18 incomplete responses. Therefore, we discarded those responses and were left with 276 (38.04% female) for further analysis.

4. Results
4.1 Reliability and validity of the measurement model
We conducted a confirmatory factor analysis (CFA) for all the considered variables, resulting in a satisfactory model fit ($\chi^2$/df = 2.51, Tucker–Lewis Index = 0.95, comparative fit index = 0.95, goodness-of-fit index = 0.98 and the root-mean-square error of approximation = 0.05). All items showed sufficient reliability, such as composite reliability (CR) values greater than the standard threshold of 0.70 (Hair et al., 2014). Convergent validity was demonstrated by all items with mean extraction (AVE) values greater than the recommended threshold of 0.50. Furthermore, the discriminatory validity of each construct was maintained, as all individual construct correlation values were less than 0.8 with other constructs (Fornell and Larcker, 1981). Notably, the correlation values between the constructs are less than the square root of the AVE values for each construct, demonstrating discriminant validity (see Tables 1 and 2). The study calculated variance inflation factors (VIF) to check for multicollinearity. The VIF values ranged from 2.24 to 4.18, which were less than 5, implying that all variables included in the research were devoid of any multicollinearity concerns (Hair et al., 2010).

4.2 Common method bias (CMB)
We used various methods to check common method bias. One of the methods included items assessing a marker variable conceptually unrelated to other variables in the survey (Roberts and David, 2020). The marker variable had a poor correlation with the other constructs in the research, but the correlation matrix between the marker and the other variables was statistically significant after controlling for CMB. Consequently, CMB cannot explain the outcomes (Shankar and Jain, 2021). Further, Harman’s one-factor test (HFT) was used to assess the presence of common method bias. The findings of HFT revealed that one-factor
items explained less than the recommended threshold value of 50% of the variation, i.e. 28.67%. This indicates that the study shows no risk of CMB.

4.3 Hypothesis testing
The structural equation model using AMOS 25 was conducted to evaluate the relationship proposed in the research framework. The result of path analysis (see Table 3) indicates that performance risk, security risk and psychological risk are significantly associated with non-adoption intention towards enterprise metaverse. Therefore, H1, H5 and H6 are supported. However, the association among social risk, infrastructure risk, technological dependence risk and non-adoption intention towards enterprise metaverse are not significant. Therefore, H2, H3 and H4 were not supported. The $R^2$ value for the distrust and non-adoption intention towards the enterprise metaverse are 0.447 and 0.648, respectively, indicating that the
predictor variables adequately explain the proposed conceptual model. The goodness-of-fit indices indicate that the model fit is acceptable (CMIN/DF = 2.581 (p < 0.001), CFI = 0.96, GFI = 0.95, TLI = 0.95, RMSEA = 0.06) (Hair et al., 2010).

4.4 The mediation effects
We used Model 4 in Process Macro (Hayes, 2013) to examine the mediation effects of distrust on non-adoption intention. The outcome of mediation effects is shown in Table 4, which indicates that distrust significantly mediates the association between performance risk, social risk, technological dependence risk, security risk, psychological risk and non-adoption intention towards enterprise metaverse. Therefore, H7a, H7b, H7d, H7e, H7f are supported. However, distrust does not mediate the association between infrastructure risk and non-adoption intention towards the enterprise metaverse. Hence H7c is not supported.

4.5 Moderated mediation
The conditional indirect effect of different risks on non-adoption intention towards enterprise metaverse via distrust at high and low levels of technostress was investigated using Model 7 in Process Macro (Hayes, 2013). The results of moderated-mediation hypotheses (see Table 5) indicate that the mediating effect of distrust on the association among performance risk, social risk, psychological risk and non-adoption intention towards enterprise metaverse is higher for individuals having high technostress compared to individuals having low
Therefore, $H_8a$, $H_8b$ and $H_8f$ are supported. Whereas technostress does not significantly moderate the mediating effect of distrust on the association between infrastructure risk, technological dependence risk, security risk and non-adoption intention towards enterprise metaverse. Hence, $H_8c$, $H_8d$ and $H_8e$ are not supported (see Table 6).

### Table 4. Mediation analysis

<table>
<thead>
<tr>
<th>Hypotheses</th>
<th>Path</th>
<th>Estimate</th>
<th>SE</th>
<th>LLCI</th>
<th>ULCI</th>
</tr>
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<tbody>
<tr>
<td>Performance risk $\rightarrow$ DT $\rightarrow$ NAI</td>
<td>Indirect</td>
<td>0.177</td>
<td>0.038</td>
<td>0.105</td>
<td>0.252</td>
</tr>
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<td>Social risk $\rightarrow$ DT $\rightarrow$ NAI</td>
<td>Direct</td>
<td>0.457</td>
<td>0.052</td>
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<td>0.559</td>
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<tr>
<td>Infrastructure risk $\rightarrow$ DT $\rightarrow$ NAI</td>
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<td>0.072</td>
<td>−0.150</td>
<td>0.130</td>
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<tr>
<td>Technological dependence risk $\rightarrow$ DT $\rightarrow$ NAI</td>
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<td>0.172</td>
<td>0.072</td>
<td>0.031</td>
<td>0.313</td>
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<tr>
<td>Security risk $\rightarrow$ DT $\rightarrow$ NAI</td>
<td>Indirect</td>
<td>0.281</td>
<td>0.064</td>
<td>0.158</td>
<td>0.404</td>
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<tr>
<td>Psychological risk $\rightarrow$ DT $\rightarrow$ NAI</td>
<td>Indirect</td>
<td>0.242</td>
<td>0.047</td>
<td>0.152</td>
<td>0.331</td>
</tr>
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</table>

**Note(s):** DT = distrust and NAI: non-adoption intention

**Source(s):** Authors' own creation

### Table 5. Moderated-mediation analysis (technostress)

<table>
<thead>
<tr>
<th>Paths</th>
<th>Effect</th>
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<th>ULCI</th>
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<tr>
<td>Performance risk $\rightarrow$ DT $\rightarrow$ NAI</td>
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<td>0.0787</td>
<td>0.0381</td>
<td>0.0125</td>
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<td></td>
<td>High</td>
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<td>0.0389</td>
<td>0.1237</td>
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<td>Social risk $\rightarrow$ DT $\rightarrow$ NAI</td>
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<td>0.1121</td>
<td>0.0692</td>
<td>−0.0003</td>
</tr>
<tr>
<td></td>
<td>High</td>
<td>0.2483</td>
<td>0.0546</td>
<td>0.1492</td>
</tr>
<tr>
<td>Infrastructure risk $\rightarrow$ DT $\rightarrow$ NAI</td>
<td>Low</td>
<td>−0.0335</td>
<td>0.0642</td>
<td>−0.1516</td>
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<tr>
<td></td>
<td>High</td>
<td>−0.0471</td>
<td>0.0800</td>
<td>−0.2072</td>
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<td>Technological dependence risk $\rightarrow$ DT $\rightarrow$ NAI</td>
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**Note(s):** DT: distrust, NAI: non-adoption intention towards enterprise metaverse

**Source(s):** Authors' own creation

### Table 6. Effects of distrust on different levels of technostress

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<tr>
<td></td>
<td>High</td>
<td>−0.0471</td>
<td>0.0800</td>
<td>−0.2072</td>
</tr>
<tr>
<td>Technological dependence risk $\rightarrow$ DT $\rightarrow$ NAI</td>
<td>Low</td>
<td>0.0944</td>
<td>0.0720</td>
<td>−0.0262</td>
</tr>
<tr>
<td></td>
<td>High</td>
<td>0.2030</td>
<td>0.0622</td>
<td>0.0844</td>
</tr>
<tr>
<td>Security risk $\rightarrow$ DT $\rightarrow$ NAI</td>
<td>Low</td>
<td>0.0436</td>
<td>0.0293</td>
<td>−0.0198</td>
</tr>
<tr>
<td></td>
<td>High</td>
<td>0.2436</td>
<td>0.0575</td>
<td>0.1416</td>
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<td>Psychological risk $\rightarrow$ DT $\rightarrow$ NAI</td>
<td>Low</td>
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<td>0.0527</td>
<td>0.0107</td>
</tr>
<tr>
<td></td>
<td>High</td>
<td>0.2599</td>
<td>0.0454</td>
<td>0.1733</td>
</tr>
</tbody>
</table>

**Note(s):** DT: distrust, NAI: non-adoption intention towards enterprise metaverse

**Source(s):** Authors' own creation
5. Discussion
The study uses the moderated-mediation framework to investigate the effects of performance, social, infrastructure, technological dependence, security and psychological risks on non-adoption intention towards the enterprise metaverse. Results indicate that organizations tend to resist adopting enterprise metaverse if they perceive performance risk as a potential barrier, which is consistent with the previous study’s findings (Verma and Tandon, 2022; Wang et al., 2019). One of the probable reasons could be the significant investment of time, money and resources required for enterprise metaverse implementation. Further, suppose the platform does not provide a clear return on investment in terms of better efficiency in processes. In that case, it can be challenging to justify the cost of implementing the technology. Further, it is difficult to measure the performance of the enterprise metaverse before implementation, making it difficult for organizations to make an adoption decision.

Further, consistent with previous literature in other contexts (Klobas et al., 2019; Naicker and Van Der Merwe, 2018; Verma and Tandon, 2022), the results indicate that security and psychological risks are significantly associated with adoption intention. With so many users interacting in a virtual environment, monitoring and controlling access to sensitive information can be challenging. Hackers and cybercriminals can use this platform to exploit vulnerabilities and gain access to sensitive data, putting the company’s reputation, assets and intellectual property at risk (Chen et al., 2022). Also, the immersive nature of the enterprise metaverse can cause employees to experience psychological distress, such as anxiety, confusion and fatigue (Issa et al., 2022). These negative feelings can reduce productivity and increase employee turnover, resulting in a significant loss for the company.

However, contrary to previous findings in other contexts, social, infrastructure and technological dependence risks were not significantly associated with behavioural intentions (Kapoor et al., 2022; Mani and Chouk, 2018; Verma and Tandon, 2022). There was no significant effect of social risk in an organizational setting because the interactions among employees tend to be more formal, and social risks such as inappropriate behaviour, harassment and unprofessional conduct have declined because of the implementation of strict human resource policies. Further, the infrastructure risks are negligible because the enterprise metaverse is built on a robust and scalable cloud-based architecture, ensuring high availability and minimal downtime (Gadekallu et al., 2022). Technological dependence risk was not significant as the present metaverse system is compatible with various devices, which mitigates the technological dependence barrier (Ning et al., 2023).

Our results find some support from prior studies in other contexts (Liu et al., 2022; Prakash and Das, 2022), which reveals that distrust mediates the association between risks and behavioural intentions. One probable reason for this could be attributed to the newness of the metaverse technology that lacks clear standards and regulations. Therefore, organizations are hesitant to trust the technology despite its benefits. Similarly, consistent with prior literature (Hang et al., 2022; Lee and Kim, 2019), the moderating effect of technostress was found to be significant. Thereby, the mediating effect of distrust on the association among performance risk, social risk, psychological risk and non-adoption intention towards enterprise metaverse is higher for individuals with high technostress compared to those with low technostress. One probable reason could be attributed to the changes in workflows and business processes that come with implementing the enterprise metaverse, which could be stressful for employees.

6. Implications
6.1 Theoretical implications
This study offers several theoretical implications to researchers. The present study is the first study which attempts to examine various risks associated with the adoption of enterprise
metaverse. The findings of this study enrich the existing literature on IRT by providing empirical evidence that supports the framework. IRT proposes that consumers resist adopting innovations due to cognitive, emotional and social factors (Ram and Sheth, 1989). The literature highlights various barriers that influence adoption intention, such as usage, value, social recognition, performance, information overload, tradition, compatibility and complexity barriers (Kumari and Kumar, 2023; Kumar et al., 2023b). However, the findings of this study show that performance, social, infrastructure, technological dependence, security and psychological risks are significant cognitive factors that impede the adoption of the enterprise metaverse. Further, previous researchers focused on exploring the dark side of technologies, such as mobile human resources management applications (Shankar and Nigam, 2022), mobile health (Guo et al., 2013), mobile payment (Behera et al., 2022), mobile applications (Gu and Kannan, 2021) and customer relationship management systems (Frow et al., 2011). However, as per the authors’ knowledge, no study investigated the significant risks associated with enterprise metaverse adoption. The findings of this study will enlighten organizations about the potential risks associated with enterprise metaverse. Also, the present study contributes to the emerging literature on technology adoption. This study also examines the mediating and moderating effects of innovative contextual variables to provide a comprehensive understanding of behavioural intentions towards the enterprise metaverse. This study contributes to the distrust literature by examining the mediating effect of distrust on the association between risks and non-adoption intention. The results of this research are consistent with the prior literature on distrust as customers face resistance to innovation due to distrust in the technology (Prakash and Das, 2022; Arora and Sahney, 2019). Finally, this study contributes to the technostress literature by investigating the moderating effect of technostress in the B2B context. This study also has social contributions. The UN Sustainable Goal 9 (SDG -9) discusses industry innovation and infrastructure. To achieve the above-mentioned goal, metaverse technology could be a game-changer. Hence, organizations have started using metaverse to connect with consumers. As the future of the metaverse from different stakeholders’ responses is still unclear, it is crucial to investigate organisations’ (one of the crucial stakeholders) responses to metaverse technology. Therefore, this study will contribute to the limited knowledge about metaverse in the information system literature.

6.2 Practical implications
The present research also offers several managerial implications. The findings of this study will help managers and organizational leadership understand the risks associated with enterprise metaverse adoption. Further, this research will be very insightful to small and medium-sized enterprises with limited resources to invest in technologies that can make their processes efficient. The findings of this study reveal performance, security and psychological risks to be the significant barriers to enterprise metaverse adoption. To reduce the influence of performance risk, organizations should first conduct extensive performance testing to identify and address any potential bottlenecks, issues with scalability, or other performance risks before implementing enterprise metaverse throughout the organization. Testing should cover different scenarios, such as peak loads, network latency and user activities. Organizations should continuously monitor the metaverse’s performance and conduct regular maintenance to identify and address any issues that may arise (Teng et al., 2022). Further, to reduce security issues, organizations should implement strong access controls to ensure that only authorized users have access to the enterprise metaverse and its data. Moreover, organizations should use robust authentication methods, such as multi-factor authentication, to prevent unauthorized access and ensure that only authorized users can log in to the enterprise metaverse (Di Pietro and Cresci, 2021).
Finally, to tackle psychological risks, organizations should communicate openly and transparently with employees about the enterprise metaverse’s benefits. It is crucial to address employees’ concerns and explain how the metaverse can improve collaboration and productivity (Carter, 2022). Organizations should foster a sense of community within the metaverse environment to reduce feelings of isolation or disconnection (Oh et al., 2023). This includes creating virtual spaces for employees to socialize and collaborate, promoting virtual team-building activities and encouraging employees to use the enterprise metaverse for informal communication. The study results also reveal distrust and technostress as significant mediators and moderators, respectively. Therefore, metaverse platforms should provide an easy-to-use interface with full data transparency to gain users’ trust.

7. Limitations and future research directions
Despite the implications provided by the present study, this research suffers from a few limitations. This study uses cross-sectional data. However, future researchers could use longitudinal data to examine the proposed framework of pre-adoption and post-adoption of the enterprise metaverse. Further, the present study only examines risks associated with enterprise metaverse; however, identifying benefits and risks simultaneously could yield a better understanding of the adoption phenomenon. Therefore, theoretical frameworks such as behavioural reasoning theory, value-based adoption model and dual-factor model could be used by future researchers to understand the phenomenon better. Finally, the adoption intention of innovation in the B2B context may also differ based on the firm size (Ebrahimi et al., 2018). Therefore, future researchers could use firm size as a potential moderator to understand behavioural intention towards the enterprise metaverse.

References


## About the authors

Mr Aman Kumar is a doctoral candidate in the Department of Marketing at the Indian Institute of Management Visakhapatnam, India. His research interests include metaverse, technology in marketing, innovation resistance and online communities. Aman’s research has been published in the *International Journal of Hospitality Management, Technological Forecasting & Social Change, Journal of Consumer Behaviour, Australasian Marketing Journal, Journal of Global Marketing, Information Systems and e-Business Management* and *VINE Journal of Information and Knowledge Management Systems*.

### Variables and scale items

<table>
<thead>
<tr>
<th><strong>Performance risk</strong> (Wang <em>et al.</em>, 2019)</th>
</tr>
</thead>
<tbody>
<tr>
<td>PER1: the performance of enterprise metaverse may fall short of its expected level</td>
</tr>
<tr>
<td>PER2: enterprise metaverse may not deliver me the expected advantages</td>
</tr>
<tr>
<td>PER3: enterprise metaverse may not perform well and cause problems</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Social risk</strong> (Verma and Tandon, 2022)</th>
</tr>
</thead>
<tbody>
<tr>
<td>SOR1: If I use enterprise metaverse, then it will negatively affect the way others think of me</td>
</tr>
<tr>
<td>SOR2: my signing up for and using enterprise metaverse would lead to a social loss for me because my peers would think less highly of me</td>
</tr>
<tr>
<td>SOR3: my signing up for and using enterprise metaverse would lead to a social loss for me because my competitors would think less highly of me</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Infrastructure risk</strong> (Verma and Tandon, 2022)</th>
</tr>
</thead>
<tbody>
<tr>
<td>IFR1: poor ICT infrastructure hinders me to use enterprise metaverse</td>
</tr>
<tr>
<td>IFR2: poor hardware quality makes enterprise metaverse difficult to operate</td>
</tr>
<tr>
<td>IFR3: lack of cutting-edge technologies, such as virtual reality (VR), augmented reality (AR), and blockchain hinders me to use enterprise metaverse</td>
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<table>
<thead>
<tr>
<th><strong>Technological dependence risk</strong> (Mani and Chouk, 2018)</th>
</tr>
</thead>
<tbody>
<tr>
<td>TDR1: I’m afraid of becoming dependent on the enterprise metaverse</td>
</tr>
<tr>
<td>TDR2: enterprise metaverse will reduce my autonomy</td>
</tr>
<tr>
<td>TDR3: I think my social life will suffer from my use of enterprise metaverse</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Security risk</strong> (Wang <em>et al.</em>, 2019)</th>
</tr>
</thead>
<tbody>
<tr>
<td>SR1: enterprise metaverse would be insecure</td>
</tr>
<tr>
<td>SR2: enterprise metaverse would be unsafe</td>
</tr>
<tr>
<td>SR3: enterprise metaverse would put me at potential risk</td>
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</table>

<table>
<thead>
<tr>
<th><strong>Psychological risk</strong> (Verma and Tandon, 2022)</th>
</tr>
</thead>
<tbody>
<tr>
<td>PR1: enterprise metaverse creates a psychological diversion from other tasks</td>
</tr>
<tr>
<td>PR2: I find difficulty in understanding/inferencing the data derived from enterprise metaverse as a whole</td>
</tr>
<tr>
<td>PR3: I think that enterprise metaverse will make me dependent on them</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Distrust</strong> (Arora and Sahney, 2019; Cheng and Shen, 2020)</th>
</tr>
</thead>
<tbody>
<tr>
<td>DT1: I am afraid of using enterprise metaverse</td>
</tr>
<tr>
<td>DT2: I feel that enterprise metaverse will exploit my vulnerability</td>
</tr>
<tr>
<td>DT3: I do not trust enterprise metaverse</td>
</tr>
<tr>
<td>DT4: I feel that the way enterprise metaverse functions is irresponsible and unreliable</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Technostress</strong> (Kumari and Kumar, 2023)</th>
</tr>
</thead>
<tbody>
<tr>
<td>TS1: I feel that I am forced to change habits in adapting to enterprise metaverse</td>
</tr>
<tr>
<td>TS2: I feel threatened to use enterprise metaverse</td>
</tr>
<tr>
<td>TS3: learning how to operate enterprise metaverse makes me feel stressed</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Non-adoption intention towards enterprise metaverse</strong> (Cham <em>et al.</em>, 2022)</th>
</tr>
</thead>
<tbody>
<tr>
<td>NAI1: I do not have intention to use enterprise metaverse in the future</td>
</tr>
<tr>
<td>NAI2: I would not recommend others to use enterprise metaverse</td>
</tr>
<tr>
<td>NAI3: I will not use enterprise metaverse in the future</td>
</tr>
</tbody>
</table>

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**Table A1.**

Survey questions

Dr Aqueeb Sohail Shaik is Assistant Professor of Strategy, Entrepreneurship and General Management at Jindal Global Business School, OP Jindal University, India. He holds Ph.D. in Strategic Management Specialization from the Department of Management Studies, Indian Institute of Technology Delhi (IITD), India, and Master of Technology (M.Tech.) in Engineering Management from Manipal Institute of Technology. He has published various research papers in leading international journals which include empirical and literature review papers. His research papers were presented and published as conference proceedings at some prestigious academic conferences such as British Academy of Management (BAM), Academy for Global Business Advancements (AGBA) and International Association for Management of Technology (IAMOT). His Research interests include strategic management, strategic thinking, strategic planning, organisational development, systems thinking, innovation, entrepreneurship, business development, system dynamics and structural equation modelling.

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