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Simulating Success: Developing Resilience as a Critical Skill in Digital Business

María Escrivá-Beltrán[1], **Rosa Currás-Móstoles**[2], **Dolores Botella-Carrubi**[2,*]

[1]Universitat de València, Valencia, Spain.
[2]Universitat Politècnica de València, Valencia, Spain.

***Corresponding author:** Dolores Botella-Carrubi.
Email: dbotella@omp.upv.es

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ABSTRACT

In today's fast-evolving digital economy, organizations face constant technological disruptions, demanding not only technical proficiency but also strong human-centric soft skills to remain competitive. Among these, resilience has emerged as a vital skill enabling individuals to adapt to uncertainty, recover from setbacks, and drive sustainable growth. This study explores the effectiveness of simulation-based learning as a strategic approach to foster resilience in future professionals navigating digital business environments. Using a quantitative design, the research employed the ten-item Connor–Davidson Resilience Scale (CD-RISC 10) to measure resilience levels before and after participants engaged in an intensive Model United Nations (MUN) simulation. The activity placed participants in high-stress, dynamic, and collaborative international scenarios designed to replicate real-world business complexities. Results from pre- and post-simulation assessments show a statistically significant improvement in resilience levels, demonstrating the training potential of immersive simulations. The findings underscore the transformative impact of experiential learning on personal adaptability and stress management, key attributes in digitally driven professional contexts. From a theoretical standpoint, the study contributes to the growing body of literature positioning resilience as a trainable and essential soft skill. Practically, it provides actionable insights for organizational leaders, advocating for the integration of simulation-based programs into corporate training strategies to prepare talent for digital-era challenges. This research not only validates simulation as a tool for resilience development but also highlights its broader implications for workforce readiness, talent retention, and organizational agility in a volatile and digitized business landscape.

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1. Introduction

The contemporary digital business landscape is characterized by rapid technological advancements, heightened market volatility, and ever-changing consumer demands (Isac et al., 2024; Maalouf et al., 2024). Organizations operating in this environment must navigate a complex web of uncertainties, disruptions, and evolving digital ecosystems (Xie et al., 2022). Success in such a dynamic context is no longer solely determined by financial capital or technological capabilities; rather, it hinges on the ability of individuals and teams to adapt, innovate, and respond effectively to challenges (Heinz et al., 2021). This digital transformation necessitates the development of a workforce equipped with essential competencies that extend beyond technical expertise, including the ability to manage stress, embrace change, and recover from setbacks (Khurana et al., 2022; Konopik et al., 2021).

Among the essential competencies required in digital business environments, soft skills have gained increasing recognition as key determinants of organizational resilience and individual professional success (Schislyaeva & Saychenko, 2022). While technical proficiency remains a fundamental requirement, organizations are placing greater emphasis on human-centric skills that foster adaptability, problem-solving, and collaboration (Kasim et al., 2024). Among these, resilience has emerged as a particularly crucial trait. Resilience enables individuals and teams to withstand the pressures of uncertainty, persist in the face of adversity, and transform challenges into opportunities (Hartwig et al., 2020; Windle, 2011). In a business climate characterized by constant technological shifts, regulatory changes, and competitive pressures, resilience acts as a vital enabler of long-term sustainability and growth (Al Omoush et al., 2023; Napier et al., 2024).

Resilience plays a pivotal role in digital business success. Companies that cultivate resilience within their workforce are better positioned to navigate market disruptions, recover from operational setbacks, and maintain a competitive edge (Mossberger et al., 2023). Employees with high levels of resilience demonstrate greater emotional regulation, improved stress management, and enhanced problem-solving capabilities (Gong et al., 2023). Moreover, resilient organizations are more likely to foster cultures of innovation, adaptability, and continuous learning, which are crucial for thriving in digital markets (Talukder, 2023). Research indicates that businesses investing in resilience-building strategies experience lower employee turnover, higher engagement, and increased performance in volatile market conditions (Awad & Martín-Rojas, 2024).

Despite the growing recognition of resilience as a critical competency in digital business, there remains a significant research gap in understanding how resilience can be effectively developed and measured (Stepnov, 2021). While existing studies highlight the importance of resilience, limited research has been conducted on practical methodologies for fostering resilience in business professionals (Faisal et al., 2023). This study seeks to bridge this gap by exploring the role of simulation-based learning as a tool for enhancing resilience in digital business environments (Johansson et al., 2018; Kancs, 2024; Yates et al., 2021). The primary objective of this research is to evaluate the effectiveness of simulation exercises in cultivating resilience, equipping individuals with the skills needed to manage uncertainty and thrive in high-pressure professional settings (Apasrawirote & Yawised, 2024; Carter 2024; Wang & Wang, 2012). The findings contribute valuable insights into resilience development, offering practical recommendations for business leaders, educators, and policymakers aiming to strengthen workforce resilience (Connor & Davidson, 2003; Kancs, 2024).

To achieve these objectives, the study employs a quantitative research approach, using the Connor–Davidson Resilience Scale to assess resilience levels before and after participation in simulation exercises (Connor & Davidson, 2003). The results provide empirical evidence on the impact of immersive learning experiences in fostering resilience, thereby supporting the integration of simulation-based training into business education and corporate development programs (He et al., 2022; Schijven & Kikkawa, 2023; Vlachopoulos & Makri, 2017). Key conclusions highlight the effectiveness of experiential learning in preparing professionals for the complexities of digital business, reinforcing the need for organizations to prioritize resilience training as part of their talent development strategies (Huang et al., 2022; Walker et al., 2019).

This paper is structured as follows: The next section provides a theoretical framework that explores the role of soft skills in digital business and examines resilience as a critical competency. Following this, the study delves into the methodology employed to assess the impact of simulation-based learning on resilience development. The results section presents empirical findings derived from the study, followed by a discussion of their implications for business practice and workforce development. Finally, the conclusion summarizes key takeaways and offers recommendations for future research and practical applications in the field of digital business resilience.

2. Theoretical Framework

2.1 The Role of Skills in Digital Business

In today's context, marked by the increasing digitalization of the economy and the transformation of business models, the acquisition of competencies and skills emerges as a fundamental element for success in digital businesses (Kinkel, 2023). This environment, characterized by its dynamism, high uncertainty, and technological dependence, requires individuals and organizations alike to develop capabilities that enable them to adapt swiftly to changes, manage challenges effectively, and seize the opportunities presented by emerging technologies (Isac et al., 2024).

Research on digital transformation has highlighted that the most successful companies in this space are those that prioritize training in strategic areas and foster an organizational culture centered on learning (An et al., 2024). In this regard, technical skills such as advanced management of digital tools, Big Data analytics, software development, and the implementation of artificial intelligence (AI) solutions are essential for operating in complex technological environments and harnessing their potential (Zagar et al., 2024). However, these competencies must be complemented by equally critical interpersonal skills, such as adaptability, critical thinking, and problem-solving in high-uncertainty scenarios (Schislyaeva & Saychenko, 2022). These soft skills not only strengthen teams' ability to innovate but also promote a collaborative environment that fosters creativity and enhances responsiveness to challenges (Kasim et al., 2024).

In this context, resilience stands out as one of the most valuable skills in digital businesses (Heinz et al., 2021). Given that technological transformation is an ongoing and often disruptive process, the ability of individuals and organizations to recover quickly from setbacks, manage the stress associated with rapid changes, and maintain focus on strategic goals becomes a competitive differentiator. Resilience goes beyond mere resistance to change; it encompasses the ability to learn from failures, adapt to new circumstances, and transform obstacles into growth opportunities (Al Omoush et al., 2023). Leading companies in the digital domain, such as Amazon, have demonstrated the importance of this competency. Their ability to overcome crises and adapt to sudden shifts in market dynamics—such as those seen during the coronavirus disease 2019 (COVID-19) pandemic—was crucial in maintaining their leadership in e-commerce and logistics (Mossberger et al., 2023; Xie et al., 2022).

The impact of skills, including resilience, in digital businesses extends beyond individual productivity (Khurana et al., 2022; Palvalin et al., 2017). The right competencies enable the automation of processes, optimization of resource management, and analysis of large datasets to inform strategic decisions (Talukder, 2023). Additionally, these capabilities strengthen corporate competitiveness by allowing organizations to respond swiftly to consumer demands and anticipate market movements. This connection between skills and performance is also evident in a company's capacity to innovate (Akib et al., 2022; Wu & Zhong, 2009). With resilient and well-trained teams, organizations can develop disruptive products and services that not only address current needs but also open new business opportunities (Conz et al., 2023).

The importance of these skills is theoretically supported by the concept of the knowledge economy, which asserts that human capital has become the primary driver of value generation in contemporary societies. From this perspective, an organization's ability to manage the knowledge and

skills of its teams will determine its competitive advantage (Aman-Ullah et al., 2022; Kianto et al., 2017). As Peter Drucker pointed out, in an environment where change is constant, companies that fail to invest in human talent will fall behind those that view their employees not as mere resources but as strategic assets (Drucker, 2006).

In digital businesses, continuous learning is another key aspect. The rapid pace at which new technologies and tools emerge creates constant pressure to update knowledge and acquire new skills (Ruel et al., 2021, Sadeghi et al., 2024).

Concepts such as "reskilling" (retraining) and "upskilling" (enhancing skills) have become central to corporate strategies (Bennett & McWhorter, 2021). Organizations that embrace this continuous learning approach not only strengthen their competitiveness but also foster a workplace environment where employees feel valued and motivated. This has a positive impact on talent retention and on the company's ability to adapt to new demands (Kundu & Gaba, 2023).

Thus, the acquisition of competencies and skills, with a special emphasis on resilience, is not merely important but absolutely essential for success in digital businesses. Scientific and empirical evidence supports the notion that organizations prioritizing human talent development are more innovative, competitive, and resilient to the challenges posed by the digital economy. Investing in training and strengthening competencies is not a cost, but a strategy that ensures sustainability, adaptability, and growth in a world where technology continuously redefines the rules of the game. Resilience positions itself as the bridge between uncertainty and success, serving as the cornerstone that allows companies not only to survive but also to thrive in the digital age.

2.2 The Importance of Resilience in Digital Business

The nature of digital businesses often requires navigating dynamic and unpredictable environments characterized by rapid technological advancements, uncertainty, and constant change (Stepnov, 2021). Thus, individuals must cultivate skills and capabilities to adapt swiftly, manage transitions effectively, and capitalize on opportunities presented by emerging technologies (Isac et al., 2024). Among these skills, resilience stands out as a critical enabler, as it empowers individuals to navigate and thrive in the face of such challenges.

The concept of resilience has received attention in scientific literature in both theoretical and practical terms. The first studies date back to the mid-twentieth century, with roots in multiple disciplines, such as ecology, psychology, engineering and, later, organizational studies.

Today, resilience is a versatile and valuable concept that is being widely studied, making it challenging to define owing to its multidisciplinary nature, the evolution of its applications, and the contextual variability that embraces it. Its application varies according to the discipline in which it is framed, albeit with the common background of features such as recovery, adaptation, or transformation. Recently, the literature has taken up a more functional view that conceives resilience on the basis of three different aspects: ***resilience of what***, ***resilience to what***, and ***resilience for what*** (Carpenter et al., 2001; Folke, 2016; Sadeghi, 2024; Sakurai & Chughtai, 2020). ***Resilience of what*** refers to the identity of the resilient entity, such as organizations or communities. However, ***resilience to what*** refers to the source of shocks, such as short-term stressors, including earthquakes and floods, or long-term transformations. Finally, ***resilience for what*** focuses more on the objectives to be achieved, such as achieving efficiency and robustness, improving adaptability and flexibility (Folke et al., 2010; Sadeghi et al., 2024), or managing the sustainability of an entity (Lee et al., 2024).

In the individual-oriented area of psychology, resilience is understood as a process by which individuals mobilize personal and contextual resources to overcome challenges over time (Mansfield, 2021). Other definitions conceive it as a person's ability to adapt successfully to life tasks and development in the face of very adverse conditions or social disadvantage (Windle, 2011), but also as the process or outcome of successful adaptation to threatening or challenging circumstances (Howard and Johnson, 2004; Sadeghi, 2024). Highly resilient individuals are better equipped to work in constantly changing environments (Bachtiar et al., 2022; Fogoros et al., 2022; Shin et al., 2012) and perceive the work environment as a learning opportunity rather than a threat (Mesidor & Sly, 2016; Plekhanov, 2022). These individuals tend to have a more positive cognitive style regarding reality and the future, have higher self-esteem, are more inclined to use coping strategies, and more effectively use various resources to overcome difficulties, reduce psychological distress, and improve adaptive capacity (Gong et al., 2023). Thus, psychological resilience directly contributes to maintaining good mental health.

Within the digital business context, resilience has evolved into a collective construct that encompasses different key dimensions to face challenges and adapt to constant changes in a highly dynamic environment.

In any case, resilience, defined as an acquired and dynamic capacity that develops in the face of adverse situations (Rutter, 2012), should be strategically cultivated and worked on during training periods. In this sense, higher education institutions, as centers of knowledge and trainers of future professionals, play a key role in its development. The current labor environment requires human capital capable of adapting to the organizational, technological, economic, and competitive needs of the future (Menéndez Blanco & Montes Botella, 2016; Fogoros, 2022; Plekhanov, 2022). Therefore, the development of resilience should be integrated within the set of soft skills that prospective workers should acquire, complementing their technical knowledge and enabling them to successfully face the challenges in academic, professional, and personal environments of an increasingly dynamic and globalized world.

Developing resilience requires a combination of personal and contextual resources, alongside the implementation of appropriate strategies (Mansfield, 2021). These strategies can be applied through carefully designed activities that teach individuals in different stages of their professional career to "bounce back" in challenging environments while simultaneously strengthening the resilience component of psychological capital (Bachtiar et al., 2022; Bardoel et al., 2014). Ideally, these activities should occur in environments that encourage intra- and inter-organizational relationships and promote diversity management (Fogoros, 2022; Legnick-Hall et al., 2011).

There is a significant lack of research examining resilience's importance for professional performance, and more specifically within the digital business landscape. This gap underscores the need for further studies and the development of targeted programs that align resilience-building efforts with the demands of the modern and future workforce.

One versatile methodology with significant potential for fostering resilience and other competencies is simulation-based learning (SBL). The next section of this study highlights the critical role of simulation-based activities in cultivating resilience.

2.3 Fostering Resilience through Simulation

Previous studies have highlighted the gap that exists between employers' expectations for soft skills and the skills graduates possess (Gunarathne et al., 2021; He et al., 2022; Singh & Jaykumar, 2019). Given the importance that resilience as a soft skill has in digital businesses (Ogurinde, 2022; Stewart et al., 2016; Trenerry, 2021), it is essential that academic institutions and business schools integrate soft skills training, for example, for resilience, into their specialized curricula to effectively manage digital transformation, cybersecurity threats, and other challenges in today's business environment.

Simulation activities provide engaging learning environments that not only enhance content understanding but also support the acquisition of diverse skills. Historically, simulation has been widely employed for educational purposes, yet the integration of technological advancements in learning environments has further amplified its role (Chatpinyakoop, 2024; Vlachopoulos & Makri, 2017). Currently, the majority of scientific studies on simulation-based learning focus on its application in fields such as medicine and engineering.

Research has demonstrated that games and simulations positively impact participants by improving knowledge acquisition, academic performance, engagement, and motivation (Backlund & Hendrix, 2013; Carenys & Moya, 2016; Clark et al., 2015; Connoly et al., 2012; Fu et al., 2016; Li & Tsai, 2013; Queiro et al., 2025; Ritzhaupt et al., 2014; Schijven, 2023; Shin et al., 2015; Smetana & Bell, 2012; Tsekleves et al., 2014; Warren et al., 2016). While both terms—"games" and "simulations"—cover a wide range of concepts, "simulation" specifically refers to "realistic environments that enable users to interact with models of situations and phenomena" (McAlpin et al., 2023). Compared with learning in real-world environments, simulations offer key advantages: They simplify complex realities, provide unique learning opportunities, highlight learning obstacles, and allow learners to make mistakes without real-world consequences (Heitzmann et al., 2023).

The growing accessibility of the Internet has amplified these benefits by creating additional opportunities for technology-enhanced learning, fostering collaboration, information sharing, and content creation (McLoughlin & Lee, 2008; Walker et al., 2019). This expansion, coupled with the rise of participatory cultures in education, has further motivated educators to integrate games and simulations into their teaching practices, ensuring students reap the full advantages of these innovative approaches.

Simulation is also recognized as a valuable tool for integrating various aspects of content that are often learned separately, facilitating active learning through experimentation, commonly referred to as "learning by doing" (Below, 2024; Koape & Mamabolo, 2024; Sjöstedt, 2015;). It offers a safe environment where mistakes can be made without real-world consequences. In simulations, participants are immersed in a specific application of knowledge, that is, a concrete experience requiring their active participation (Njaramba & Olukuru, 2025; Raymond, 2012;). Furthermore, it helps standardize learning experiences, reducing the variability associated with hands-on practice in different settings and addresses concerns that traditional learning lacks authenticity or practical relevance (Gonzci, 2013; Obi et al., 2021).

In this context, simulation activities emerge as an optimal approach, as they provide controlled, experiential learning environments where participants can face challenges, adapt to uncertainty, and develop resilience in a manner that mirrors real-world scenarios. Resilience enables firms to anticipate, plan for, and adapt to change, ensuring their survival and continuity in the face of disruption (Casalino et al., 2019; Hokmabadi et al., 2024).

This study contributes to an underexplored area in the literature, focusing on the impact that experiential learning and simulation, particularly in a Model United Nations simulation, have on the advanced cognitive skills of students, who are the future workforce (Hammond & Albert, 2020). Thus, the aim of the paper is to study whether, through simulation activities, the levels of resilience of participants can be improved in a way that allows them to develop skills that enable them to thrive in the face of adversity and digital business challenges. The following section is devoted to explaining the methodology used.

3. Methodology

To measure the effects on the variation in the level of resilience capacity after participating in the simulation, the psychometric instrument known as the Connor–Davidson Resilience Scale (CD-RISC) (Connor & Davidson, 2003) was used.

The activity used to develop resilience is known as a Model United Nations (MUN). It is an international educational simulation in which participants must assume the role of

diplomats from different countries and participate in a representation of debates and negotiations in various bodies of the United Nations (UN). Attendees discuss global issues and seek solutions to international problems in areas such as peace and security, sustainable development, human rights, health, and environment, among others. The activity takes place over 4 days, during which the subjects engage in a negotiation simulation in an international environment with the objective of achieving a number of objectives.

The preparation phase for participating in the MUN conference simulation begins months in advance. The participants (or delegates), who come from business schools and are enrolled in programs related to this field or law, are randomly given a country by the organizing committee. Training involves several key components: understanding procedural rules and the committee's role; researching the assigned country's background and international stance; drafting position papers; developing diplomatic, public speaking, and negotiation skills; and learning resolution writing to create impactful proposals.

During the different stages in the preparation process, the trainers devise a series of targeted activities, through which participants must foster resilience by developing adaptability, problem-solving, and building emotional strength.

First, during the mock committee sessions, unexpected challenges such as last-minute changes to agenda topics, participants' shifts in alliances, or the introduction of crises such as humanitarian emergencies or conflicts are created. Second, in the debate practice sessions, participants are assigned to represent a country with views opposite to their initially assigned country, with the aim of fostering empathy, flexibility, and the ability to view issues from multiple perspectives. When teamwork is involved, time-bound tasks are set up so the participants must manage group dynamics and resolve conflicts constructively. Impromptu speech drills are also used: Participants must deliver short, unprepared speeches on random topics to handle the pressure of speaking without prior preparation. "Failure" scenarios—such as a resolution being rejected or a negotiation falling apart— are simulated, and participants are guided through regrouping and strategizing a comeback. Likewise, sessions on techniques such as mindfulness or time management to help participants cope with the intensity of MUN preparation and the conference itself are included. Finally, constructive feedback and reflection on their decisions, emotions, and strategies during the simulation are encouraged to normalize setbacks as part of the learning process and cultivate a growth mindset, helping them to determine how to face similar situations in the future with greater resilience.

This use of diverse contexts and scenarios, such as digital, cultural, or international environments, allows resilience to be developed in the face of a variety of challenges and changes. Furthermore, the competition is conducted in English, the primary language of business and international communication. For a significant proportion of participants, English is not their native language, which introduces additional pressure factors, leading to heightened stress and insecurity throughout the simulation process. However, the competition takes place in a controlled environment where errors do not result in real-world negative consequences. This setting fosters critical reflection on mistakes and encourages the development of strategies to address and overcome them.

3.1 The Connor–Davidson Resilience Scale

Drawing on a critical review of prior research, Connor and Davidson (2003) synthesized evidence from earlier studies by Kobasa (1979), Rutter (1985), and Lyons (1991) to identify and integrate the defining characteristics of resilient individuals. From Kobasa (1979), they adopted the notions of viewing stress or change as a challenge, maintaining commitment and acknowledging the limits of one's control. Based on the work of Rutter (1985), they incorporated the importance of seeking social support, forming close and secure relationships, setting personal or collective goals, and developing self-efficacy. Rutter's emphasis on learning from past successes, maintaining a realistic sense of control and choice, using humor, and taking an action-oriented approach was also retained. From Lyons (1991), they drew the qualities of patience and tolerance of negative emotions. To complete the profile, Connor and Davidson (2003) further added optimism and faith as additional hallmarks of resilience.

The original Connor–Davidson Resilience Scale (CD-RISC) is composed of 25 items and is referred to as CD-RISC 25 (***CD-RISC***, n.d.). Each of these 25 items is rated by participants on a Likert scale ranging from 0 to 4, resulting in a total score between 0 and 100. Following factor analysis of the original scale, these items are categorized into five factors: (1) personal competence, high standards, and tenacity; (2) trust in one's instincts, tolerance of negative affect, and stress management; (3) positive acceptance of change and secure relationships; (4) control; and (5) spiritual influences.

In addition to the CD-RISC 25, there are two abbreviated versions: the ten-item CD-RISC (CD-RISC 10; Campbell-Sills et al., 2009) and the two-item CD-RISC (CD-RISC 2; Vaishnavi et al., 2007). Both the full version (CD-RISC 25) and the abbreviated versions (CD-RISC 10 and CD-RISC 2) have been used in various fields of study, including nursing (Aloba et al., 2016; Crespo et al., 2014), sports (Ruiz Barquín et al., 2012; Trigueros Ramos et al., 2017), and education, for adults (Hunsu et al., 2022; León et al., 2019) and for children or university students (Fu et al., 2021; Smith et al., 2019). For this analysis, the ten-item scale was selected owing to its widespread use and academic validation in multiple languages, including Spanish (Gras et al., 2019; López-Fernández et al., 2024; Notario-Pacheco et al., 2011), and its prevalent application in assessing resilience among young adults.

As detailed in the study by Campbell-Sills et al. (2009), the items on the ten-item CD-RISC are rated on a Likert scale with five response options ranging from 0 (never) to 4 (always). The final score is obtained by summing the scores of the participants' responses for each item, yielding a total score between 0 and 40, where higher scores indicate greater resilience.

The results of this study, which the authors note are comparable to those of the original CD-RISC 25 test by Connor and Davidson (2003), will be considered in the analysis. The reference values obtained by Campbell-Sills et al. (2009) provided a mean for the surveyed population of 31.8 with a standard deviation (SD) of 5.4. Upon dividing the population into quartiles (Q), all those who scored below the first quartile (Q1 = 29) were identified as having low resilience, those between Q1 and Q3 (i.e., between 29 and 36) as having medium resilience, and all those with resilience above the third quartile (Q3 = 36) as having high resilience.

3.3. The Sample

The study involved 12 university students (8 female and 4 male) who took part in the international simulation activity described earlier. Participation was voluntary and was initiated through the submission of a motivation letter written in English. The selection process was both rigorous and competitive, aimed at identifying candidates with a strong intrinsic motivation to engage in a demanding and enriching experiential learning environment. Academic background was considered, though greater emphasis was placed on the candidates' willingness to take on responsibility, demonstrate sustained commitment, and effectively balance the simulation requirements with their ongoing degree obligations.

Applicants were expected to possess a sound understanding of key international topics, including international trade, economics, law, business, and the institutional functioning of both international and transnational organizations. The final stage of the selection involved a structured personal interview and an oral English assessment to evaluate candidates' communication abilities, critical thinking, performance under pressure, leadership, proactivity, and problem-solving, all of which were particularly valued in the selection process.

English proficiency among the selected participants ranged from B2 to C2 according to the Common European Framework of Reference for Languages (CEFR). All participants were able to communicate fluently in at least two languages—typically English as well as their native language or Spanish.

The final team consisted of students from three Spanish universities, aged between 19 and 25 years, and represented diverse academic disciplines, primarily business, international relations, and law.

3.4. Measurement Tool

To assess the resilience levels of students participating in the activity, a survey was administered to the participating students in two phases: one prior to their participation in the competition (a pre-activity test, designated as Test 1) and one upon their return, approximately 1 month later (post-activity test, designated as Test 2).

Both Test 1 and Test 2 are identical, each containing 24 questions. Ten of these questions relate to the ten CD-RISC items, as detailed in Table 2, while the remaining questions gather sociodemographic information. Data were collected using a Google Form.

To protect students' privacy, participants were asked to provide a set of identifiers that allowed their responses to be matched across the two phases while maintaining anonymity. These identifiers included the last three digits of their national identity number, the last letter of their first name, the first letter of their surname, and their birthday (excluding the month and year). This coding system enabled the linkage of student data before and after the competition, thereby ensuring confidentiality and anonymity. The same test was administered at the start of the competition and again 2 weeks later to assess changes over time.

4. Results

Twelve undergraduates from business schools, comprising four males and eight females, participated in the simulation activity held in New York in March 2023. However, only 11 students completed the survey accurately. Consequently, the analysis will focus on the remaining sample of 11 participants, which included 8 female and 3 male participants, aged between 19 and 25 years. The mean age for women was 21.13 years (SD = 1.96), and for men it was 23.00 years (SD = 2.00). Overall, the sample had a mean age of 21.64 years with a standard deviation of 2.06. The total score by subject before competition (pretest or Test 1) and after competition (posttest or Test 2) are shown in Table 2. The descriptive statistics associated with both questionnaires are presented in Table 3. The mean score for Test 1 was 27.82, while the mean for Test 2 was slightly higher, at 30 points.

The test range was between 21 and 37 for the pretest and between 23 and 37 for the posttest, with a standard deviation of 5.44 and 4.56, respectively. The distribution of the CD-RISC 10 score had a positive skewness coefficient in both cases, although it was higher in the previous test, and the kurtosis was very close to zero, so it is statistically within the typical range of normality.

The estimation of the internal consistency of the CD-RISC measurements was optimal, finding Cronbach's alpha coefficient = 0.86 for the pretest and 0.73 for the posttest, which despite being somewhat lower, is also considered statistically of excellent reliability.

Table 1. CD-RISC 10

	Pretest (Test 1)	Posttest (Test 2)
Subject 1	21	29
Subject 2	21	27
Subject 3	23	31
Subject 4	24	24
Subject 5	27	23
Subject 6	28	30
Subject 7	29	29
Subject 8	29	36

Subject 9	31	29
Subject 10	36	37
Subject 11	37	35
Mean	27.82	30

Table 2. Descriptive statistics

	Pretest (Test 1)	Posttest (Test 2)
Mean	27.82	30.00
Standard error	1.64	1.38
Median	28.00	29.00
Mode	29.00	29.00
Standard deviation	5.44	4.56
Sample variance	29.56	20.80
Kurtosis	−0.65	−0.73
Skewness	0.42	0.12
Min	21.00	23.00
Max	37.00	37.00
Total subjects	11.00	11.00
Q1	27.82	30.00
Q2	1.64	1.38
Q3	28.00	29.00
Confidence interval (95.0%)	3.65	3.06

Scores on the ten CD-RISC items were classified into three resilience levels. Participants whose scores on the first test fell below the first quartile (Q1 = 23.50) were categorized as having low resilience. Those with scores between the first and third quartiles were classified as having moderate resilience, while participants scoring above the third quartile (Q3 = 30) were considered to have high resilience. These classifications are presented in Tables 4 and 5.

Table 4. Pre-competition test results ranked by resilience level

Test 1	Resilience mean (by level)			Resilience mean	Standard deviation (by level)			Total standard deviation	N (by level)			N (total)
Gender	High	Low	Medium		High	Low	Medium		High	Low	Medium	
Female	34.7	21.0	28.3	28.88	3.2	0.0	1.2	5.96	3	2	3	8
Male		23.0	26.0	25.00		—	2.8	2.65		1	2	3
Total	34.67	21.67	27.40	27.82	3.21	0.00	2.07	5.44	3	3	5	11

In Table 5, students have been categorized on the basis of their resilience levels as determined by the initial test, or Test 1.

Table 5. Post-competition test results classified by level of resilience

Test 2	Resilience mean (by level)			Resilience mean	Standard deviation (by level)			Total standard deviation	N (by level)			N (Total)
Gender	High	Low	Medium		High	Low	Medium		High	Low	Medium	
Female	33.3	23.0	27.3	29.75	3.3	—	2.9	4.80	4	1	3	8
Male	36.0		28.0	30.67	—		1.4	4.73	1		2	3
Total	33.80	23.00	27.60	30.00	3.11	—	2.19	4.56	5	1	5	11

A paired *t*-test was conducted to measure the effect of participation in the Model United Nations on overall resilience levels among all students. The results are presented in Table 6. As observed, the mean CD-RISC 10 scores were slightly higher in the post-competition test. The test indicated that, with a *p*-value of 0.01, the hypothesis that participation in the competition had a positive effect on resilience levels cannot be rejected, as the pre-competition test results were significantly lower than the post-competition results. Additionally, the Pearson coefficient (0.838) indicated a positive correlation between the pre- and post-competition questionnaires.

Another paired *t*-test was conducted to determine whether, as suggested in other studies, women were significantly less resilient than men (Kavčič et al., 2023; Pulido-Martos et al., 2020; Smith et al., 2018; 2019). As shown in the results in Table 7, it cannot be rejected that men were less resilient than women; however, the result was not significant, given the small and possibly unrepresentative number of male participants, with a *p*-value of 0.15.

Table 6. Student t-test for paired samples

	Pretest (Test 1)	Posttest (Test 2)
Mean	27.8181818	30
Variance	29.5636364	20.8
Observations	11	11
Pearson's correlation coefficient	0.83878903	
Hypothetical difference of means	0	
Degrees of freedom	10	
t-Statistic	−2.4444025	
$P(T \le t)$ one-tailed	0.01729374	
Critical value of *t* (one-tailed)	1.81246112	
$P(T \le t)$ two-tailed	0.03458747	
Critical value of *t* (two-tailed)	2.22813885	

Table 7. Student t-test for resilience and gender

	Pretest (Test 1)	Posttest (Test 2)
Mean	27.8181818	30
Variance	29.5636364	20.8
Observations	11	11
Pearson's correlation coefficient	0.83878903	
Hypothetical difference of means	0	
Degrees of freedom	10	
t-Statistic	−2,4444025	
$P(T \leq t)$ one-tailed	0.01729374	
Critical value of *t* (one-tailed)	2.76376946	
$P(T \leq t)$ two-tailed	0.03458747	
Critical value of *t* (two-tailed)	3.16927267	

This study aimed to evaluate the effectiveness of simulation-based exercises in enhancing participants' resilience, with a focus on developing the adaptability and problem-solving skills needed to thrive in high-pressure, digitally driven professional environments. To achieve this, a quantitative approach was employed, using the Connor–Davidson Resilience Scale (Connor & Davidson, 2003) to assess resilience levels before and after participation in targeted simulation activities designed by the trainers. These exercises were intended to strengthen emotional endurance and coping strategies in response to uncertainty and complex challenges.

The results demonstrated a significant increase in resilience following the intervention, suggesting that simulation activities can indeed enhance individuals' capacity to cope with stress and adapt to challenging conditions. More specifically, while both male and female participants showed improvements, female students reported significantly lower resilience scores than their male counterparts.

5. Discussion

Technological transformation is a continuous and often disruptive process. In digital business environments, both individuals and organizations must develop the capacity to recover from setbacks, manage stress stemming from constant change, and remain aligned with strategic objectives. This ability—referred to as resilience—is a key competitive advantage. Resilience goes beyond resisting change; it involves learning from mistakes, adapting to evolving circumstances, and transforming challenges into growth opportunities. Leading companies in e-commerce and logistics recognize resilience as a critical factor in maintaining market leadership.

The findings of this study support the idea that resilience can be developed through training and through the implementation of strategies aimed at fostering adaptability and flexibility, such as skill development and process adjustments (Rachmad, 2022). Prior research has emphasized the central role of continuous learning in strengthening resilience within digital business contexts (Arora, 2023; Biggane & Steinbauer, 2025). Developing this skill requires a combination of personal and contextual resources, alongside the adoption of effective strategies.

In this regard, simulation activities emerge as particularly effective learning tools, as they offer controlled, experiential learning environments where participants can confront challenges, adapt to uncertainty, and strengthen resilience in ways that mirror real-world scenarios (Diffley & Duddle, 2022; McIntosh, 2022). This study confirms that participation in such activities has a significant and positive impact on resilience levels, with statistically significant improvements between pre- and post-simulation measurements. These findings are consistent with previous research highlighting the positive influence of simulations on resilience development (Johannson et al., 2018; Sood et al., 2011; Walker et al., 2029; Yates et al., 2021).

Another relevant finding concerns gender differences: Women exhibited significantly lower levels of resilience compared with men, aligning with previous studies (Kavčič et al., 2023; Pulido-Martos et al., 2020; Smith et al., 2018; 2019). However, this conclusion must be interpreted with caution, given the small and possibly unrepresentative number of male participants, which limits the generalizability of the results.

In sum, this study adds to the growing body of evidence indicating that simulation-based learning activities are not only effective professional training tools but also key instruments for strengthening resilience—especially in volatile, technologically driven contexts.

6. Conclusions

This study confirms that experiential learning through simulation-based activities, such as a Model United Nations (MUN), is an effective tool for developing resilience in high-pressure environments that reflect the challenges of today's digital business landscape. The findings reveal a statistically significant increase in participants' resilience levels following the simulation, providing empirical support for the study's main hypothesis: Resilience can be cultivated through well-structured training methodologies.

Moreover, the results underscore the importance of incorporating immersive learning activities into the education of future professionals, particularly in fields such as business, law, and international relations. This approach not only enhances essential soft skills such as adaptability and problem-solving but also strengthens emotional preparedness to navigate uncertainty and constant change in digitally driven environments.

Although gender-based differences in resilience were observed—with women scoring lower on average—no definitive conclusions can be drawn owing to the small sample size. Nonetheless, this finding highlights the need for further research into the personal and contextual factors that influence resilience development.

Overall, the study supports the strategic integration of simulations into educational and corporate training programs to foster a more resilient workforce—one that is better equipped to meet the demands of an increasingly volatile and technology-intensive professional landscape. However, the rigidity of academic curricula often poses a challenge. Therefore, it is up to educators and simulation organizers to creatively design and adapt these learning experiences to strengthen students' ability to cope with the demands of the professional world.

Ultimately, embedding resilience-building strategies into university education is not just desirable—it is essential for preparing future professionals to thrive in environments characterized by volatility, diversity, and constant transformation.

7. Theoretical and Practical Implications

This study presents several important theoretical implications. First, it reinforces the notion that resilience is a trainable skill, providing further support for existing theories on its malleability. Second, the findings highlight the critical role of continuous learning in adapting to technological transformation, emphasizing that simulation-based training is an effective tool for fostering resilience. Additionally, this study strengthens the evidence that simulation-based learning serves as a validated and practical approach to resilience development.

From a practical perspective, the results suggest that organizations and educational institutions should prioritize simulation-based training to better equip individuals for the challenges of rapid technological change. Furthermore, the observed gender differences in resilience levels indicate a potential need for targeted interventions to address disparities and ensure inclusive skill development. Finally, these findings underscore the importance of further research and policy development aimed at designing comprehensive and equitable resilience-building strategies.

8. Limitations and Future Research

While this study offers valuable insights into resilience in digital business, certain aspects warrant further exploration. The sample size was limited, and future research should aim to include a broader and more diverse participant pool to enhance generalizability. Additionally, the study focused on a single simulation methodology, suggesting a need to explore alternative learning approaches such as gamification, role-playing, and AI-driven simulations.

Future research should also examine long-term resilience development by conducting longitudinal studies. Investigating the integration of resilience training into corporate learning programs and its impact on organizational performance could provide practical insights. Furthermore, analyzing individual differences—such as personality traits, cultural backgrounds, and prior experiences—could help tailor resilience-building strategies for diverse work environments.

Advancements in technology also open new avenues for research, such as the role of virtual reality and immersive experiences in fostering resilience. Finally, future studies could explore the intersection of resilience with other critical competencies in digital business, such as agility, adaptability, and emotional intelligence, to develop a more holistic approach to workforce development.

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