LUISS

Graduate Course LM-77 "Scienze economico-aziendali" (Economics and Business Sciences)

Course of Global Organization Design and Human Resources Management

The change in international assignment practices as a consequence of the digital revolution and climate change awareness.

Prof. Luca Giustiniano

SUPERVISOR

Prof. Gianfranco Pellegrino

CO-SUPERVISOR

Sara Crapanzano Mazzone - 773081

CANDIDATE

Academic Year 2024/2025

LIST OF FIGURES

TABLE OF CONTENTS

1. Introduction: why international assignments, digitalization and climate change?

For decades, international assignments have been central in global business, allowing organizations to expand their operations beyond national borders, manage subsidiaries and develop worldwide leadership talent, through cross-cultural experiences (Harzing & Reiche, 2010). The latter have often been used to prepare workers for leadership positions. Expatriate management has therefore been an important aspect of this practice for fostering knowledge transfer (i.e. employees are sent abroad to share their expertise, train local staff and facilitate the transfer of, mainly tacit, best practices across subsidiaries, ensuring consistency in corporate strategy and operational efficiency), building cross-cultural competencies and ensuring an effective implementation of corporate strategies across the globe (Berthoin Antal, 2000; Hocking, Brown, & Harzing, 2007). Multinational corporations (MNCs) have traditionally relied on long-term expatriate assignments: as Harzing (2001a) highlights, because MNCs operate in multiple locations, the need to maintain international presence and ensure operational consistency across different markets emerges. These assignments typically involve sending employees to foreign locations for extended periods of time, to both establish a corporate position and manage local teams, as well as oversee projects. Despite these benefits, a re-placement comes with significant hurdles: firstly, it is costly - international assignments often require MNCs to handle relocation expenses, including housing and education of the expatriate's children, if any; secondly, personal and professional difficulties for employees may emerge (e.g. cultural adaptation, family adjustment and career transition after repatriation). These hurdles have led some organizations to seek alternatives (Gregersen et al., 1996) that align with technological and environmental considerations.

In recent years, the nature of international assignments has been undergoing a significant transformation, influenced by two powerful megatrends, i.e. long-term forces having an impact on a global scale in the present and future (European Commission, 2024): digitalization and climate change awareness. Advances in technology and the widespread adoption of digital tools, as high-speed internet, cloud computing, artificial intelligence (AI) and virtual collaboration platforms, have altered how businesses operate (Vorecol Editorial Team, 2024), communicate and collaborate across geographical

locations, allowing companies to operate globally with less reliance on physical mobility (Manyika et al., 2016). The COVID-19 pandemic served as a catalyst for remote work, demonstrating that many business functions can be carried out from a distance, without undermining efficiency, through the use of video conferencing tools, like Microsoft Teams and Zoom (Zhang et al., 2022). The latter have enabled employees to engage with global teams in real time without the need for frequent travel. As a result, many firms are utilizing virtual assignments as an alternative to traditional ones (GARLAND, 2021). Besides, AI is reducing the need for human intervention in corporate operations, leading companies to replace humans with digital solutions for selected expatriate assignments (Fähndrich, 2022). This shift challenges the traditional justification of international transfers in areas where automation can bridge geographical gaps.

Simultaneously with digitalization, increasing concerns over climate change and corporate sustainability have led corporations to reevaluate their global mobility policies, due to the environmental impact, especially greenhouse gas (GHG) emissions, that frequent travels and long-term expatriation have (AON, 2024). Indeed, as the world faces the negative effects of climate change, organizations deal with the growing pressure (Nikolaou et al., 2015) to reduce their carbon footprint and adopt eco-friendly and responsible practices. This need has led to the reduction of business travel, particularly unnecessary flights, to decrease carbon emissions, the introduction of carbon offset programs, the draft of sustainable expatriate policies, as green mobility strategies, and the utilization of digital tools as a replacement for superfluous physical presence (Manyika et al., 2016).

These two trends are shaping the way businesses assess international assignments, raising questions about the necessity, effectiveness and future of traditional expatriate models. As a matter of fact, organizations need to develop innovative approaches, involving hybrid models, where traditional expatriate roles are complemented by virtual assignments, short-term mobility programs and sustainable relocation strategies (Welch et al., 2003; Collings et al., 2007). In light of this, the present thesis will explore these emerging megatrends, examining whether and how international assignment practices have been changing as a consequence of the digital revolution and climate change awareness, to provide insights for businesses. In particular, Chapter 2 will describe the meaning of international assignments, as well as the different stages that define this

practice (Bonache et al., 2001), the motives behind international transfers (Edström and Galbraith, 1977) and any related drawback and/or critique. Chapter 3 illustrates the megatrend of digitalization, a defining and transformative feature of modernity, together with the impact it has on firms' performance (Naughtin et al., 2024). Chapter 4 will adopt the same approach as the previous chapter, but in relation to climate change. Chapter 5 will analyse the interplay between digitalization and sustainability, which is complex in nature, still essential to advance and fulfil Sustainable Development Goals (SDGs). It will unveil both benefits and risks associated to digitalization and suggest the adoption of the "Digitainability Assessment Framework" to manage the interaction between digitalization and sustainability, ensuring that the former acts as a catalyst for sustainable growth rather than a cause of new challenges (Gupta & Rhyner, 2022). Building on an understanding of both megatrends, Chapter 6 aims to generalize empirical evidence (AON, 2024) of the effects of digitalization and climate change awareness on international assignments. By analysing this evidence, the chapter seeks to explain the evolution of international assignment practices as a result of the digital revolution and increased climate change awareness. Lastly, concluding remarks will be presented to finalize this work.

2. Global staffing and international assignments

International assignments and their stages

International assignments (IAs) are processes through which employees are relocated outside national borders to fulfil specific organizational roles in foreign subsidiaries or headquarters (HQ). They are a central feature of multinational corporations' strategies to achieve both strategic and operational goals, aligning with a globalized business environment and nurturing integration within the organization. International assignments' purpose is traditionally multifaceted, ranging from filling positions, transferring knowledge between headquarters and subsidiaries to developing a globally oriented leadership and strengthening organizational cohesion across different geographic locations. They serve as a means to address the complex management of culturally and economically diverse subsidiaries while ensuring alignment with the parent company's objectives. This practice has evolved over time beyond traditional expatriation. Indeed, its scope has expanded to include other models as inpatriate assignments, i.e. employees are brought from subsidiaries to headquarters, short-term assignments, virtual assignments and self-initiated assignments. Each of these structures addresses specific needs, including cost efficiency, operational flexibility and the inclusion of diverse perspectives across the global network. IAs also provide the opportunity to build cross-cultural competencies, improve problem-solving skills in various environments and prepare the workforce for leadership positions that require navigating the complexities of international operations. Therefore, they serve as investments in the development of a globally competent personnel. Harzing & Reiche (2010) acknowledge the challenges associated with international assignments: cultural adaptation, the strain of relocation on both expatriates and their families and the financial and logistical demands placed on the organization. Indeed, the effective management of this practice requires careful planning, role definition and a robust support system, ensuring the success of both the individual worker and the organization. Overall, international assignments are both a logistical and strategic tool, able to bridge the gap between the HQ and subsidiaries of a given MNCs: they enable knowledge transfer, leadership development and operational alignment, while

ensuring that the organization succeeds in a competitive and interconnected global landscape.

There are various classifications to differentiate employees in MNCs based on their nationality and the relationship they have with both the HQ and subsidiaries (*see Figure 1 below*): Parent Country Nationals (PCNs), Host Country National (HCNs) and Third Country Nationals (TCNs) (*see Figure 2 below*). PCNs are employees who have the same nationality as the MNC's HQ one. For instance, a British employee working for a UK-based multinational corporation's subsidiary in a foreign country would be categorized as a PCN. These expatriates are usually deployed to oversee operations, implement corporate policies or transfer knowledge to the subsidiary. The use of PCNs may be common in the *control* (Joseph & Sengul, 2025) approach and ethnocentric staffing strategies, where multinational corporations favour control and alignment with HQ targets through formal rules, consistency in decision-making, strong communication with HQ and cross-border cultural dissemination. Challenges include the high cost of expatriation and the potentially arising cultural friction between PCNs and local employees. HCNs constitute the second category: these employees' nationality matches that of the subsidiary's host country (e.g. a Japanese employee working for the Japanese subsidiary of a foreign-based MNC). There are various advantages of employing HCNs, namely their familiarity with the local culture, economic and legal environment, as well as the well-established networks and understanding of local consumer behaviour they possess, which can support the subsidiary's success. Polycentric staffing strategies, while prioritizing local autonomy and consequently relying on HCNs, may limit the subsidiary's integration with the global operations of the MNC, favouring misalignments with the HQ. Lastly, TCNs are workers whose nationality is different from both the MNC's HQ and the subsidiary's host country. They usually bring international experience and cross-cultural competence, rendering them essential in geocentric staffing strategies that strive to benefit from global talent (Perlmutter, 1969). Specifically, their use allows multinational corporations to draw from a diverse pool of talent for roles whose expertise is not available either in the HQ or in the host country. The main challenge relates to the dual cultural adoption, i.e. host country and corporate culture of the MNC (Negandhi, 1987; Phatak, 1989; Dowling, Festing, & Engle, 2008). These three diverse classes of workers play a pivotal role in shaping the success of MNCs and their global operations. Indeed,

they allow corporations to balance the need for global consistency, local responsiveness and operational efficiency.

Parent country national (PCN)	Nationality of employee is the same as that of the headquarters of the multinational firm	e.g. a German employee working at the Chinese subsidiary of Volkswagen
Host country national (HCN)	Nationality of employee is the same as that of the local subsidiary	e.g. a Chinese employee working at the Chinese subsidiary of Volkswagen
Third country national (TCN)	Nationality of employee is neither that of the headquarters nor the local subsidiary	e.g. an Indian employee working at the Chinese subsidiary of Volkswagen

Figure 1 Classification of international staff (Harzing & Reiche, 2010, p.4).

	Advantages	Disadvantages
PCNs **Parent country nationals**	• familiarity with the home office's goals, objectives, policies and practices • technical and managerial competence • effective liaison and communication with home-office personnel • easier exercise of control over the subsidiary's operations	• difficulties in adapting to the foreign language and the socioeconomic, political, cultural and legal environment • excessive cost of selecting, training and maintaining expatriate managers and their families abroad • the host countries' insistence on localizing operations and on promoting local nationals in top positions at foreign subsidiaries • family adjustment problems, especially concerning the unemployed partners of managers
HCNs **Host country nationals**	• familiarity with the socioeconomic, political and legal environment and with business practices in the host country • lower cost incurred in hiring them as compared to PCN and TCN • provides opportunities for advancement and promotion to local nationals and, consequently, increases their commitment and motivation • responds effectively to the host country's demands for localization of the subsidiary's operation	• difficulties in exercising effective control over the subsidiary's operation • communication difficulties in dealing with home-office personnel • lack of opportunities for the home country's nationals to gain international and cross-cultural experience
TCNs **Third country nationals**	• perhaps the best compromise between securing needed technical and managerial expertise and adapting to a foreign socioeconomic and cultural environment • TCN are usually career international business managers • TCN are usually less expensive to maintain than PCN • TCN may be better informed about the host environment than PCN	• host country's sensitivity with respect to nationals of specific countries • local nationals are impeded in their efforts to upgrade their own ranks and assume responsible positions in the multinational subsidiaries

Figure 2 Advantages and disadvantages of using Parent Country Nationals, Host Country Nationals and Third Country Nationals (Harzing & Reiche, 2010, p.6).

There are various factors influencing the choice between HCNs and PCNs in a multinational corporation (Harzing, 2001b), including cultural, strategic, organizational and operational matters (*see Figure 3 below*). As far as culture is concerned, MNCs originating from countries with high levels of uncertainty avoidance (Hofstede, 1980, 2001) favour PNCs for leadership positions. Indeed, they prefer familiar managerial styles to control the subsidiary and ensure the latter aligns its operations with the established HQ practices. Also, in case of significant cultural and operational differences (Gaur et al., 2007) between the HQ and the subsidiary, the former may focus on the deployment of PCNs to maintain direct control and ease communication. This is rooted in the belief that PCNs are more likely to understand and comply with the MNC's objectives. Another driver shaping the decision is the subsidiary's characteristics. For instance, newer subsidiaries tend to rely more heavily on PCNs, as the headquarters may be willing to establish control and ensure operations adhere to corporate policies (Belderbos & Heijltjes, 2005). As subsidiaries mature and develop a local knowledge base, the reliance on PCNs decreases (Gong, 2003), while the one on HCNs increases. Additionally, majority-owned and strategically critical subsidiaries are more likely to have PCNs in key positions to respectively exert control over decision-making processes and safeguard corporate interests. Thirdly, host country factors, i.e. level of education, political risk and cost of living, influence the choice between HCNs and PCNs. Provided that the host country has a low level of education, MNCs are more likely to appoint PCNs to ensure competency in relevant positions. A high level of political risk also necessitates the deployment of PNCs (Boyacigiller, 1990). On the contrary, when the cost of living is high, HCNs are the most cost-efficient option, as they are better adjusted to the local economic climate. Fourthly, considerations over the strategy of the corporation should be undertaken: a MNC pursuing a global strategy, emphasizing integration, is more likely to opt for PCNs to ensure consistency. Oppositely, MNCs prioritizing local responsiveness, i.e. multidomestic strategy (Tarique et al., 2006), favour HCNs who understand and adapt easily to the specific host country demands. Also, dynamics specific to an industry influence staffing choice: industries requiring stringent control have a higher portion of PCNs in leadership roles to ensure compliance (Hofstede, 1980, 2001). Conversely, industries where local market knowledge is essential, such as the food sector, are more likely to employ HCNs to leverage their understanding of local consumer preferences.

Lastly, knowledge transfer and effective communication do also define staffing decisions: in the presence of communication barriers, arising from cultural or linguistic differences and possibly bringing to misunderstandings (Marschan-Piekkari et al., 1999), PCNs are usually favoured due to their familiarity with the organizational culture and communication styles. Moreover, industries with high research and development, which need to transfer specialized knowledge, often nominate PCNs to share HQ knowledge and train the local workforce (Hamill, 1989), gradually building the subsidiary's capacity. Broadly speaking, PCNs are preferred when control, knowledge transfer and alignment with the HQ are required (Tan & Mahoney, 2002), while HCNs are employed when local market knowledge, cost assessments and cultural adaptability are ranked as primary concerns. By evaluating these factors, MNCs can make informed staffing decisions, which align with their broad and specific objectives (Harzing & Reiche, 2010).

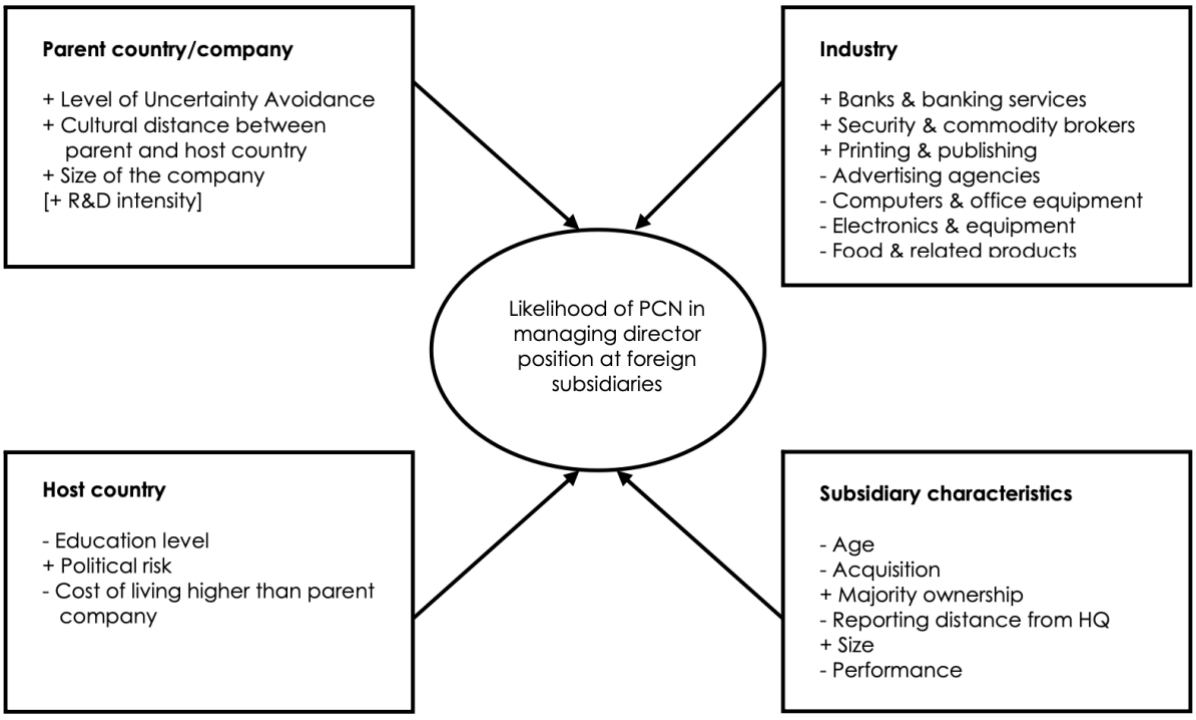

Figure 3 Factors influencing the choice between HCN and PCN. (+) denotes a positive relationship while (-) denotes a negative relationship (Harzing & Reiche, 2010, p.10).

As it has been appreciated thus far, international transfers are critical for MNCs, but issues such as high costs (Hébert et al., 2005) may reduce their feasibility (Forster, 2000; Harvey, 1998). Accordingly, companies increasingly use inpatriate, short-term, self-

initiated and virtual assignments as alternatives to meet corporate needs in the most efficient and effective way. Inpatriate assignments involve bringing managers or employees from the foreign subsidiary to the MNC's headquarters (Harvey et al., 2000), reflecting a shift in how talent mobility is viewed. The reverse flow allows subsidiaries to bring knowledge and experiences to the HQ, while providing MNCs with the opportunity to build increasingly integrated and responsive organizations. The experience at HQ also allows inpatriates to gain a deeper understanding of corporate strategies, which they can later implement within their home subsidiaries. Additionally, inpatriation equips MNC's managers with knowledge into the local conditions and cultural and market dynamics of their inpatriates' regions. This increasingly used (Oddou et al., 2001) two-way exchange (*see Figure 4 below*) enhances HQ's ability to adapt its global strategies to local conditions, improving performance. However, they face unique challenges, such as limited influence at HQ, as they are perceived as subsidiary representatives, leading to power imbalances that hinder decision making and integration, and dual cultural adjustments, both at the national and corporate leadership levels. The second alternative type of assignment is the short-term one, which typically lasts between one and twelve months and is designed to address specific and urgent needs in a timely manner (Collings et al., 2007). Employees on short-term assignments usually work on projects, solve operational issues or transfer knowledge without undergoing a full relocation, which makes this option cost-effective and flexible. These assignments are advantageous for employees with significant personal obligations; however, the partial family relocation could lead to emotional strain and burnout. From the organizational point of view, they provide targeted and efficient ways to utilize talent across the organization and are less expensive than traditional expatriation. Still, logistical complexities, including the need to manage work permits, travel arrangements and the employee's difficult integration due to the short duration of his foreign work are present (Tahvanainen et al., 2005). Thirdly, self-initiated assignments occur when individuals independently look for employment opportunities in foreign countries. This new form of mobility reflects a growing trend among younger professionals who are willing to explore opportunities beyond their home countries. They are motivated by personal goals rather than organizational objectives, as career prospects' enhancement, especially for people coming from stagnant economies or highly unemployed regions, and multi-cultural immersion (Suutari & Brewster, 2000).

For companies, these assignees represent a cost-effective way to access global talent: organizations are not burdened with relocation expenses, familiar support or other benefits usually granted to expatriates. However, self-initiated assignees often lack the structured support system provided to expatriates, leading to possible challenges in their integration, retention and alignment with organizational goals. Lastly, the most innovative approach is the virtual assignment, enabled by advancements in digital communication technologies: this alternative allows workers to perform international responsibilities without being physically relocated elsewhere (Welch et al., 2003). Tools such as video conferences and cloud-based systems are used to connect employees across borders in real-time, fostering global collaboration without facing the costs and (personal) disorders of relocation, as housing and children's enrolment in international schools. These assignments are particularly effective for positions involving knowledge transfer and sharing or project management. One of the most significant challenges of virtual assignments is the lack of face-to-face interaction, which may hamper trust, relationship building and effective communication (Harzing & Reiche, 2010). Overall, each alternative offers unique advantages to address specific gaps that traditional expatriation may not solve. By leveraging them, organizations can balance cost efficiency, effectiveness and employee satisfaction in their international operations.

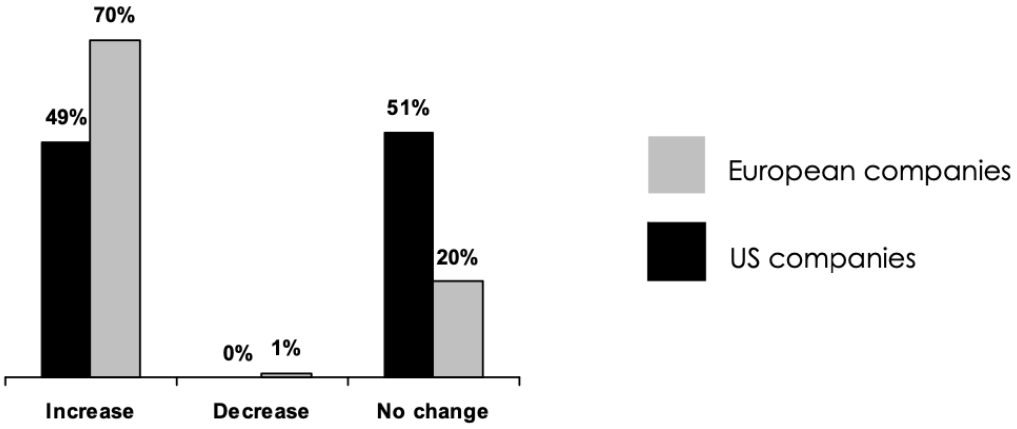

Figure 4 Expected future change in the inpatriate population (Oddou et al., 2001, pp. 99,116).

Because a company can be considered as a system of independent choices, there must be both internal and external (i.e. alignment to the external environment) fit among its processes, organization, structure and goals: the need to design the organization in a way these elements work in synergy and remain aligned with changing environmental conditions emerges (Joseph & Sengul, 2025). This explains the underlying reason for dividing the international assignment process into three separate stages (*see Figure 5 below*): the pre-assignment stage, i.e. selection, preparation and *channelization* (Joseph & Sengul, 2025); the actual assignment and the post-assignment stage, i.e. repatriation (Bonache et al., 2001). The selection phase is the foundation of the process because it determines which individual is best suited to meet the requirements of the assignment and ensures there is an alignment between the candidate's competencies and the strategic objectives of the assignment. A mistaken decision may result in assignment failure, financial losses and weakened employee morale. This stage is therefore critical for the success of the process. The primary goal of the selection stage is to identify workers who possess the technical expertise (the ability to perform the job function in an effective manner), interpersonal skills (the ability to build relationships and communicate effectively in a cross-cultural team) and cultural adaptability (openness to respect and learn the foreign cultural norms) required for success, as well as his/her emotional intelligence, motivation to take the challenges of the job, ability to handle ambiguity and resilience to difficulties in the host country (Harzing & Reiche, 2010). Family readiness is also a crucial aspect: if it is unwilling or unable to adapt to the new environment, emotional strain, dissatisfaction and premature repatriation could result (Tung, 1981). There are various tools employed by organization to evaluate candidates, including interviews to assess interpersonal skills (Caligiuri, 2000; Spreitzer, McCall, & Mahoney, 1997), motivation and cultural sensitivity; psychometric assessments to understand personality traits, resilience and cultural intelligence (CQ); role-playing to test the ability to navigate real-life scenarios and cultural adaptability assessments to evaluate the candidate's openness to new experiences and differences. Once the expatriate is selected, he/she and his/her family need to be prepared and equipped with the skills, knowledge and resources indispensable to navigate the new environment. An effective preparation minimizes cultural shock, facilitates the adjustment and ensures the expatriate's focus on professional tasks without distractions. The training consists of understanding norms,

values and communication styles of the foreign country (Harris & Brewster, 1999b; Harvey & Miceli, 1999; Tung, 1981), which are cultural differences that may influence workplace interaction, decision making and negotiation styles. Also, language training is essential for international assignee to master the English language and the local one, for non-English-speaking countries. This allows them to gain confidence, interact with colleagues and reduce the sense of isolation. Training also covers practical information, such as housing options, healthcare system, legal requirements and transportation. Families should receive an ad-hoc training to understand the new cultural environment and adjust more easily; find employment in the host country and enrol children in international or local schools, while adapting to the new educational system (Harzing & Reiche, 2010). Lastly, this stage entails helping expatriates develop realistic expectations about the hurdles they might face, empowering them to manage challenges (e.g. loneliness and cultural misunderstandings) effectively (Black et al., 1991). The second phase is the actual assignment, during which the expatriate is supported both professionally and personally to enable productivity and motivation, while meeting the objectives of the assignment. Upon arrival, expatriates undergo an onboarding process (Shaffer et al., 1999) to receive support in finding housing, enrolling children, being introduced to the subsidiary's operations, personnel and cultural context; and feeling motivated to build relationships with the local community (*see Figure 6 below*). Moreover, throughout the assignment, expatriates benefit from continuous support for: cultural adjustment by HR teams or expatriate support groups to help navigate cultural challenges, i.e. the "cultural shock" (Oberg, 1960); professional development to ensure international assignee continue grow and contribute to corporate goals; and communication with HQ to be informed about organizational developments, fostering a sense of belonging (Kraimer et al., 2001). During the assignment, performance management is crucial to ensure the expatriate's contribution is measured, recognized and rewarded through financial rewards, career advancement and non-monetary recognition and to maintain motivation and accountability (Joseph & Sengul, 2025). To do so, the monitoring of previously well-established and clear objectives is needed to evaluate the job performance and cultural adaptability, as well as external factors which may hinder performance, and offer guidance to overcome challenges (Harzing & Reiche, 2010). The third and last stage is repatriation, i.e. the most overlooked step of the international assignment process

(Bolino, 2007; Lazarova & Cerdin, 2007). However, it is a critical moment to retain expatriates and leverage their acquired expertise. This phase comes with challenges for the returning worker (Gullahorn & Gullahorn, 1963), including cultural shock, career stagnation, struggling personal adjustment and negative feelings toward the experience, if the latter is not recognized or leveraged. To overcome these difficulties and support the repatriate, organizations can provide career development opportunities, such as promotions or leadership roles; recognize the expatriate's achievements and facilitate personal adjustment in terms of new housing, schooling and other logistical matters (Lazarova & Caligiuri, 2001). In conclusion, the international assignment process is intricate, requiring careful planning and executing at each stage. By adopting an employee-centric approach, MNCs can maximize the value of international assignments, fostering engagement, loyalty and global competence within the workforce (Harzing & Reiche, 2010).

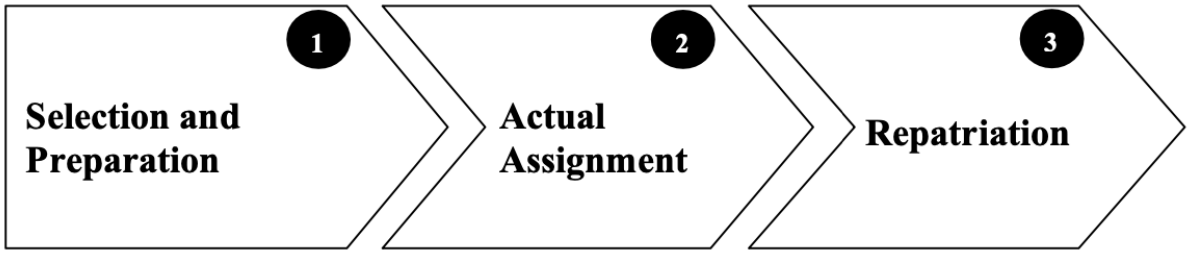

Figure 5 The international assignment cycle (Harzing & Reiche, 2010, p.26).

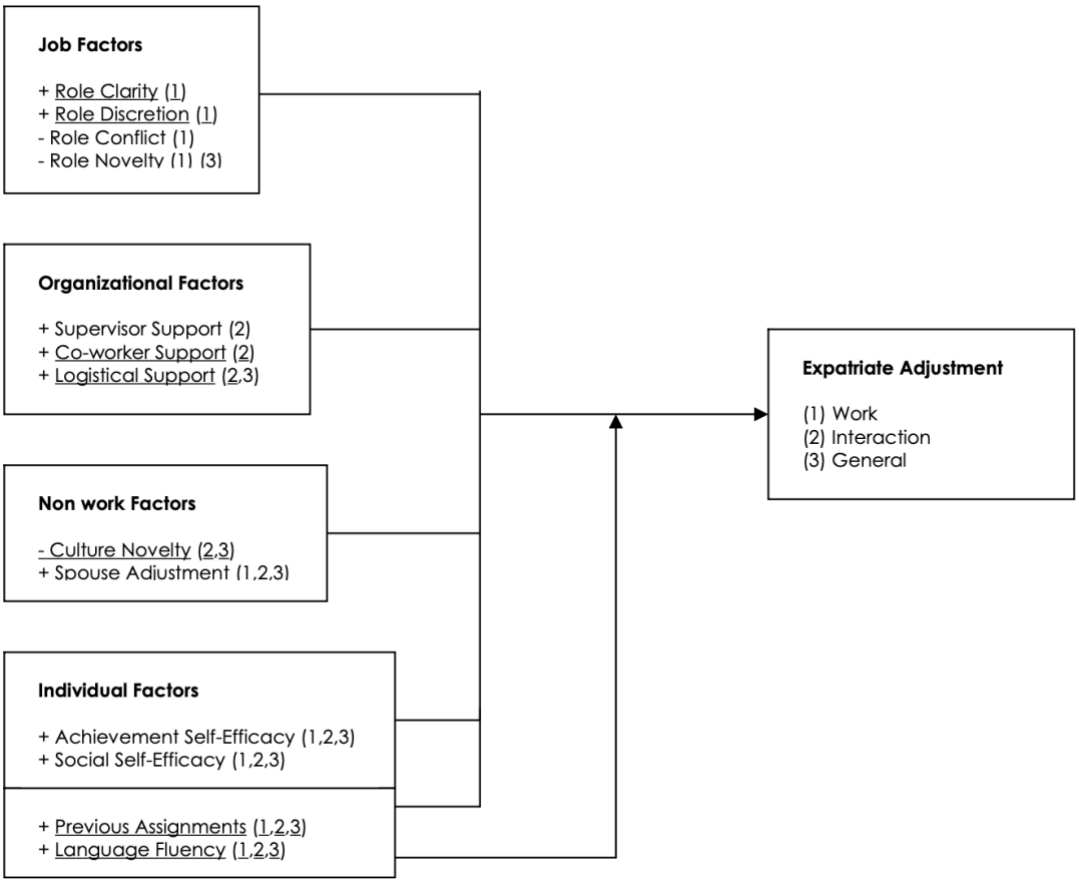

Figure 6 International assignments and their stages; Numbers in parentheses indicate the corresponding dependent variables (Harzing & Reiche, 2010, p.33).

Understanding the motives behind international transfers

Edström and Galbraith (1977) presented a seminal model to classify the motives behind international employee transfers in multinational corporations. The framework organizes these motives in three main categories: position filling, management development and organization development (*see Figure 7 below*). The latter three each reflect a specific purpose for transferring employees, addressing different strategic, developmental and operational corporate needs. Edström and Galbraith's framework is recognized as a foundational theory in human resources management because it provides a structured way to analyse why MNCs invest in expatriation and how the latter aligns with organizational goals.

Position-filling is one of the most immediate and direct justifications for expatriation because it fulfils a specific need of the subsidiary that cannot be met using the local

workforce. This gap may be related to managerial, technical or operational proficiency that is essential for the subsidiary's functioning. In developing countries, position filling is critical due to the limited availability of skilled workers: local educational systems may not yet have reached the level necessary to support complex and specialized business functions. In this case, expatriates are dispatched overseas to control operations, introduce cutting edge techniques and knowledge, and ensure quality, therefore bringing both technical skills and the ability to manage and guide the local workforce. As far as developed countries are concerned, position filling is relevant to transfer specialized knowledge or experience which are not available locally. This is especially the case for industries like IT, aerospace or pharmaceuticals, where the expertise needed for high-performance operations and innovation is specific and often concentrated in particular regions (Harzing & Reiche, 2010). Also, position filling is tied to knowledge transfer (Harvey et al., 2000), both tacit and explicit. Tacit knowledge is particularly significant in the context of international assignments because it is rooted in personal experience (Riusala & Suutari, 2004). Thus, expatriates transfer this type of knowledge through direct interactions, training and mentorship. Contrarily, explicit knowledge can be documented and shared through formal means and includes MNC's processes, systems and best practices. Expatriates are sent to foreign countries to train and mentor local employees, building a sustainable skill base in the subsidiary (Bonache & Brewster, 2001; Hébert et al., 2005). Thus, the latter can become more autonomous over time, reducing the dependency on the HQ for expertise. As an example, expatriates may oversee the installation and initial operations of new equipment while training the local workforce. Lastly, expatriates may fill positions in foreign volatile countries, to ensure greater control over operations which need to be aligned with HQ standards. In this sense, international assignee become representatives of the headquarters (Harzing & Reiche, 2010).

Management development is a motive which highlights the benefits of international transfers for employee growth and organizational endurance. It focuses on building globally competent leaders who can handle the complexities of operating in diverse markets. Indeed, employees can cultivate a global mindset - an increasingly essential trait for leadership roles in MNCs - by being exposed to different cultural, regulatory and business environments. Typically, employees are tasked with managing teams, negotiating with local stakeholders and adapting to unaccustomed business practices,

further fostering their adaptability and problem-solving skills and CQ. The use of international assignments falling in this category is not tied to a shortage of personnel: a MNC may decide to assign a high-potential employee from its HQ to manage a subsidiary in an emerging market, not because there is lack of local personnel, rather because the experience will prepare the expatriate for more significant and complex future responsibilities (Berthoin Antal, 2000; Hocking, Brown, & Harzing, 2007). Through this approach, the individual gains field knowledge of the market while developing skills to manage cross-cultural and dynamic realities. Moreover, management development contributes to the growth of the organization's talent pipeline: MNCs ensure a stable supply of leaders who understand the complexity of global operations and are better equipped to make decisions aligned with the MNC's goals (Harzing & Reiche, 2010). Overall, these assignments have a combined advantage. Indeed, they both prepare employees for future roles and create immediate value for the subsidiary, as workers gain an understanding of the parent company's culture, processes and priorities, which can be shared with local teams.

Organizational development is a motive that underscores the importance of integration and alignment with the corporation as a whole, and it is tied to the need for coordination (Joseph & Sengul, 2025) and control (Harzing, 2001a) across geographically dispersed units. In fact, in MNCs, ensuring that all subsidiaries work toward a common goal and adhere to shared values is a complex challenge which can be addressed through international transfers. Viewed in this light, expatriates act as ambassadors of the corporate culture (the "*bumble-bee*" role), by embedding HQ culture and practices within the subsidiary and ensuring consistency in how the corporation operates, regardless of the geographic location. This is important in culturally diverse environments where local practices may differ from HQ expectations. Moreover, an international assignee may serve as bridge to build informal communication networks to facilitate the exchange of information, ideas and practices between the HQ and its subsidiaries and prevent potential conflicts from happening (the "*spider*" role). Also, expatriates might provide a way to maintain control in subsidiaries operating in growing markets. Expatriates in these roles are tasked with ensuring compliance with corporate policies, monitoring performance and implementing strategic initiatives (the "*bear* role"). Lastly, as highlighted by Harzing and Reiche (2010), the presence of expatriates in key positions reassures both local employees

and stakeholders that the subsidiary is fully integrated into the multinational corporation, fostering a sense of trust which is essential for long-term success.

In totality, the different motives for international transfers underscore the strategic importance of expatriates in multinational corporations. Indeed, they (expatriates) serve as instruments to achieve corporate objectives, among which it is possible to find position filling, global leaders' development and organizational integration (Pausenberger, 1987). Their success is a multifaceted concept, including both organizational and individual achievements (*see Figure 8 below*): the completion of the assignment as initially planned (Feldman & Thomas, 1992; Thomas, 1998); a correct work, an accomplished cultural and interpersonal adjustment of the expatriate and their family; a successful job performance during the time abroad, an effective transfer of both tacit and explicit knowledge to the subsidiary's team (Harzing & Reiche, 2010); the expatriate's own development in terms of personal growth, acquisition and career advancement (Stahl et al., 2002; Tung, 1998); and the achievement of organizational strategic goals, i.e. the transfer of best practices, the effective implementation of global strategies and the development of a strong leadership talent pool (Yan et al., 2002). The contributions expatriates bring to global operations is testified by the enhanced competitiveness (Roessel, 1988) and unified thriving organization.

Edström and Galbraith (1977)	**Position Filling**	**Management Development**	**Organization Development/ *Coordination & Control****
Pausenberger and Noelle (1977) *[our translation]*	To ensure transfer of know-how; To compensate for a lack of local managers; Training and development of local managers.	To develop the expatriate's management capabilities; To develop managers' global awareness.	To ensure homogeneous practices in the company; To ensure a common reporting system in the company; Presence of different viewpoints in decision-making bodies.
Welge (1980 *[our translation]*)	Position filling; Transfer of know-how.	International experience; Use management potential.	Coordination; Change management.
Kenter (1985) *[our translation]*	Lack of qualified local managers available; Transfer of know-how; Training of local managers.	Development of parent country nationals.	Control and coordination; Increase loyalty and trustworthiness of expatriates.
Kumar and Steinmann (1986) *[our translation]*	Transfer of know-how; The necessity to train German managers.	HQ wants Japanese managers to gain international experience.	To ensure coordination with HQ corporate policies and philosophies; To facilitate communication; Desired loyalty with HQ goals.
Pausenberger (1987) [our translation]	Transfer of know-how.	Management development.	To ensure a uniform company policy.
Roessel (1988) *[our translation]*	Transfer of Management know-how; Lack of qualified local personnel	Managerial development of expatriates and local managers.	Coordination, control and steering; Reciprocal information flows; Internationalisation of the company as a whole.
Groenewald and Sapozhnikov (1990) *[our translation]*	Transfer of technological, administrative or sales know-how; Lack of qualified local personnel.	Management Development; Better career opportunities for employees.	Steering and coordination.
Kumar and Karlhaus (1992) *[our translation]*	Transfer of know-how; Limited availability of local managers; The necessity to train foreign managers.	HQ wants German managers to gain international experience.	To ensure coordination and communication with HQ; Desired loyalty with HQ goals.
Macharzina (1992) *[our translation]*	Filling vacant positions.	Management development	Coordination.
Wolf (1994) *[our translation]*	Filling vacant positions.	Personal or managerial development.	Coordination.

*Figure 7 International assignments and their stage (Harzing & Reiche, 2010, p.15). * "Coordination & control" is a term used as an alternative to Edström and Galbraith's "organization development" motive.*

	Individual benefits	Organizational benefits
During the assignment (short-term)	• Task performance • Skill building, learning, growth • Adjustment • Job satisfaction	• Accomplishment of organizational tasks • Achievement of key organizational objectives (such as control & coordination, knowledge transfer)
After the assignment (long-term)	• Continued development • Attractive future assignments • Development of contacts with key people • Promotion • Enlargement of responsibility	• Retention of repatriated employee • Utilization of new expertise • Transfer of expertise • Encouragement of international mobility among colleagues • Willingness to accept future international transfers

Figure 8 Success criteria for international transfers (Harzing & Reiche, 2010, p.40).

Drawbacks and critiques of international assignments

As emerged from the analysis conducted so far, international assignments, while being strategic tools for MNCs, are not without challenges and drawbacks. Firstly, the high cost of international assignments for relocating individuals across borders is one of the most significant challenges. These costs include allowances, housing subsidies, international school fees for the expatriate's children, healthcare coverage, and travel expenses for the expatriate and his/her family. Long-term assignments entail an escalation of these costs, making the financial burden considerable for the MNC. Because of this, many MNCs have adopted a strategy of training local personnel as a cost-effective alternative. Nevertheless, situations requiring highly specialized knowledge or intervention still necessitate costly in-person expatriate deployment. Secondly, dual-career and family challenges are a growing concern for MNCs. Many expatriates have partners with established careers which are often disrupted by relocations in foreign countries, leading to dissatisfaction and reluctance to accept assignments. This proves to be highly demanding when visa restriction or local labour laws prevent spouses from working in the host country. The consequent feeling of isolation, loss of professional identity and resentment ultimately affect the expatriate's performance and willingness to complete the work. Children should also be taken into account: the new educational system, language and social environment may be challenging. This also applies more broadly to the expatriate's family. Because these family-related issues are among the leading causes of assignment failure, MNCs often organize spousal support programs, e.g. career counselling and job search assistance, and international schooling options for children,

further increasing overall corporate expenses. Thirdly, expatriates and their families may have difficulties in adjusting to the hosting culture, especially when the distance between the HQ country and the host one is substantial. Stress and health issues may emerge as a result of these demands. Cultural intelligence is needed to overcome this challenge, build relationships, collaborate with the local team and integrate within the new social environment. Fourthly, time constraints and language barriers may limit relationship-building efforts. Because trust is a critical component of successful expatriation, if the expatriate fails in building it because of cultural misunderstanding or linguistic obstacles, it becomes difficult to implement organizational changes, introduce new practices, influence decision-making and transfer knowledge. In this context, many MNCs provide expatriates with resources to help them build relationships in the foreign country: international assignees are introduced to local stakeholders, cross-cultural coaching and access to professional groups (Harzing & Reiche, 2010). Fifthly, the risk of expatriate failure, defined as the premature return of an expatriate or the ineffective performance in the host country, and repatriate failure, i.e. the expatriate resignation shortly after completing the assignment, both represent a loss of the organization's investment and benefit competitors (Kamoche, 1997). Lastly, subsidiaries' colleagues may perceive expatriates as agents of HQ control undermining their autonomy and marginalizing local expertise. This may lead to reduced collaboration, resistance and lower morale among the staff. Also, over-reliance on expatriates may inhibit the development of local talent, especially when key roles are often filled with PCNs. MNCs should invest in building and developing local expertise and create a balanced approach which gradually integrates HCNs intro leadership positions (Harzing & Reiche, 2010). These limitations underscore the importance of a careful planning and management of international assignees (Gregersen et al., 1996), as well as measures to mitigate drawbacks. Accordingly, MNCs can refine the effectiveness of their international assignments while cultivating a more inclusive and resilient global workforce.

Furthermore, while Harzing and Reiche's (2010) contributions remain foundational in the area of international human resource management, providing a structured and robust framework to understand international assignments and global staffing strategies, the continuously transforming business landscape requires a re-assessment of their applicability in the contemporary era. Indeed, the traditional concept of physically

relocating individuals to foreign subsidiaries seems obsolete, considering the impact of the digital transformation, among others. Remote working practices and collaborations with AI have reoriented attention from expatriation as the principal method of the international mobility of the workforce. One of the most important shortcomings of Harzing and Reiche's work may be the limited consideration of how digital tools might reduce the need for international mobility of workers and their families for long periods of time. Although virtual assignments and hybrid models facilitate the transfer of knowledge and corporate cohesion without the displacement of individuals, the two Professors root their studies in the idea that intellectual exchange and organizational unity may only be achieved through physical expatriation. Moreover, their model does not address the environmental sustainability aspect of international mobility: nowadays, since companies are under great pressure to lower their carbon footprint, transferring managers and executives by air entails significant environmental concerns. The ecological impact of travel provokes reflection on whether both the proposed framework is still viable and MNCs should shift towards a more decentralized and regionally focused workforce strategy. Additionally, the post-pandemic world has forced organizations to rethink the necessity of long-term expatriation: employees currently value work-life balance more than they used to do in the past and many are reluctant to commit to long relocations that may disrupt their personal lives. Harzing and Reiche's discussion does not fully account for this shift, instead they assume a workforce willing to be relocated. The new generation of employees places greater emphasis on flexibility and companies that do not adapt may struggle with talent retention. Accordingly, research should explore how these trends reshape talent mobility, knowledge transfer and leadership development in multinational corporations. Specifically, Chapter 3 and 4 of this work will explain more in detail the megatrends of respectively digitalization and climate change, while Chapter 6 will explore the way in which MNCs might have re-thought the international assignment practice in light of the digital revolution and climate-related awareness.

3. Digitalization

The megatrend

While the second industrial revolution introduced mass production enabled by electricity (Mokyr & Strotz, 1998), the third one has utilized electronics and IT to automate production (Sandvik Coromant, n.d.). Actually, the current wave of digitalization, supported by advances in technology, denotes a fundamental step ahead (Brümmerstedt & Fiedler, 2017). Indeed, digitalization is a revolutionary technological megatrend implying the rapid growth in the adoption of digital technologies (*see Figure 9 below*) across multiple fields, i.e. social, political, economic and environmental, and having a transformative impact on them (Naughtin et al., 2024). This advancement is due to the increase in consumers' expectations: as they (consumers) familiarize themselves with the efficiency of digital solutions, the demand for the same effectiveness across all other sectors increases, making traditional channels outdated in contrast to new digital ones. Accordingly, digitalization not only transforms industries, but it also shapes consumer behaviour, leading to new demand trends (Rangaswamy et al., 2022). The accelerating trajectory of digital access and its global reach is testified by the fact that by 2013, as far as the World Bank is concerned, mobile phone subscriptions had surpassed the global population reaching 108%, while half of the world population was an internet user. This growing interconnectedness reflects the penetration of digital technologies into everyday life over the last 20 years (*see Figure 10 below*), altering the execution, understanding and conceptualization of activities, through the integration of intelligent technologies (STOXX, 2017), and reimagining the foundations of industries and economies (Brümmerstedt & Fiedler, 2017). Through the integration and processing of data gathered from different sources, as highlighted by Ambasht (2023), the autonomous systems result in unmatched opportunities for industries, among others, to optimize their processes and respond dynamically to complexities and changing conditions (Wan et al., 2020; Brümmerstedt & Fiedler, 2017). Overall, digitalization can be considered as one of the most influential forces impacting the future (IMD, 2020), driven by advancements in computing power, connectivity and emerging technologies (e.g. AI, big data and cloud computing). These elements contribute to an extensive and disruptive long-term

reconfiguration of businesses, governance frameworks, social norms (Malik & Janowska, 2018, 2019) and individuals' and organizations' operations. Therefore, digitalization represents a cognitive shift in perspective, challenging traditional methods and requiring societies to reconsider long-established approaches (STOXX, 2017).

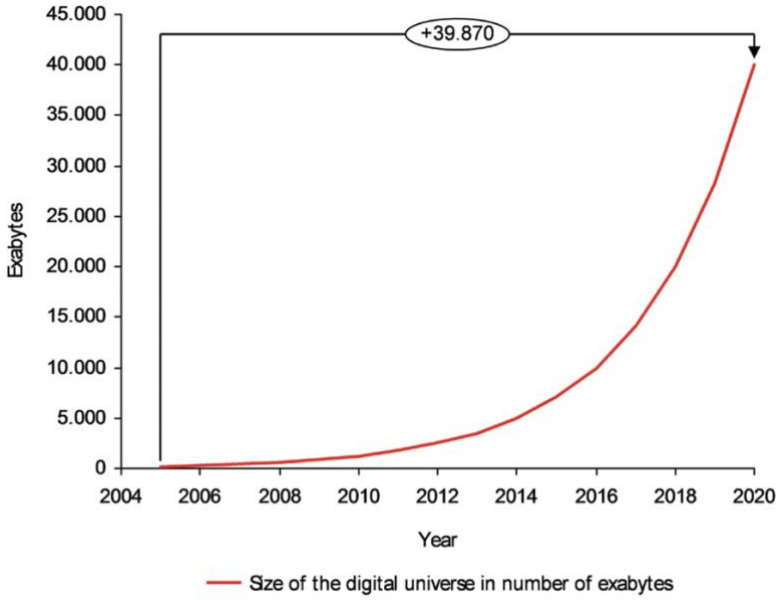

Figure 9 Increasing size of the digital universe, i.e. a term used to describe the volume of digital data created, replicated, and consumed globally (Brümmerstedt & Fiedler, 2017, p.49).

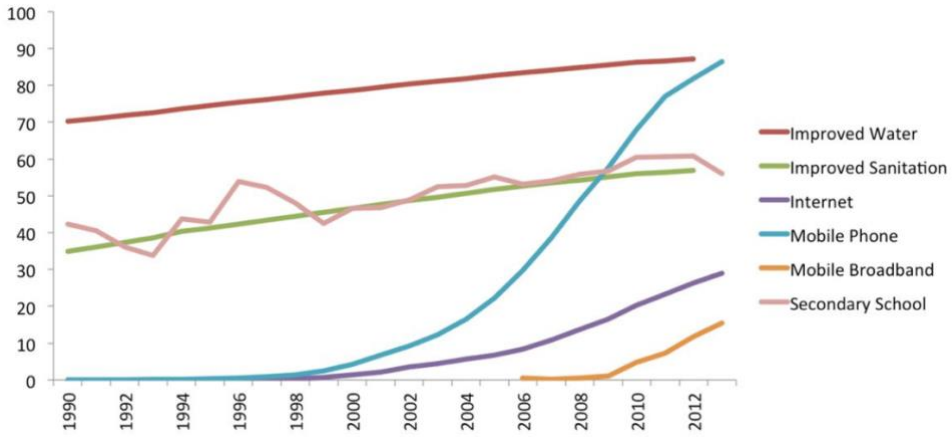

Figure 10 Mobile phone penetration takes off, internet follows. The chart displays the trajectory of various development categories tracked by the World Bank until 2013 (STOXX, 2017).

The significance of digitalization's challenging nature on established practices is multifaceted (*see Figure 11 below*). Firstly, it possesses an extensive impact: for instance, digital technologies are revolutionizing medical services, via telemedicine and remote diagnostics (Haleem et al., 2021). In education, digital tools are providing students with quasi-worldwide access through remote and online platforms (United Nations, n.d.-a). Furthermore, digitalization is promoting the modernization of current business processes (STOXX, 2017) and the development of new ones through the adoption of technologies as e-commerce platforms, while challenging traditional industries to advance (Naughtin et al., 2024). Companies that fail to adjust may face a possible loss of competitive advantage (*see Figure 12 below*), being replaced by more innovative competitors (Marr, 2023; Brümmerstedt & Fiedler, 2017; Qiong et al., 2023; Zhang et al., 2022). Secondly, and in a similar vein, digitalization enables economic globalization: through digital communication and transactions, it has allowed businesses to go beyond geographical boundaries and specific sectors, easing trade and cooperation at the global level (Manyika et al., 2016). Digitalization represents a shift in capital and growth opportunities, creating new markets, while rendering traditional and non-updated methods and models obsolete. Among the industries most affected by the transformation, there are commercial banks (CommBank, 2024), software providers, digital content streaming platforms, disk storage system manufacturers, and network administration system providers. As an example, logistic and technology companies, as Amazon and Facebook, have benefited from digitalization, which has refined worldwide commerce, communications and supply chain management (STOXX, 2017). Many of these firms are both drivers and beneficiaries of the digital transformation, leveraging their digital capabilities to reshape their industry, while setting new cross-business benchmarks for efficiency and consumers' engagement. Thus, the economic consequences of digitalization extend beyond specific companies and sectors. Moreover, as per Naughtin et al. (2024), digital tools are becoming central to delivering public services, managing electoral processes and enhancing transparency. Lastly, digitalization is re-defining how individuals interact (Walden University, n.d.) and consume information (Shanmugasundaram & Tamilarasu, 2023).

Despite the benefits envisioned so far, such as improved growth, connectivity and innovation resulting from digital tools, the latter present risks, namely the "digital divide", i.e. the unequal availability between developed and developing countries (MUSTAPHA,

2024), the spread of misinformation (ANDERSON & RAINIE, 2023), data privacy concerns (United Nations, n.d.-b), due to the vast amounts of data generated, gathered and processed, and cyberthreats (Maurer & Nelson, 2021), caused by the increasing reliance on interconnected digital systems which create vulnerabilities that can be exploited. These hurdles highlight the need for robust governance and regulatory frameworks to ensure that the digital transition enhances public well-being, while minimizing its risks (Brümmerstedt & Fiedler, 2017).

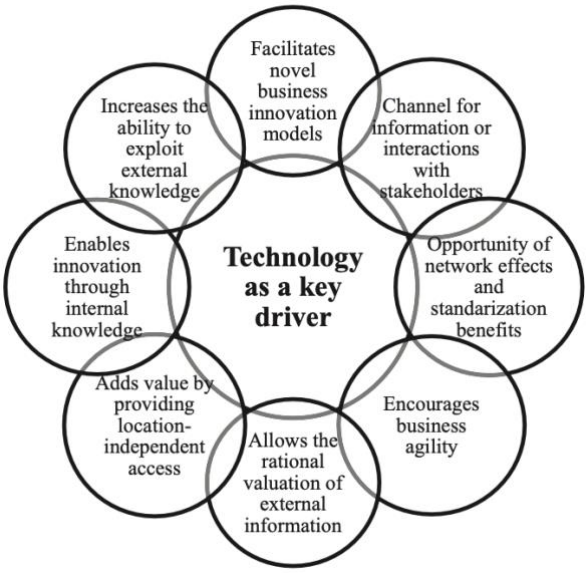

Figure 11 Advantages that companies and organizations can obtain if they introduce technology into their strategies and ways in which they operate (Kraus et al., 2021, p.11).

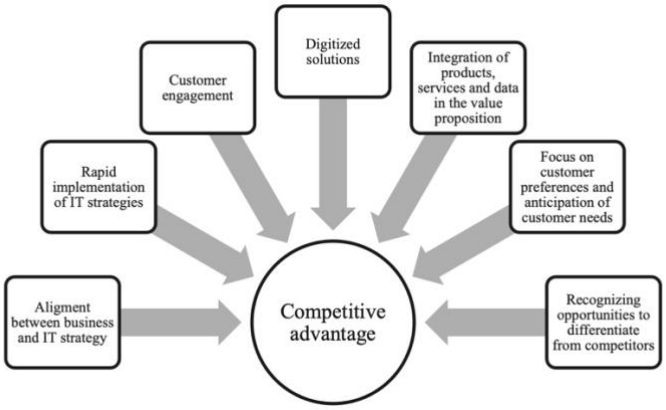

Figure 12 Companies can obtain a competitive advantage if they combine digital and non digital business strategies, acquiring capabilities, knowledge and resources which improve their reputation (Kraus et al., 2021, p.7).

In conclusion, digitalization is not only a technological evolution, but also a reordering of how society functions and economies grow. It challenges traditional norms and enters in all sectors, requiring the latter to adapt to a rapidly changing landscape. Digitalization has immense present and future benefits (Kraus et al., 2021), particularly in terms of efficiency, connectivity and innovation. Still, it is also disruptive, highlighting the need for a thoughtful governance that balances opportunities and challenges; an adaptive strategy to ensure that its transformative potential is realized in a sustainable and equitable way (STOXX, 2017); and continued research to address gaps in its current understanding, particularly in terms of its socio-cultural implications and its impact on late adopters. Overall, digitalization is the defining feature of the modern era, with transformative effects extending beyond technology. Indeed, it demands a holistic approach, integrating technological, organizational and societal perspectives to navigate the complexities of a rapidly evolving digital landscape (Kraus et al., 2021).

The impact of digitalization on firms' performance

Digitalization, as emerged in the previous section, is a transformative force, influencing firms' performance by reshaping their competitive and operational structures. Indeed, it has a comprehensive impact on them, involving three main dimensions, which determine how firms make use of digital technologies to achieve improved performance

outcomes: IT capabilities, digital orientation and digital transformation (*see Figure 13 below*) (Barba-Sánchez et al., 2024). Firstly, IT capabilities form the core of digital performance because they allow firms to acquire, deploy, integrate and reconfigure IT resources in support of strategic objectives. Utilizing technologies such as AI, big data analytics and cloud computing provides organizations with the opportunity to process information, drive innovation and improve decision-making, while enhancing organizational agility. Nevertheless, investing in IT capabilities is not sufficient for improved performance: IT competencies must be strategically aligned with the corporate goals, integrated with human expertise and embedded within the organizational culture to unlock their full potential. Secondly, digital orientation is the strategic enabler of IT capabilities, reflecting the corporate commitment to embrace digital technologies as a pivotal element of its operations and culture. A strong digital orientation ensures that investments in technology align with strategic organizational objectives and encourages a culture of innovation, collaboration and improvement. Accordingly, firms with a high level of digital orientation are more likely to integrate digital tools effectively, leading to a smoother transformation process and better performance outcomes. Empirics suggest that digital orientation enhances customer satisfaction, drives innovation and improves financial performance. Lastly, digital transformation represents the culmination of the digitization process: it is an evolutionary and disruptive process redefining business models, optimizing operations and enhancing customer experiences (Bailetti, 2012). It requires an intrinsic rethinking of the organization's value chain, enhancing efficiency, reducing costs and introducing new products and services. Notably, the digital transformation is not only a digital shift; its success is closely linked to the integration of methods, cultural (Pedersen, 2022) and technical elements as well (Ballards LLP, 2023). The interplay between social and technical factors is essential for corporate success: a socio-technical approach (Baxter & Sommerville, 2010), aligning technological resources with organizational culture and human skills, which must be trained, is essential for firms to navigate any arising challenge, e.g. resistance to change (Pasmore et al., 2018), skill gaps (Abbas & Michael, 2023) and complex system integration (Govers & van Amelsvoort, 2023). In conclusion, digitalization impacts firms' performance resulting in enhanced agility, innovation and consumers' satisfaction. However, its success depends on a combination of technological, social and strategic factors. IT capabilities provide the

foundation, digital orientation grants alignment and digital transformation redefines business models and value creation processes. By leveraging these elements, firms can achieve a sustainable competitive advantage in a digitally transformed world (Barba-Sánchez et al., 2024).

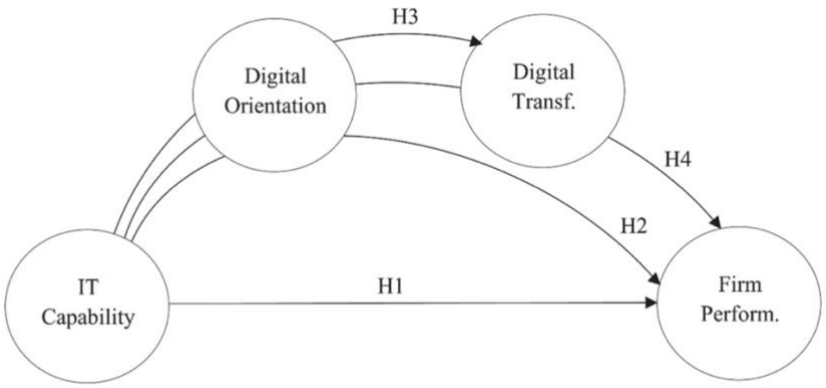

Figure 13 The three main dimensions of digitalization's impact, which determine how firms leverage digital technologies to achieve enhanced performance outcomes (Barba-Sánchez et al., 2024, p.4).

Going in more detail, digitalization has a profound impact on management control (MC) tasks: the integration of advanced technologies as AI and business intelligence (BI) tools has optimized MC, shifting the focus from operational monitoring to strategic decision making (Fähndrich, 2022). Indeed, automation has reduced the time spent on routine accounting, according to Jacob (2024), and reporting, which have evolved from static and labour-intensive exercises to dynamic and real time processes leveraging big data analytics and predictive models, while enhancing forecasting accuracy (Smith, 2024), allowing managers to engage in proactive business planning and innovation (Controllers Council, 2024). Digitalization has also revolutionized MC by introducing integrated digital platforms and advanced analytic tools, providing comprehensive organizational understanding and enabling decentralized decision-making and cross-functional collaboration. Business intelligence tools and predictive analytics enhance firms' ability to anticipate future trends and optimize resource allocation, thus improving operational efficiency and financial performance. Internet services further improve real time accessibility to data, ensuring that leaders have access to critical business information

(Fähndrich, 2022). In addition, Aksu (2023) points to the organizational agility provided by digitalization, moving away from hierarchical control models to more flexible ones (Aksu, 2023). MC has become integrated throughout multiple departments, reinforcing the collaboration between finance, IT and strategic management, while ensuring that digital technologies are leveraged both for efficiency and value creation, as well as competitive advantage (Fähndrich, 2022). Moreover, the use of digitalization implies new skill sets needed to navigate the shift (Howard, 2024) (e.g. expertise in data analytics, digital tools and cross functional collaboration) ensuring organizations adapt to technological advancement and maintain their competitive edge. Overall, digitalization has improved firms' performance by making management control more dynamic, strategically oriented and data driven. Companies that manage to effectively adopt digital technologies gain improved agility and strength in decision making, as well as long-term competitive advantage. However, to capitalize on the digital transformation, firms must ensure that technological advancements are aligned with their strategic goals, culture and workforce capabilities (Fähndrich, 2022).

Digitalization has also reshaped work structures, operational flexibility and productivity, through the widespread adoption of remote working, enabled by the integration of advanced information and communication technologies (ICT) (Vorecol Editorial Team, 2024). The latter have allowed organizations to maintain continuity, efficiency and innovation even amid disruptions like the COVID 19 pandemic. Technologies such as enterprise resource planning (ERP) systems, BI tools and cloud-based collaboration platforms have provided firms with the opportunity to shift substantial portions of their operations online, enabling businesses to adapt quickly to market changes and optimize resource allocation, and guarantee sustained productivity despite external uncertainties (Urbaniec et al., 2022). From a strategic point of view, digitalization has facilitated innovation and competitiveness by enabling corporations to collaborate harmoniously and across locations (Manyika et al., 2016). Specifically, firms in knowledge-intensive sectors, healthcare and education have benefitted from digital tools, which allow for real-time collaboration, data-driven decision making and rapid responses to industry trends. Companies have been able to introduce new business models, diversify services and improve customer engagement, leading to advanced market resilience and long-term growth (Urbaniec et al., 2022). For employees, digitalization has

improved efficiency, productivity (*see Figure 14 below*) and work-life balance through flexible work arrangements (GFoundry, 2024). Remote working solutions have also allowed firms to reduce costs (Omnipresent Team, 2024) while expanding access to a broader talent pool, improving workforce diversity and engagement (Abbas, 2023). Moreover, digitalization has driven an increase in employees' technical skills and digital literacy, improving firms' resilience to evolving markets. The success of digitalization in improving organizational performance is dependent on corporate support and investment in IT resources, employee training and strategic change management. Firms that effectively integrate digital tools into their operational and cultural frameworks experience higher efficiency, innovation capacity and adaptability, among others (*see Figure 15 below*). Despite these benefits, it is acknowledged that the digitalization of work practices, altering traditional workplace dynamics, comes with challenges (*see Figure 16 below*), necessitating new management and organizational strategies to ensure the achievement of long-term advantages and sustainability (Urbaniec et al., 2022).

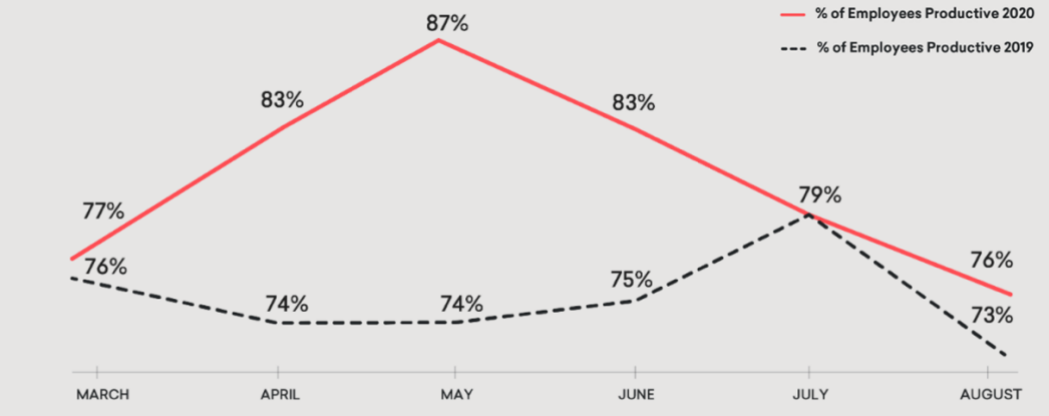

Figure 14 The output of employees is improved while working remotely from home, March-Aug 2019 and 2020 (Kazi & Hastwell, 2021).

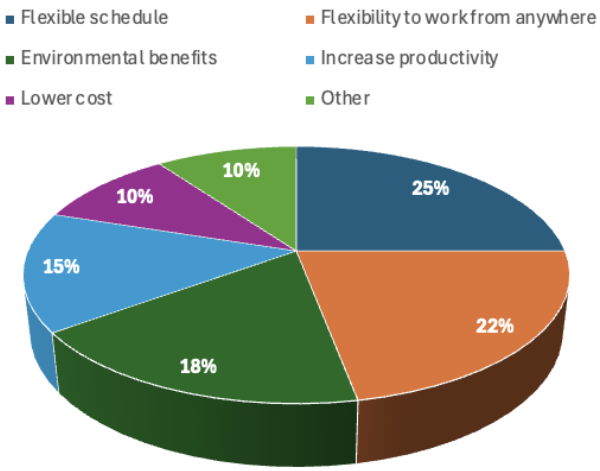

Figure 15 Benefits arising from remote working (Bhuwal, 2023).

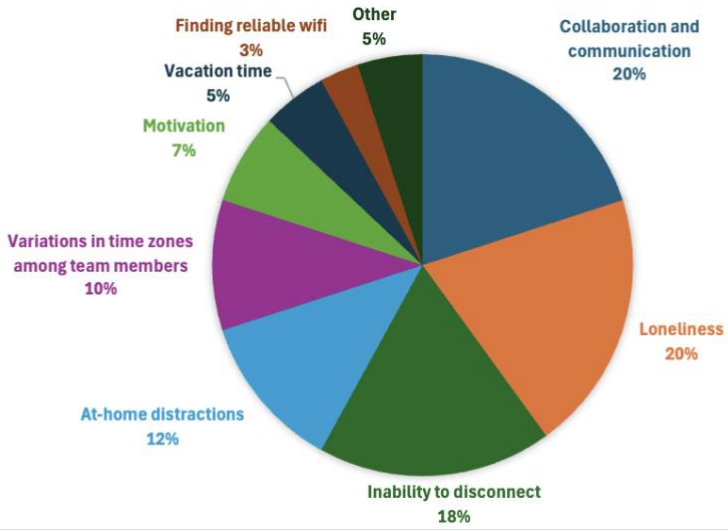

Figure 16 Challenges of working from home (Perry, 2021).

4. Climate change

The megatrend

Limiting and adapting to climate change is not only the 13th SDG established by the United Nations (UN) in 2015 as part of the "2030 Agenda for Sustainable Development" (United Nations, 2015; Resolution Adopted by the General Assembly on 25 September 2015: Transforming Our World: The 2030 Agenda for Sustainable Development, 2015), but it is also one of the most profound mega-trends, having mostly anthropogenic origins (Turrentine, 2022), which is shaping the world's future. As the ESPAS & Gaub's (2019) analysis highlights, climate change is already causing severe ecological, environmental, economic and social consequences (Herring, 2020). The earth temperature has warmed by more than one degree since the late 19th century, with most of this warming occurring in the past few decades (NOAA, 2024a), and, by 2030, it is projected to reach 1.5 degrees above pre-industrial levels (International Panel on Climate Change, 2018). This temperature rise is a reality that will disrupt human society in the coming decade, with more frequent heat waves, which lead to serious implications for human health, agricultural productivity and energy demand (Perkins-Kirkpatrick & Lewis, 2020).

Even if all human-made emissions were to cease immediately, the carbon dioxide currently present in the atmosphere would persist for 40 years: the world is locked into a specific degree of warming and the related consequences. Accordingly, climate change functions on two levels: the unavoidable repercussions of past inaction and the severe consequences that could arise if current inaction was to continue. The disruptive effects of rising temperatures are no longer abstract concerns for future populations, rather they are evident: extreme weather events have become more frequent and intense (ESPAS & Gaub, 2019). For instance, Europe has been characterized by significant heatwaves, which led to agricultural losses (- 30-50% in crop yields). On the same note, in the United States, in 2017, the cost of fighting wildfires reached $2 billion (Schmeltz & al., 2016), testifying the increasing economic burden of climate-related disasters. Additionally, hurricanes have increased their strength, due to warmer ocean waters which fuel storms and increase the latter's intensity, as well as rainfalls and consequent floodings, overwhelming drainage systems and causing major disruption in urban centres (NOAA,

2024a). More generally, 2017 weather-related calamities amounted to 290 billion euros in global economic losses, confirming the immense financial impact of climate inaction (Schmeltz & al., 2016).

The intensifying impact of climate change will not be uniform across the world. Indeed, certain regions, especially those already dealing with brutal environmental extremes, will bear a disproportionate burden (ESPAS & Gaub, 2019). Low-income communities, indigenous populations and communities of colour (*see Figure 17 below*) are often disproportionately affected by climate change impacts (Ebi et al., 2018), as they tend to live in areas where extreme weather events are more present and have fewer resources to adapt and face disasters (NOAA, 2024a). For example, the Middle East and North Africa region is expected to warm at a rate of 1.5 times higher than the global average, driving increasing aridification, inhabitability of large areas and population of cities, exacerbating urban overcrowding and social tensions (ESPAS & Gaub, 2019). Meanwhile, in Syria, prolonged droughts due to rising temperatures, combined with political and economic factors, contributed to the factors that fuelled the civil war (Gleick, 2014). Also, water availability is increasingly at risk as higher temperatures cause water to be lost from soil and reservoirs (Lall et al., 2018). This is particularly dangerous for territories which rely on seasonal snowpack for their water supply, as warmer temperatures reduce snowfall and lead to faster snowmelt, affecting drinking water supplies, hydropower generation and irrigation for agriculture. Flooding particularly affects lower-income communities with outdated infrastructure and inadequate flood protections, leaving residents more exposed. Similarly, heatwaves are more dangerous for communities lacking access to air conditioning, green spaces and healthcare services (NOAA, 2024a). These examples illustrate how climate change does not only manifest in environmental degradation but also amplifies existing political, economic and social stresses, leading to instability and conflict (National Research Council, 2013). Indeed, climate justice is needed, as well as equitable disaster response strategies and policies to address disparities (Mattar et al., 2021).

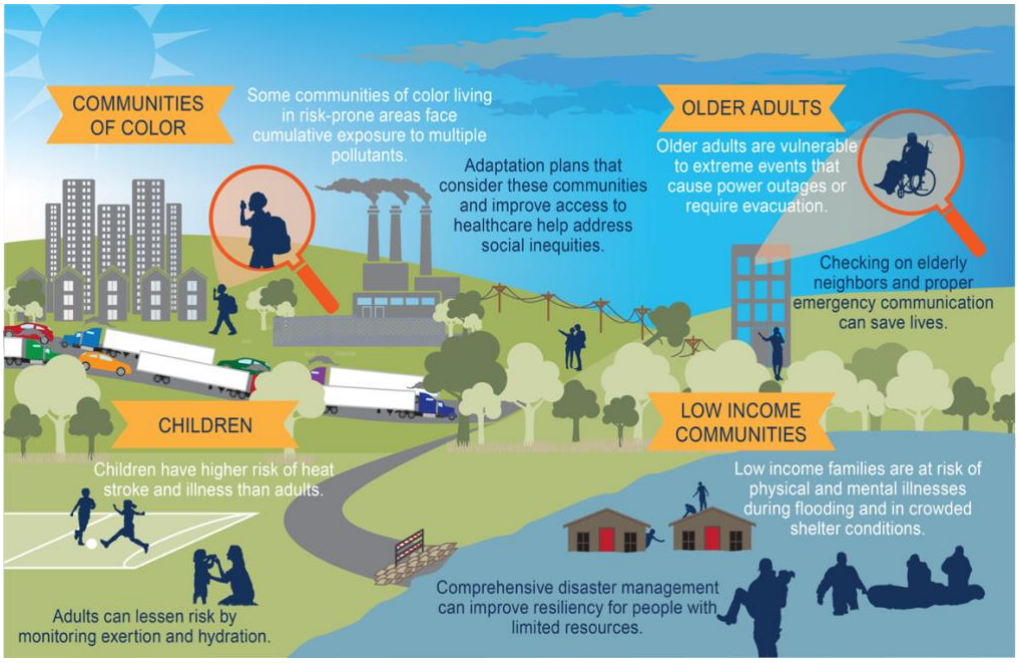

Figure 17 Some of the groups with the highest risk of exposure to climate-related adverse health threats are displayed, together with adaptation measures to address disproportionate impacts (Ebi et al., 2018, p.542).

Another major effect of climate change is sea-level rise and the related consequences. The marine heat rise, and the melting of glaciers have caused an increase in the sea level by approximately 20-22 cm since 1880, with the rate of rise recently accelerating. This is particularly dangerous for coastal communities (NOAA, 2024c), where even small increases in sea level lead to frequent and severe floodings, coastal erosion (U.S. Climate Resilience Toolkit, 2017) and intrusion of saltwater into freshwater supplies. Some of the most at-risk regions are the United States East Coast, the Gulf of Mexico and low-lying island nations, where communities are already being forced to relocate (Lindsey, 2023). The increasing presence of storms and hurricanes further amplifies the exposure of these areas, leading to enormous damages to infrastructures and businesses. Coastal resilience plans, improved infrastructures and natural defences are urgently needed to mitigate the impacts of rising seas (NOAA, 2024a).

Besides weather-related impacts, it is important to highlight the effects of climate change on ecosystems and biodiversity (Weiskopf et al., 2020). Rising temperatures and shifting precipitation trends alter habitats and both force species to migrate and disrupt ecosystems. For instance, ocean acidification is weakening coral reefs, harming shellfish

populations and disrupting marine food chains (NOAA, 2025). Coral bleaching, driven by higher ocean temperatures, is causing mass die-offs of coral reefs (NOAA, 2024b), which are crucial habitats for many marine species. This condition threatens fisheries, tourism and coastal protection, as these ecosystems act as natural barriers against storm erosion and surges. Shifting temperatures and precipitations are affecting flora and fauna. Without efforts to protect and revive ecosystems, biodiversity loss will accelerate, threatening food security, water resources (International Panel on Climate Change, n.d.) and human life (UNEP & FAO, 2021).

As far as the economic dimensions of climate change are concerned, productivity and labour markets are impacted: higher temperatures have caused declining productivity, particularly in outdoor sectors such as agriculture and construction. By 2030, the intense heat is projected to cause productivity losses amounting to over 1.7 trillion euros globally (Johnston, 2016). The self-sustaining cycle where rising temperatures increase reliance on air conditioning, driving up energy consumption and related emissions (*see Figure 18 below*) (BP p.l.c., 2016), will exacerbate the problem, particularly in cities (Liddle, 2013). As a result, urban planning and climate adaptation measures will become essential in mitigating the effects of climate change on infrastructure, economy and, most importantly, human health (ESPAS & Gaub, 2019).

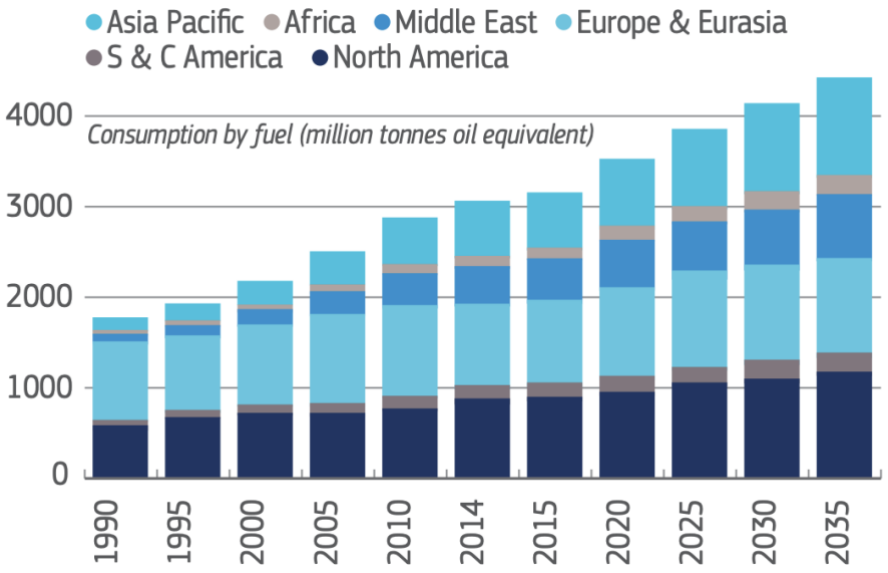

Figure 18 Natural gas consumption outlook by region. Energy consumption will rise by 1.7% per year at the global level (ESPAS & Gaub, 2019, p.17).

Concerning human health, higher temperatures are increasing the frequency of heat-related illnesses (Schmeltz et al., 2016) and deaths, especially among seniors, young children and individuals with particular health conditions. The urban heat island effect, i.e. cities retain heat due to concrete, asphalt and lack of green areas, exacerbates this problem, making heat waves more dangerous (Rutledge et al., 2024). Climate change is also endangering air quality due to repeated wildfires and vector diseases, brought by insects, caused by higher temperatures (NOAA, 2024a).

The energy sector is a dominant source of greenhouse gas emissions (*see Figure 19 below*) (Château et al., 2011) and, while the transition to renewable energy sources is progressing, it is not happening rapidly enough to counteract rising temperatures. For instance, the EU is expected to take only 32% of its energy from renewables by 2030. Still, this target is insufficient to effectively fight climate change. Accordingly, coordinated global efforts, especially among the three largest emitters, namely the EU, the US and China, are necessary to achieve meaningful reductions in emissions (ESPAS & Gaub, 2019).

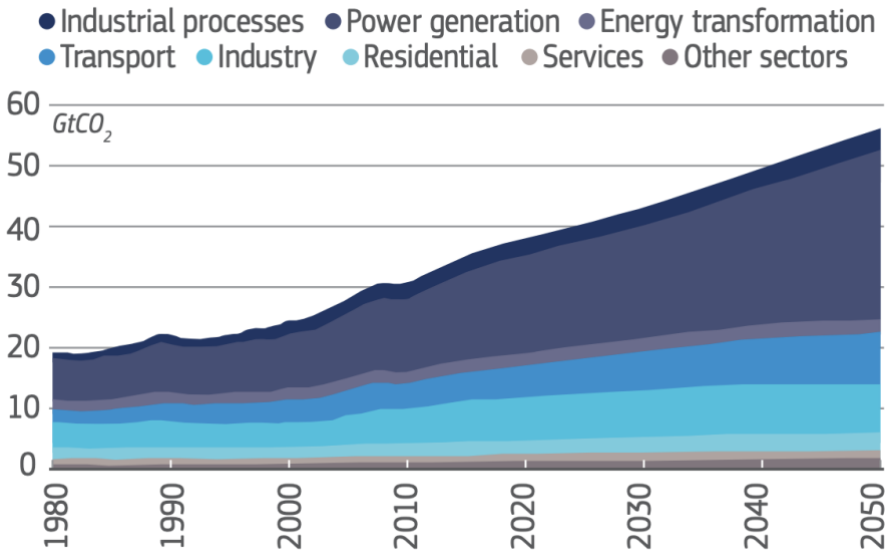

Figure 19 Global CO2 emissions by source: Baseline, 1980-2050 (ESPAS & Gaub, 2019, p.9).

Energy production is not the only cause of increasing emissions: livestock farming contributes to 14.5% of global GHG emissions (Swinburn et al., 2019). Particularly, cattle farming is a major emitter (Fiore et al., 2018). If livestock farming were a country, it

would be the third largest worldwide emitter. Therefore, a comprehensive approach, including reconsidering eating habits and sustainable food practices, is essential to address climate change. Nevertheless, only a few countries like Germany have integrated these guidelines (ESPAS & Gaub, 2019).

Despite the evident negative effects of climate change, political responses remain insufficient (Kamarck, 2019): the necessary transformations to halt emissions have not yet materialized. Indeed, while climate change has been considered an urgent matter for more than 10 years, policy responses have failed to achieve the necessary standards, and political systems still need to demonstrate the readiness and competence to mitigate and adapt to climate change (ESPAS & Gaub, 2019). Still, the related public concern is rising, creating opportunities for implementing stricter regulations on emissions and models of a greener economy.

Overall, this megatrend needs to be considered as both an environmental crisis and a threat to the existence of humanity. The choices made will determine the future path the world will take (ESPAS & Gaub, 2019). Investing in GHG emissions reduction by 2030 (*see Figure 20 below*) through clean energy technologies and in resilient infrastructures (US EPA, 2024), as improved drainage systems, reinforced buildings against extreme events and updated emergency response plans, is an essential solution and adaptation strategy to preserve the humankind and its activities. Also protecting and restoring ecosystems, improving climate education and awareness and seeking the support of scientific research may help communities around the world to adapt to climate change and mitigate its worst effects (NOAA, 2024a).

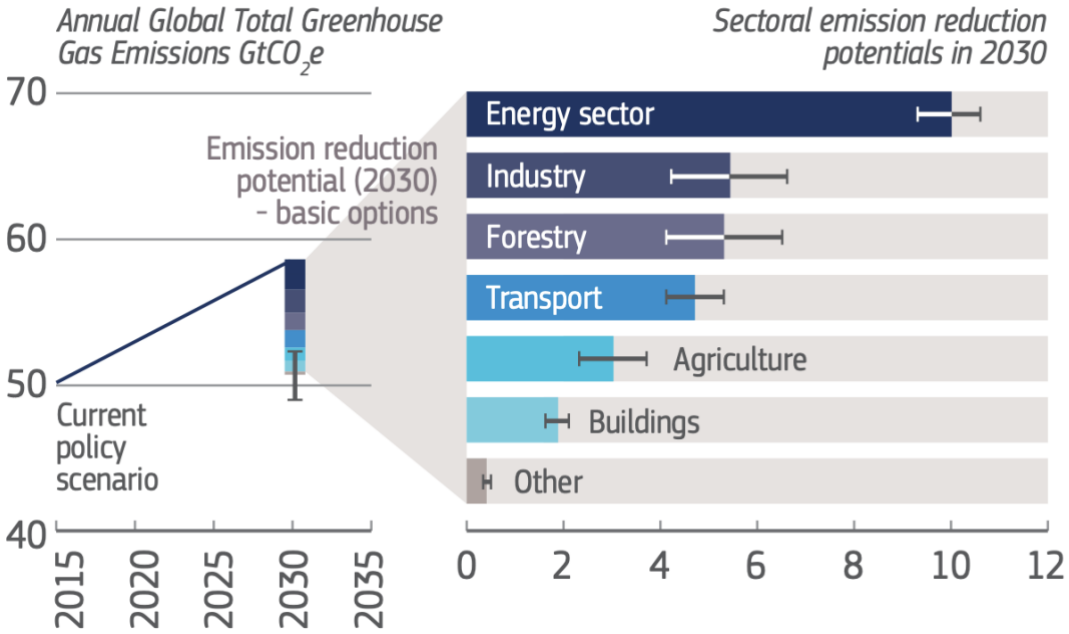

Figure 20 Total emission reduction potential in 2030 (ESPAS & Gaub, 2019, p.34).

The impact of climate change on firms' performance

Climate change, besides its environmental, social and policy implications, has profound effects on firms' economics and operations. The main causal loops of climate change risks related to organizations are physical, regulatory, reputational and litigation ones (*see Figure 21 below*) (Nikolaou et al., 2015).

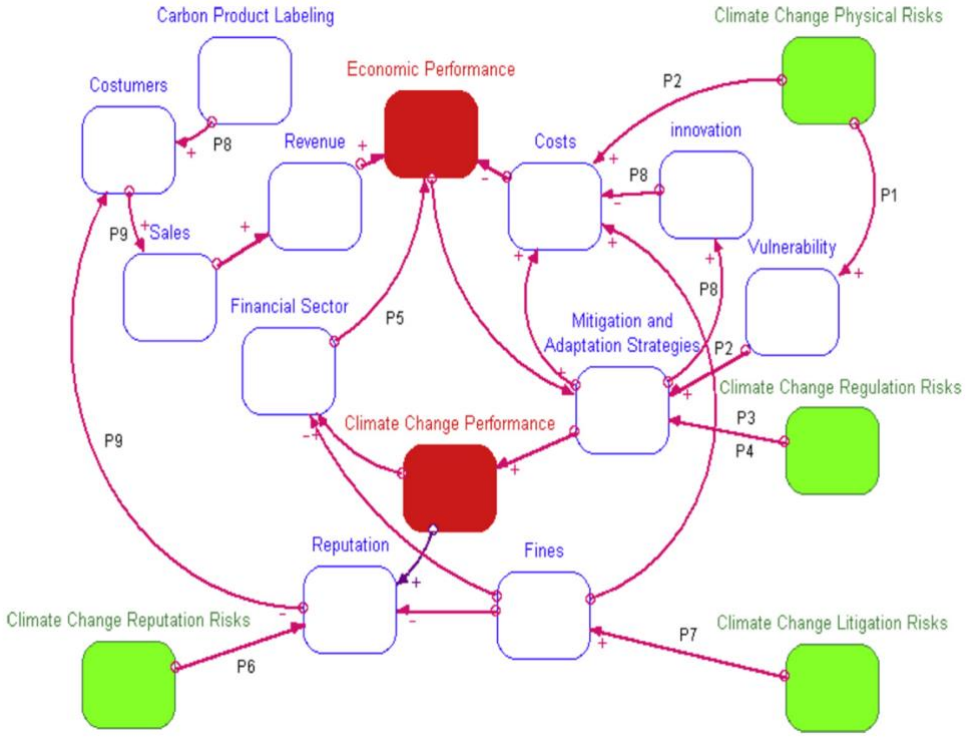

Figure 21 The causal loop of risks related to the adverse events of climate change (Nikolaou et al., 2015, p.502).

Physical risks refer to the direct consequences of climate change on business operations, such as extreme weather events, droughts (US EPA, 2025), floods and temperature fluctuations. These happenings can cause supply chain interruptions, damages to infrastructures and increased operational costs. For instance, the ski sector faces direct threats from climate change: because warmer winters lead to shorter ski seasons, revenues for resorts and related businesses decrease, turning them into stranded assets (Butcher, 2024). In the same way, the agri-business is experiencing disruptions due to altered precipitation patterns and rising temperatures, impacting crop yields and food production (Anwar et al., 2012). Firms operating in these sectors must adapt to these changes, not to face financial instability. Indeed, the resilience of supply chains is crucial, especially for firms that, operating globally, are particularly vulnerable to environmental disorders (Katsaliaki et al., 2022) when it comes to sourcing and transportation, among others. Businesses need to reconstruct their supply chains to minimize vulnerabilities related to climate (e.g. disruptions in production and increasing costs), by diversifying

suppliers (Mathews, 2024; Nikolaou et al., 2015) and investing locally, as well as developing fallback plans to ensure operational stability (Bailey et al., n.d.).

Likewise, some of the latest empirical findings confirm that temperature extremes impact financial performance. From 1995 to 2019, as heat increased, approximately 17.000 firms across 93 countries had declining revenues and operating income. To be exact, a one-standard-deviation increase in extreme heat days resulted in a 0.6% decrease in revenues and 1.8% decline in operating income (Pankratz et al., 2023). The study also highlights that capital markets failed to comprehensively anticipate these climate-induced financial risks, causing investor surprises when earnings announcements reflect lower-than-expected performance. This suggests that the capacity of adaptation is crucial in the mitigation of associated-with-extreme-heat financial risks. Additionally, concerning mitigation, an effective corporate governance framework plays an important role in alleviating climate-related financial vulnerabilities. Indeed, firms that integrate climate governance into their corporate organization tend to experience better financial outcomes, as well as regulatory positions (Aibar-Guzmán et al., 2023).

Regulatory risks originate from environmental laws aimed at mitigating climate change, such as carbon taxes and emission trading standards (Nikolaou et al., 2015). Organizations that do not comply with these regulations may face financial hurdles, higher operational costs and reputational damage (Paycheck, 2024). In this sense, firms need to deal with regulatory challenges by adopting mitigation and adaptation strategies that align with evolving policy frameworks and capitalise on policy incentives to develop newer sustainable business models (Nikolaou et al., 2015).

Reputational risks arise when organizations are perceived as environmentally irresponsible or failing to adequately address climate change (Nikolaou et al., 2015). Currently, consumers, investors and stakeholders are increasingly prioritizing sustainability (Bar Am et al., 2023). Indeed, companies that are found not to be climate-responsible may lose confidence and experience decline in sales. Because consumers prioritize environmentally responsible products, companies that do not meet expectations may suffer from declining market share. Additionally, corporates which are not environmentally, socially and governance-wise (ESG) responsible endanger support coming from investors, who are increasingly focused on environmental, social and governance criteria, leading them to divest from high-risk businesses, in terms of

environmental impact. Accordingly, firms should integrate climate change considerations into their corporate strategies to improve brand image and maintain the competitive advantage. Companies that actively promote sustainability and innovation may improve their market position and build stronger relationships with environmentally conscious stakeholders. Conversely, their stock valuations may decrease, they would be unable to attract long-term capital and borrowing costs could increase (Nikolaou et al., 2015). Moreover, Pankratz et al. (2023) provide financial evidence of the significance of climate-related reputational risks: because financial analysts often underestimate the negative effects of extreme heat on firm performance, earnings forecast errors occur, leading to investor surprises and consequent stock price adjustments and highlighting the market's incapability to fully incorporate climate risks into asset pricing. This confirms that firms with weak climate risk management face increased stock market volatility and hardship in preserving investor confidence. Furthermore, in order to lower reputational risks, institutional investors should be increasingly present because they are more likely to adopt climate governance mechanisms, as they (investors) favour sustainability-oriented corporate strategies. In particular, the effectiveness of climate governance in improving financial performance is reinforced even more when institutional ownership is homogeneously distributed, securing unification toward climate resilience initiatives (Aibar-Guzmán et al., 2023).

Litigation risks concern the potential legal consequences firms may face due to their environmental impact (Nikolaou et al., 2015). Lawsuits against corporations are becoming more common, especially if related to their role in contributing to climate change (LSE, 2024). Corporates that fail to comply with climate standards or that are found responsible for environmental damage may be subject to costly legal fines or reputational harm (Karpoff et al., 2005), as well as legal battles (CHAPMAN, 2025). Firms should therefore actively implement environmental risk management strategies to reduce their exposure to such liabilities. Recent evidence confirms that organizations with poor climate change performance face higher litigation risks because of increased information asymmetry. MNCs that fail to disclose climate-related financial risks in an adequate way are more prone to be involved in lawsuits, face higher legal costs and experience greater financial volatility (Dey et al., 2024).

Nikolaou et al. (2015) explore these risks, developing a model that simulates different business scenarios under diverse climate risk conditions. Through "what-if" scenarios, the study, centred on the ski industry and agricultural sector, provides firms with a decision-making framework that helps them understand the potential consequences of climate change strategies. The analysis also reveals the financial pressures that many firms are experiencing due to climate-related disruptions and simulates four different climate risk scenarios. The first scenario aims at examining the impact of physical risks, highlighting how extreme weather events affect firms by disrupting supply chains, damaging infrastructures and increasing operational costs (*see Figure 22 below*). The scenario testifies that if firms fail to prepare for extreme weather, they face important financial losses and instability. The second scenario on regulatory risks finds that companies that invest early in mitigation and adaptation strategies tend to perform better, in terms of finance, in the long run. Indeed, they avoid compliance penalties and gain a leadership position in sustainability (*see Figure 23 below*). The third scenario shows that consumer preferences and investor behaviour can influence corporate success. Businesses that prioritize corporate social responsibility and sustainability gain reputational and competitive advantage by attracting environmentally conscious consumers and investors (*see Figure 24 below*). Lastly, companies failing to address their environmental impacts may face increasing legal costs and declining profitability and investor confidence (*see Figure 25 below*). Overall, climate change is not only an external risk but a force re-shaping financial, operational and strategic corporate decisions.

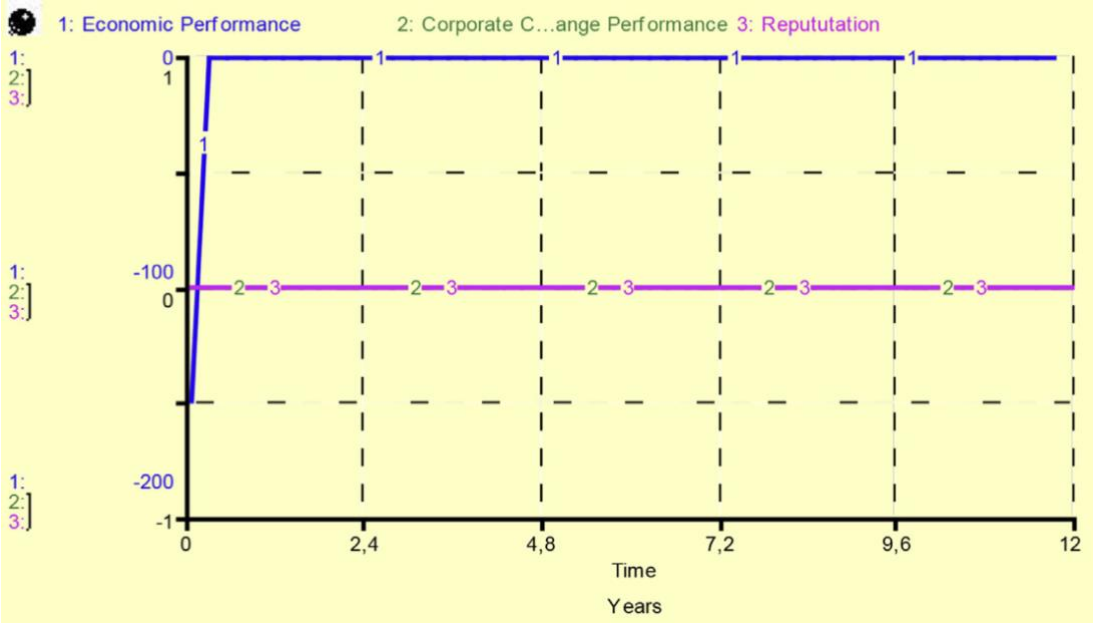

Figure 22 First scenario - in front of an extreme weather event, firms' economic performance may be affected, and their climate change performance and the reputation can reach zero. Therefore, an extreme weather event has a direct effect on firms' total costs due to a possible disruption in production and operations (Nikolaou et al., 2015, p.504).

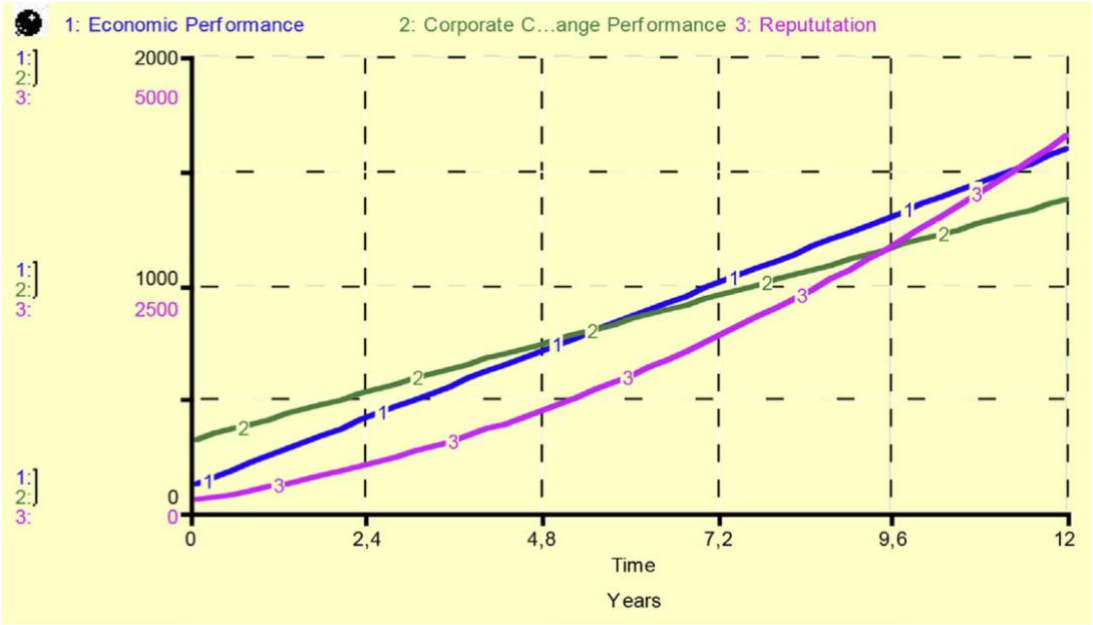

Figure 23 Second scenario - adopting climate change strategies means that the trajectories of economic performance, climate change performance and reputation will be positive if there is effective management (Nikolaou et al., 2015, p.505).

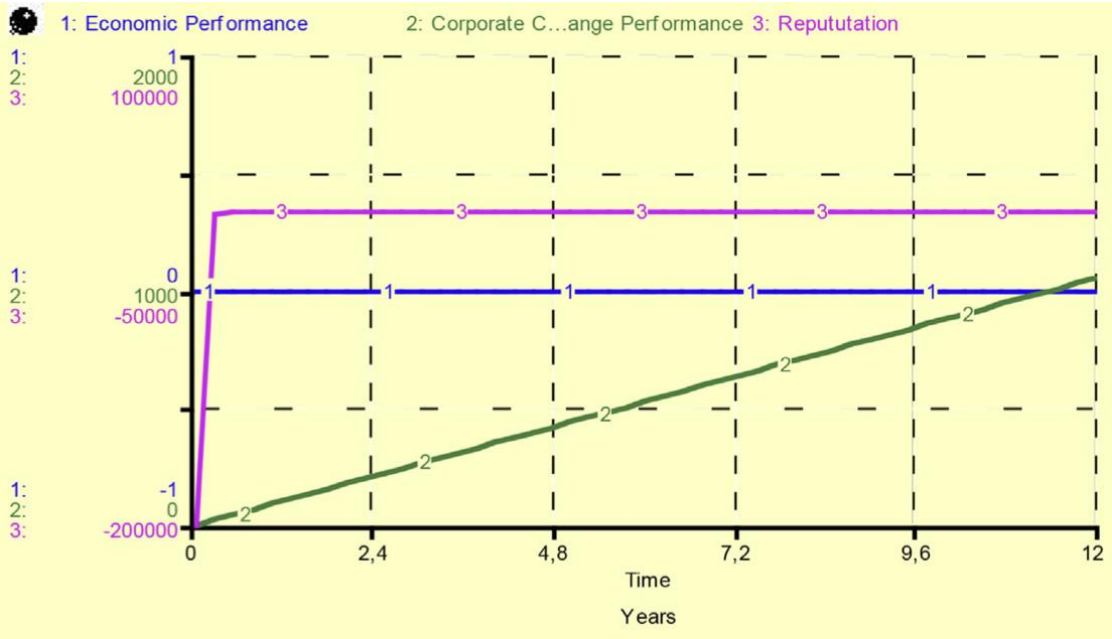

Figure 24 Third scenario - a negative reputation does not change the economic performance and reputation, while it leads the firm to adopt strategies to improve its climate change performance (Nikolaou et al., 2015, p.505).

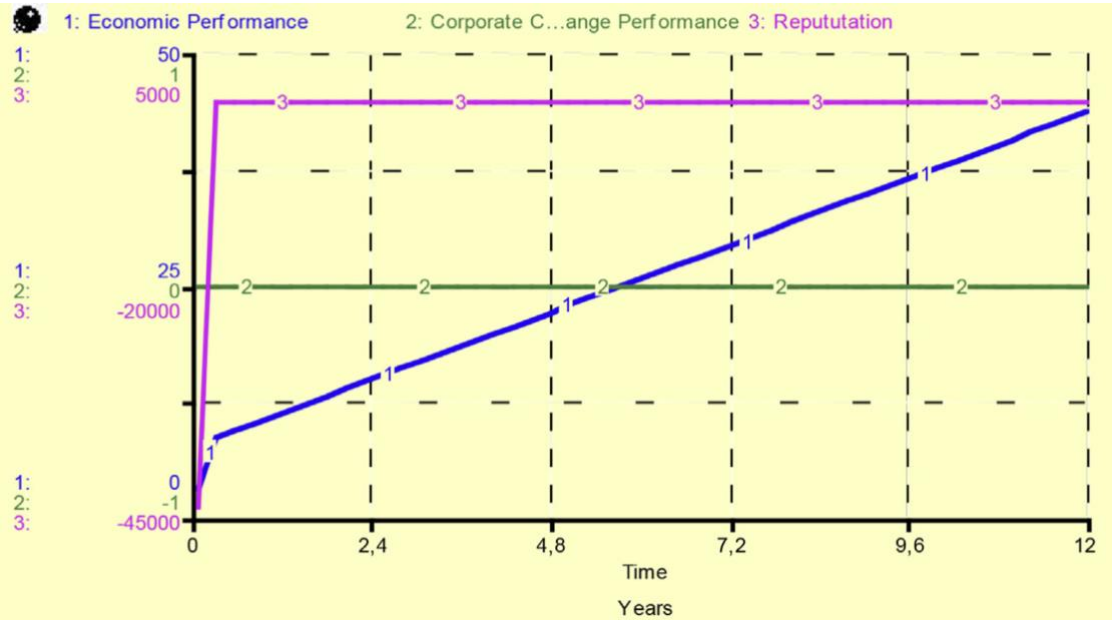

Figure 25 Fourth scenario – fines displace the economic performance curve, while the reputation and environmental performances remain constant. This happens because the firm's reputation and environmental performance would be affected by the non-compliance with climate change policy (Nikolaou et al., 2015, p.506).

As Nikolaou et al. (2015) highlight, focusing on the long-term financial and operational implications of climate change on firms, the former have both direct and indirect risks to the latter's financial stability. Indeed, respectively, firms are exposed to damages from extreme weather events such as floods, droughts (US EPA, 2025) and hurricanes, which may lead to infrastructures' destruction, supply chain disruptions and unexpected financial losses. These risks have already begun manifesting: many businesses have experienced relevant cost burdens due to climate-induced disasters and related to rising insurance premiums and capital expenditures to safeguard assets for future occurrences. Secondly, among indirect risks, climate change may lead to market volatility, hindering cost prediction and returns on investments. For companies reliant on natural resources, like agriculture and energy production, environmental changes bring further volatility in supply and operational costs. For instance, energy-intensive industries deal with increasing expenses due to carbon pricing mechanisms, emission taxes and stricter regulatory frameworks, aimed at reducing GHG emissions.

Apart from financial and operational risks, firms face strategic challenges posed by climate change (Nutz & Stebegg, 2022). Indeed, they deal with a crucial decision in determining whether to take a proactive or reactive approach to climate adaption. Businesses that invest in sustainability measures, technological innovation and compliance with regulations tend to strengthen their market position (KPMG, 2024) and financial resilience over time (Whelan et al., 2021). Specifically, innovation is critical in determining the response to climate change. The latter introduces many risks, but it also presents opportunities for businesses able to capitalize on emerging sustainability trends: developing green technology, investing in renewable energy and implementing sustainable production processes differentiate corporations from competitors and improve their positioning in the market, leveraging industry leadership (Nikolaou et al., 2015). Also, innovations can lead to cost reductions of energy consumption, lower waste production and enhanced efficiency in resource management, contributing to the firm's performance (Pons et al., 2013). Oppositely, firms that delay adaptation and mitigation strategies may struggle with rising costs, decreasing competitiveness and increasing investor scepticism (Goolgasian et al., 2025). Thus, firms should incorporate climate risk management into their long-term business plan to experience improved financial outcomes, contrarily to those that respond only if forced to do so by regulatory pressures

or physical disruptions. Businesses must find a balance between short-term costs and long-term sustainability. Investing in adaptation measures, despite being an initial expense, ultimately enhances resilience and competitiveness.

In conclusion, climate change is an existential risk for business continuity which can no longer be ignored. Treating climate adaptation as a secondary concern equals declining revenues, increasing costs (Alberti, 2024) and financial instability (International Finance Corporation, 2022; Pankratz et al., 2023). Conversely, an effective environmentally oriented governance (Aibar-Guzmán et al., 2023), i.e. corporates that embrace climate-conscious strategies, will both mitigate risks and create new opportunities for growth, resilience and profitability (Zawadzki et al., 2023). Climate change is not only a regulatory challenge, but rather a pivotal transformation of global economic systems, redefining business operations, competition and sustained profitability. Corporate leaders must urgently integrate sustainability into their business strategies to ensure they remain competitive in a market which is increasingly shaped by climate policies, shifting consumers' demand and environmental limitations. Also, firms must consider it as not only a risk but also an opportunity to achieve long-term success: investing in technology, complying with regulations and adopting sustainable business models reduces exposure to financial losses and enhances market competitiveness (Nikolaou et al., 2015).

5. The interplay between digitalization and sustainability through success and difficulty

As emerged thus far, digitalization is a transformative and strategic force (Grainger-Brown & Malekpour, 2019) that, provided it is leveraged effectively, is able to accelerate progress toward sustainability goals. Indeed, the 2030 Agenda for Sustainable Development emphasizes the need for digital approaches to address global challenges and hasten advancement. The global framework, establishing a unified plan to promote both prosperity and peace for people and the planet, was adopted by all United Nations Member States in September 2015. Through its core 17 Sustainable Development Goals, the Agenda seeks to tackle the world's most urgent challenges of both the current and upcoming times, namely poverty (Goal 1), hunger (Goal 2), health (Goal 3), inclusive quality education (Goal 4), gender equality (Goal 5), sustainable management of water and sanitation (Goal 6), worldwide "affordable, reliable and sustainable" energy access (Goal 7), economic growth (Goal 8), infrastructures' resilience (Goal 9), inequality (Goal 10), cities' inclusivity, sustainability and safety (Goal 11), sustainable consumption (Goal 12), climate change (Goal 13), sustainable conservation and use of "the oceans, seas and marine resources for sustainable development" (Goal 14), terrestrial ecosystems (Goal 15), peaceful and inclusive societies (Goal 16) and global partnerships (Goal 17) (United Nations, 2015; Resolution Adopted by the General Assembly on 25 September 2015: Transforming Our World: The 2030 Agenda for Sustainable Development, 2015). To accelerate SDG achievement, data-driven, systematic and context-specific approaches are needed. Digitalization plays a pivotal role in advancing this progress, providing innovative solutions to some of the world's most urgent sustainability challenges, such as enhancing resource efficiency, optimizing natural resource management, and improving the strategic planning of interventions.

The transformative potential associated with digitalization is highlighted by the additional positive contributions it brings to ESG performance. Indeed, digital transformation is a pivotal enabler for achieving sustainability, which is not intended as an isolated process but rather as a system of interconnected benefits, emerging from environmental stewardship, social empowerment and governance improvement. In the European Union, digital initiatives are actively integrated into sustainability strategies:

digitalization is depicted as a cornerstone for environmental improvement, offering transformative capabilities to optimize resource use and reduce the ecological footprint. For instance, technologies like the Internet of Things (IoT)-enabled energy management systems and smart grids have fundamentally altered the landscape of energy consumption toward renewables (Kwilinski et al., 2023). Related to this and concerning the environmental implication of digitalization, the latter has a significant role in fostering green innovation: digital technologies can facilitate the transition toward sustainable energy systems, by supporting renewable energy adoption (wind and solar) (Xu et al., 2022) and the emergence of green Fintech solutions. The latter are reshaping the corresponding sector by easing investments in sustainable projects, creating a network of businesses and governments that are incentivized to adopt cleaner production methods and promote sustainability in their operations (Kwilinski et al., 2023). Additionally, data analytics systems enable the precise tracking and measurement of emissions and environmental indicators, facilitating the identification of areas where sustainability measures are most urgently needed. The related transparency is fundamental to establish accountability and define targeted interventions (Kwilinski et al., 2023). In this regard, the Internet of Things plays a crucial role because it provides real time data on environmental parameters: both sensors and devices are employed to monitor the levels of pollution, truck the utilization of resources and manage industrial emissions, contributing to fossil fuels reliance reduction and cleaner industrial practices enhancement (e.g. smart manufacturing systems, powered by the Internet of Things, are able to optimize and improve the effectiveness of production processes by using a fewer amount of resources, while maintaining high efficiency). On another note, big data analytics facilitates detailed climate research by processing an extensive collection of datasets to improve predictive models and scenarios for climate change adaptation and biodiversity conservation (Xu et al., 2022). Digitalization has an important impact also on the social dimension: the former is often portrayed as a tool to enhance social equity and inclusion (Kwilinski et al., 2023). Indeed, it can address disparities, by improving access to digital skills, training and online job platforms, e-government portals and online education systems. These digital services reduce bureaucratic inefficiencies and improve service delivery. As a result, digitalization can directly contribute to social empowerment, aligning with goals such as SDG 4 (quality education) and SDG 10 (reduced inequalities)

(Kwilinski et al., 2023). With regard to SDG 4, education is one of the main areas where digitalization has showed its transformative impact: digital learning platforms and online resources have increased literacy rates and boosted innovation, by providing students with worldwide access to knowledge, including those in underserved and remote regions (Xu et al., 2022), via international educational and cultural programs. In governance, digitalization has reduced the need for physical interactions, minimizing bureaucratic delays and the likelihood of corruption. Currently, citizens are able to access government services, files and permits' applications through digital portals, enhancing the efficiency of public service delivery (Kwilinski et al., 2023). In addition, making digital records available to the public improves accountability, as data trails can be audited to ensure compliance with existing regulations (Xu et al., 2022). As a last point, these ESG factors influence and are influenced by the economic component of sustainability, where digitalization's impact is most tangible. In fact, digital tools improve productivity and efficiency across industries. For instance, digitalization has facilitated the growth of green investments, allowing firms to both align with sustainability objectives and attract investors focused on ESG compliance, and enabled businesses to optimize the use of their resources and minimize waste. Furthermore, digitalization unveils new markets and opportunities, because it reduces the need for physical infrastructures, diminishing the environmental impact associated with traditional business operations and enabling companies to reach the global audience (Kwilinski et al., 2023).

Notwithstanding the benefits recognized thus far, significant trade-offs associated with digitalization must be considered. Its costs on sustainability, i.e. environmental, social and economic factors, are deeply intertwined with the processes of innovation, adoption and pervasiveness of digital technologies, often creating unintended negative consequences that undermine SDGs (Veit & Thatcher, 2023). In fact, as far as the environmental component is concerned, both the production and use of digital technologies require significant amounts of energy and resources: the manufacturing of devices like sensor servers or smartphones requires the extraction of rare earth materials, which, in most cases, leads to habitat destruction and water contamination. Additionally, data centres, which are critical to supporting digital platforms, consume vast amounts of electricity, contributing and increasing $CO2_e$ emissions. This paradox highlights that, while digitalization may promote environmental sustainability, its unsupervised expansion may

harm natural ecosystems (Xu et al., 2022). Firstly, delving into specifics, digital technologies are non-renewable energy-intensive: cryptocurrencies, for instance, necessitate significant power to operate, consuming an amount of energy comparable to that of countries such as Sweden or Malaysia, and adding to GHG emissions. On the same line, there are data centres, which enable cloud computing, storage and processing, pivotal to the digital infrastructure. They operate continuously, requiring electricity for their functioning and contributing to around 2% of global emissions, comparable to the aviation industry's footprint (Dedrick, 2010). Along with this, the production of digital devices relies on rare earth metals, whose extraction comes with acute environmental repercussions: ecological deterioration (e.g. deforestation, habitat destruction and water pollution and depletion caused by lithium extraction) and exploitation risks (the demand for resources requires extraction in developing countries, where weak regulations result in unsafe practices and environmental harm). Additionally, e-waste is one of the fastest waste streams globally and directly results from the rapid obsolescence of digital devices: many are designed with limited lifespans or rapidly become outdated due to technological advancements, i.e. short product life cycles. The improper disposal of e-waste leads to hazardous substances (e.g. mercury and cadmium) which leach into the soil and water, posing significant risks to the ecosystem and human health; and recycling rates for e-waste persist at a low level due to technological and economic barriers (complex designs make material recovery inefficient and costly). Among these environmental costs, rebound effects should also be considered: efficiency gains from digital technologies frequently backfire due to the above-mentioned effect, where reduced consumption in one area leads to increased consumption in another one. As an example, energy-efficient appliances or data systems reduce immediate energy use. However, this may incentivize higher usage or investments, undermining environmental benefits (Veit & Thatcher, 2023). Among the social challenges that accompany the benefits of digitalization, one of the foremost issues is the digital divide, i.e. the unequal access to digital technologies and resources, with marginalized communities and underserved regions usually lacking the education, infrastructure and financial means to participate in the digital economy. Socio-economic inequalities may arise (Xu et al., 2022), increasing the exclusion of unprivileged communities in developing regions. As far as automation is concerned, while efficiency is improved, it can lead to widespread job losses and instability in

affected communities (Veit & Thatcher, 2023). Lastly, economic costs include the prioritization of short-term gains, market disruptions and unsustainable consumption patterns. As a matter of fact, digitalization often emphasizes immediate economic benefits over long term sustainability: companies prioritize cost saving and rapid innovation, which may lead to practices that compromise environmental goals, and overproduction, resulting from the push for constant tech upgrades, which creates waste and resource inefficiencies. Additionally, digitalization brings about uneven cost distribution: it often shifts burdens from firms to both the environment or marginalized communities and disrupts traditional industries. Indeed, while some sectors benefit from new efficiencies, others, e.g. small-scale businesses, suffer economic losses due to increased competition and changing consumer behaviours. Overall, digitalization tends to externalize its negative impacts: while companies and consumers collect immediate benefits, environmental and social costs are deferred to future generations or shifted to vulnerable communities. As such, it may intensify economic inequalities if access to technologies, and to the related benefits, is concentrated in the hands of a few nations, limiting innovation, as well as the even distribution of wealth and opportunities. Disparities between thriving and stagnating actors undermine the inclusive potential of digitalization and pose ethical and economic challenges to worldwide development (Xu et al., 2022). Therefore, digitalization's sustainability costs must be critically assessed to ensure that its benefits are accomplished without exacerbating existing global challenges (Veit & Thatcher, 2023).

The so far portrayed relationship between digitalization and sustainability is embedded with complexity, being an intricate and dynamic interplay with immense potential to achieve progress towards sustainability and a viable source of additional challenges. Indeed, digitalization is not inherently beneficial or harmful: it is context-dependent and shaped by the ways in which technologies are implemented, the goals that they serve, and the socio-economic, cultural and environmental context in which they operate. Despite digitalization may significantly contribute to areas such as poverty reduction and environmental monitoring; its application does not come without trade-offs. Accordingly, digitalization has a notable ecological and energy footprint due to the substantial resources required for infrastructure's operations. It may also amplify both social inequalities and the digital divide. These tensions stress the need for a "mindful use of

digitalization" (Gupta & Rhyner, 2022) to understand the latter's purpose, problem-solving capabilities, real-world outcomes, synergies and trade-offs in the context of sustainability. Existing frameworks assessing the impact of digitalization on SDGs are scattered, targeting narrowly on specific fields and goals. In relation to the UN Agenda, this results in knowledge gaps and hinders its holistic implementation. Hence, to address this complexity, Gupta & Rhyner (2022) introduce the "Digitainability Assessment Framework", which lies on the underlying idea that digitalization does not operate in isolation, rather it interacts with environmental, socio-economic and ethical components of sustainable development. This approach draws on and adapts concepts of the Theory of Change (ToC), which outlines the pathways of change resulting from specific interventions (Anderson, 2009, pp. 1, 37).

The "Digitainability Assessment Framework" primarily focuses on evaluating the impact of digital interventions (DIs) on SDG indicators, capturing all types of effects (i.e. direct, indirect and cascading). It aims to bridge gaps in understanding the interplay between digitalization and sustainability while offering insights to stakeholders, such as policymakers and organizations, responsible for implementing these interventions. As previously suggested, the framework acknowledges that digitalization relies on the interaction with a system of social, environmental, and economic factors: an intervention intended to improve air quality through the IoT-based monitoring (Madakam et al., 2015) may at the same time reduce health risks, providing a synergy, and increase energy consumption and material usage, i.e. a trade-off. Similarly, blockchain-based systems in healthcare may enhance data security while creating challenges related to energy demand and regulatory compliance. As a matter of fact, the interplay between sustainability and digitalization heavily depends on the context: the same technology can bring different outcomes in diverse settings. In developed nations, digital solutions might focus on efficiency gains, while in developing countries they could target fundamental needs, including either access to education, clean water, or healthcare. Due to this variability, the DAF highlights the importance of designing interventions according to local conditions and involving diverse stakeholders to ensure inclusivity and effectiveness. Addressing uncertain and indirect effects arising from this interplay is also crucial: digitalization can have long-term and cascading effects that may be difficult to predict. As a case in point, the increased reliance on digital technologies can lead to unforeseen shifts in labour

markets, governance structures, and environmental systems. Thus, the DAF is embedded with various processes and tools to address uncertainties: i) iterative assessments - the DAF is designed to be used repeatedly over time, which allows users to refine their understanding of DIs' impacts as more empirical evidence and contextual information becomes available, ensuring that the framework evolves with new data, reduced subjectivity and enhanced accuracy of assessments; ii) three levels of evidence, i.e. *opinion*, *reason* and *literature-backed*, to deal with varying degrees of uncertainty in impact assessments - *opinion* allows users to record preliminary beliefs or hypothesis about the impacts when data is scarce; *reason* encourages them to support their assessments with *reasoned* judgments and logical arguments; while *literature-backed* ensures that the final outcomes are scientifically grounded, requiring evidence either from studies, research or validated data; iii) five impact categories to identify domains where uncertainties exist, i.e. *synergy*, *ambivalent*, *trade-off*, *uncertain* and *bidirectional* – by way of illustration, the *uncertain* category entails potential impacts that are logical but lack sufficient data about their unclear long-term effects; iv) context – the DAF highlights its importance in impact assessment, acknowledging outcomes may vary depending on economic, cultural, social and geographic conditions. The framework, by incorporating context-specific data, reduces generalizations and enhances the reliability of assessments; v) stakeholders' involvement as a critical component to address uncertainties - diverse perspectives from civil society, academia, industries and governments may help identify overlooked impacts and refine evaluations, allowing stakeholders to collaborate in addressing gaps in knowledge and propose solutions; vi) supplementary tools – the framework includes, among others, excel-based templates for systematically documenting impacts and allowing users to map the latter across all SDG indicators, providing an holistic view and identification of gaps or uncertain areas; vii) additional indicators - the framework includes the option to suggest additional measures for assessing impacts that are not covered by existing SDGs. This is particularly useful for addressing emerging concerns, such as cybersecurity and privacy, which are not explicitly included in the Sustainable Development Goals indicators (Gupta & Rhyner, 2022).

In conclusion, the relationship between sustainability and digitalization requires continuous reflection, adjustment and mindful design and implementation to ensure benefits exceed costs, promoting sustainable progress. Their interplay becomes clearer

when we acknowledge the immense potential of digital technologies to advance SDGs. Still, because it is important to be considerate of the risks associated with digitalization's uncritical adoption, the DAF provides a system to manage this complex relationship, ensuring that digitalization acts as a catalyst for sustainable development rather than a source of new challenges.

6. MNCs rethink international assignments

Empirical evidence of the effect of the digital and climate change awareness on international assignments

As it has emerged from previous chapters, global mobility, and international assignments in particular, are undergoing a profound transformation due to the megatrends of both digitalization and climate change (*see Figure 26 below*). Companies are indeed rethinking short-term business travels as well as long-term international assignments to align with environmental goals and leverage digital advancements. Empirical data from the "International People Mobility Survey Report 2024" by AON (2024), involving various respondents (*see Figure 27 below*) and global mobility profiles (*see Figure 28 below*), pictures the return of business travels after the COVID-19 pandemic, which has been significant with 77% of organizations maintaining or increasing their travel volume in 2024. Still, a set of new challenges has been arising, i.e. aligning mobility with sustainability goals and digital mobility management. Firstly, ESG policies, active in 65% of organizations in 2024 (vs. 34% of organizations without active ESG policies or with unknown results), and especially the "E", which has been the most important aspect of sustainability over the last years, have shaped mobility strategies with companies taking proactive steps to reduce their carbon footprint, set emission targets and focus on greener behaviours. 52% of organizations state (+8% relative to 2023) that travels have decreased to meet sustainability obligations, while 47% has implemented programs to offset carbon emissions coming from travelling (+10% compared to 2023). Additionally, 30% of MNCs are opting for alternative transportation methods and greener housing solutions (*see Figure 29 below*). This trend is particularly evident if related to companies with ESG policies: as the latter increase in strength, organizations become less likely to accelerate the pace of corporate trips. Indeed, compared to 2023, only 34% of these have augmented travel, while among companies without an ESG policy, 46% travel more. Furthermore, business travels remain regionally focused with most trips occurring within Europe (32%) and North America (19%), reducing the need for long-haul flights (s*ee Figure 30 below*). Concerning the improvements in digital technologies, these are also playing a critical role in managing mobility in a more efficient and sustainable way:

with an increasing number of remote working personas, including digital nomads, permanent remote workers and international hybrid workers, virtual collaboration tools are increasingly replacing business travels, particularly short-term ones, allowing teams to connect remotely rather than flying to meet in person, while still supporting international business operations. 47% of firms are permitting or considering international hybrid remote working (*see Figure 31 below*). Despite the importance of long-term assignments in global talent strategies, the latter are evolving to incorporate sustainability considerations and digital work models. Many companies are, in fact, reducing international assignments due to related environmental impacts and cost concerns with 25% of respondents reporting fewer assignments in 2024 (*see Figure 32 below*). Shorter deployments are replacing traditional long-term transfers with a duration ranging between six months and two years. Also, local hiring and remote working are being prioritized as alternatives to the physical relocation of employees, reducing the carbon footprint associated with international mobility (*see Figure 33 below*). With regard to digitalization, there is a rise of remote work models, allowing companies to fill roles without resettlements (*see Figure 34 below*).

Despite its contribution and before proceeding with the analysis, the above mentioned "Mobility Report" has some limitations to consider. Firstly, the survey covers 37 countries, with approximately 82% of respondents coming from Europe, the Middle East and Africa (EMEA) regions. This important regional skew may undermine the accurate reflection of global mobility challenges and practices in the Americas, Asia and Oceania: in these areas, cultural, legal and logistical matters may differ significantly from the rest of the world. Secondly, the most represented sectors are the industrial, manufacturing and financial ones, while areas such as life sciences, sports and hospitality have low response rates. Consequently, the provided evidence may align more with MNCs' costumes, rather than with the ones of smaller sectors. Thirdly, the respondent pool is very limited. Indeed, the sample provides directional analysis but may not be robust enough to generalize across all companies worldwide. For roles as digital nomads and remote workers, more granularities would require a diverse and larger dataset. Fourthly, the survey was conducted in the first quarter of 2024, reflecting a moment of quick advancements in technology – AI innovation, for instance – and requiring more recent re-evaluation. Fifthly, biases and inaccuracies may be present because the report's data relies on what

respondents reported about their own organizations. They (respondents) may inflate compliance, progress or benefits or interpret the survey's terms in diverse ways. Sixthly, the report is constructed from the employer's point of view; no input from employees, expats or remote workers is there. Therefore, their experiences are not reflected. Additionally, the study does not display any quantitative analysis and techniques, making it hard to assess correlations, patterns and causality, if any. Moreover, the report, despite mentioning compliance challenges, does not dive into how these vary across countries, therefore limiting useful takeaways for Human Resources teams. Ninthly, the study seems to underestimate the long-term impact of certain trends, such as the ESG one. Lastly, while a few comparisons are made with 2023, the report does not embark in multi-year trend analysis. The latter would be useful to identify sustained shifts in KPIs versus short-term changes. In conclusion, these aspects should be taken into account for a holistic and complete interpretation of the next sections.

Factor	Ranking in 2024	2024	2023
Inflation/rising prices	1 ↑	51%	50%
Talent shortages	2 ↓	49%	51%
Political unrest/warzones	3	22%	NA
Growing awareness of equitable treatment	4	18%	NA
ESG/Sustainability	5 ↓	16%	38%
Sanctions (in 2023: specifically due to the war in Ukraine)	6 ↓	12%	16%

Figure 26 Key 2024 trends with the greatest impact on global mobility (AON, 2024, p.5).

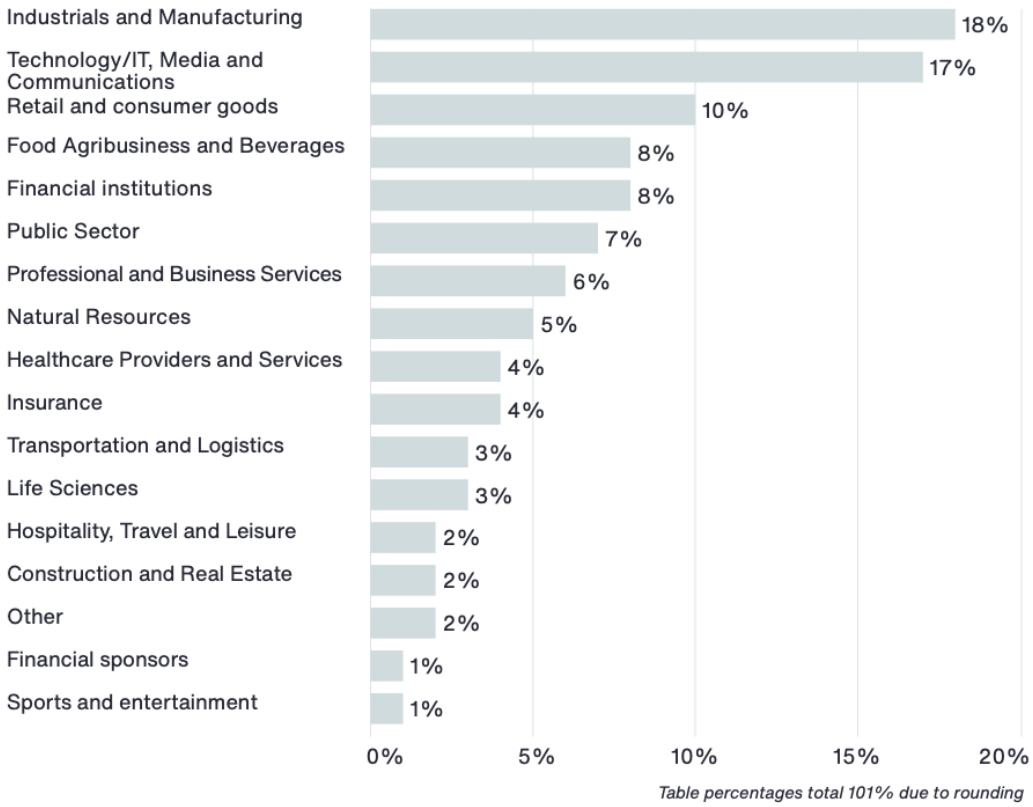

Figure 27 Survey's respondent profile by sector (AON, 2024, p.10).

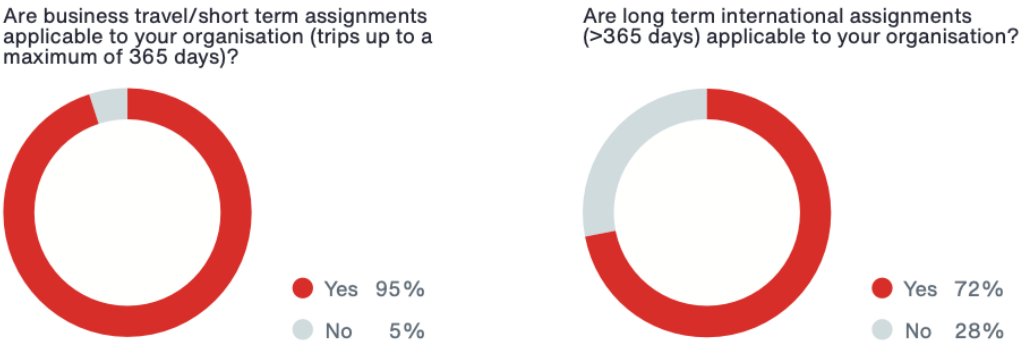

Figure 28 Survey's global mobility profile (AON, 2024, p.10).

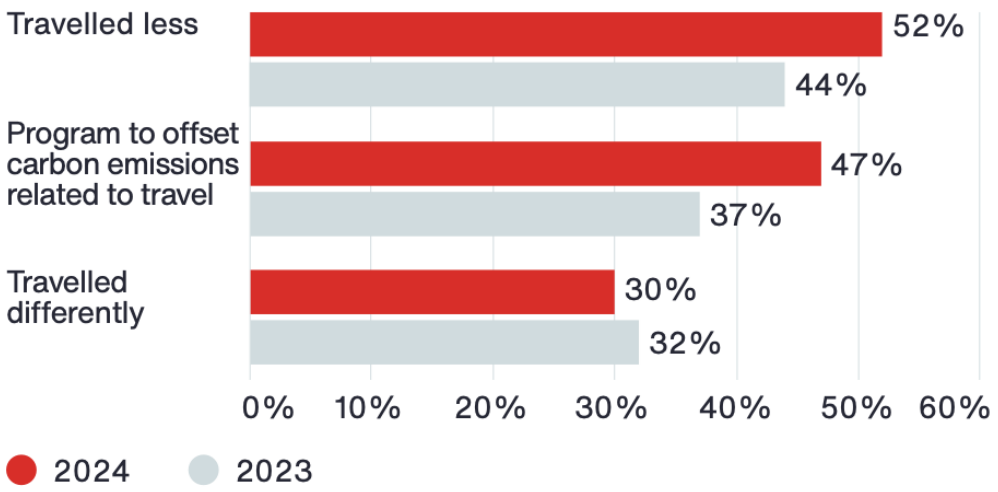

Figure 29 Survey question "What measures did your organisation take to meet the company's ESG policy related to global mobility: environmental factors?" (AON, 2024, p.13).

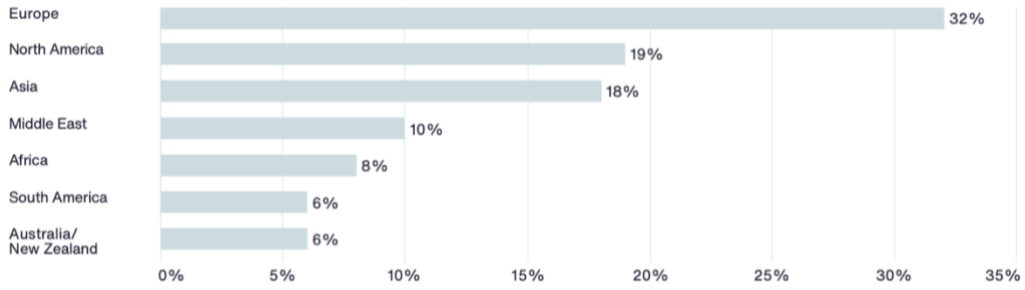

Figure 30 Survey question "Where will employees within your organisation mostly be travelling to?" (AON, 2024, p.21).

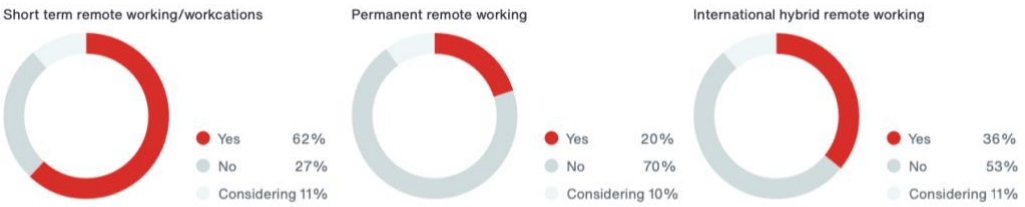

Figure 31 Survey question "Are the following ways of international remote working allowed in your organization?" (AON, 2024, p.39).

	2024	2023	2022
No change	26%		
Fewer assignments	25%	38%	33%
Different types of assignment contracts (e.g. home-based vs. host-based)	20%		
More assignments	20%	19%	9%
Shorter assignments	14%		
Equal number of assignments	13%		
Longer assignments	9%		

Figure 32 Survey question "What are the key challenges for international assignments?" (AON, 2024, p.30).

	2024	2023
Compliance/social security/tax immigration	58%	56% (1)
Equal/uniform treatment of employees	35%	N/A
Policies and instructions	34%	44% (2)
International benefits and insurances	22%	26% (=3)
Communication	16%	26% (=3)
Employee wellbeing	15%	19% (5)
Safety	12%	20% (4)
Relocation/convenience	9%	10% (6)
ESG, net-zero and sustainability commitments	3%	1% (7)

Figure 33 Survey question on "International remote working challenges", where ESG, net-zero, and sustainability commitments are not a concern, as remote working contributes to sustainability rather than posing challenges (AON, 2024, p.43).

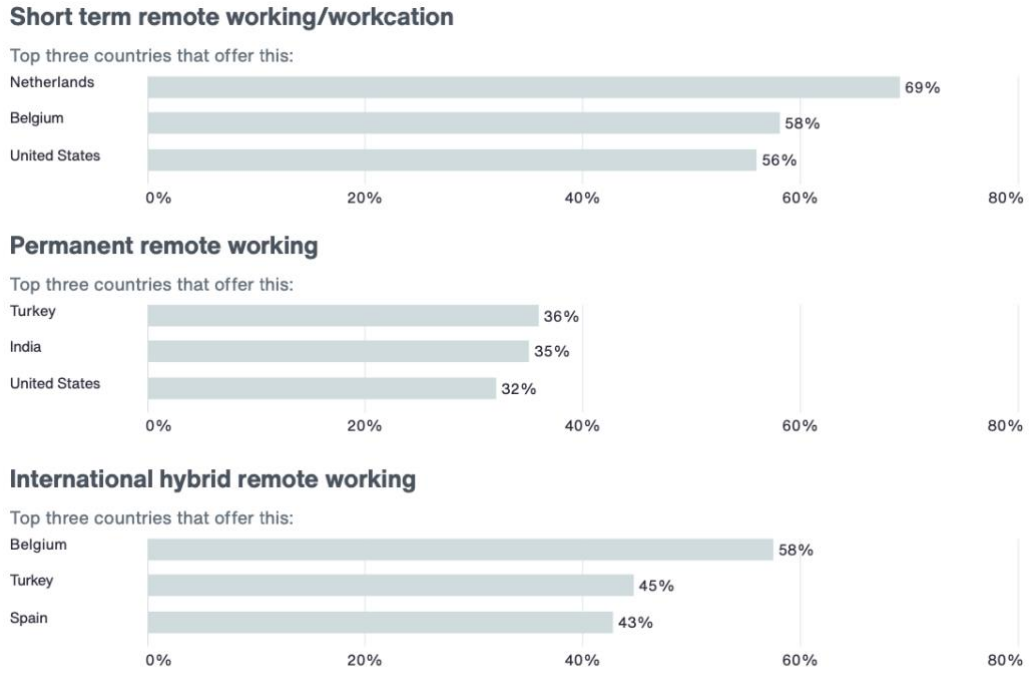

Figure 34 There are various approaches to remote working depending on the considered set of countries (AON, 2024, p.40).

Digitalization: the generalization of evidence

The traditional structure of international assignments, where employees are physically relocated abroad to manage subsidiaries, transfer knowledge and develop skills, has long been a necessity for MNCs. Nevertheless, the rapid rise of digitalization has forced companies to reconsider this practice, as evidence displayed in the previous section demonstrates, due to both the high financial and logistical costs (visas, relocation packages, accommodation and schooling of the expatriate's children) and efficiency. The reliance on digital tools, virtual collaboration platforms, as Microsoft Teams and Zoom, among others, and remote work capabilities has led many MNCs to question the effectiveness and vitality of international assignments. Additionally, the post COVID-19 pandemic scenario has encouraged businesses to reconsider their approach to expatriation as a consequence of travel restrictions, logistical challenges and worldwide adoption of remote work. Accordingly, many companies shifted to virtual international assignments out of necessity but ultimately adopted it as a fundamental part of their corporate mobility strategy (GARLAND, 2021). Currently, businesses are implementing and formalizing

virtual assignments as a standard mobility option, considering a potential expansion of this virtual practice, and others are planning to follow the same path in the near future. This testifies that corporate mobility is undergoing a fundamental transformation where physical relocation is not the default approach to manage global talent and flexibility and where cost-effectiveness and sustainability serve as pillars of a new way of working.

One of the primary reasons for this shift is related to the cost saving associated with virtual assignments: because traditional expatriation requires massive investments, as housing allowances and support services, among others, companies, by leveraging digital tools and allowing employees to work internationally without being physically relocated, can reduce these expenses while maintaining a global workforce. Another factor driving the adoption of the virtual assignment practice is (climate) sustainability awareness. Long flights are a major source of CO_2 emissions and, as environmental concerns become central to business decision making, many organizations seek ways to minimize their carbon footprint, while preserving international operations. Hence, virtual assignments allow companies to achieve their corporate sustainability goals, while reducing the need for both frequent travels and long-term expatriation periods.

Still, the digitalization of international assignments has pushed companies toward specific challenges and limitations, such as compliance concerns over tax, immigration and labour laws. Indeed, when an employee works remotely from one country while being employed in another country, questions over which labour laws apply, where the employee should pay taxes and how social security contributions should be managed may arise. Also, many governments have not yet adopted their legal frameworks to accommodate the complexity of cross-border remote work, thus creating regulatory uncertainty for businesses worldwide. Another major issue is the impact of virtual assignments on humans and their cultures: while digital tools have allowed cross-border communication and cooperation and made them easier, virtual employees may face challenges in integrating into international teams, building relationships and trust, and understanding local business cultures. In traditional expatriate assignments, workers are used to benefit from face-to-face interactions, informal networking occasions and local cultural immersion. Conversely, virtual assignments make these exchanges harder for people because of potentially arising feelings of isolation, lack of connection to the host country, and difficulties in forming business relationships. Furthermore, cross-cultural

competencies may be eroded because of the limited immersion into the new culture and adaptability that come with living and working in a foreign country. Also, knowledge transfer may suffer because the informal exchanges that occur in physical workplaces are difficult to replace in virtual settings. Besides that, there is a risk that future leaders may lack the same level of cultural intelligence and versatility that previous generations of expatriates used to develop via the direct immersion in foreign markets. Consequently, companies need to design strategies that support virtual assignments and ensure people remain integrated into their teams: the transition to virtual assignments places new demands on both HR and global mobility teams. While the latter have been focusing on matters related to the physical relocation of employees, their role has now shifted toward structuring virtual assignment policies, ensuring compliance and remote employees' flourishing to succeed in a digital work environment. This may involve training managers on how to lead remote international teams, implementing well-being programs to address any arising challenge and ensuring that virtual employees have access to the same career advancement opportunities as their physically relocated counterparts. Indeed, the lack of presence in a foreign subsidiary may hinder career progression, as leadership potential is usually recognized through in-person engagement and direct involvement in business operations. As a result, MNCs should understand and restructure the assessment of performance and success in a remote international context: the establishment of clear guidelines on what is expected from assignees, how their contributions will be measured and how they will remain visible in an organization where physical presence has traditionally played a very important role in career advancement are essential.

Overall, virtual assignments are set to remain a lasting component of the work landscape. Digital collaboration platforms have proved that working remotely at the international level can be effective and sustainable. Still, success depends on a well-defined implementation: companies must ensure that this practice aligns with corporate objectives, compliance requirements and employee well-being, among others. In this sense, hybridity may be the most effective solution to balance the advantages and challenges of virtual international assignments, the latter no longer being solely tied to the physical relocation of the workforce: offering ground experience and flexibility may allow organizations to meet the demands of a rapidly evolving business landscape.

Climate change: the generalization of evidence

Companies have long played a pivotal role in environmental degradation due to the high levels of pollution they emit and the significant depletion of natural resources. Indeed, a great majority of corporations are heavily dependent on natural resources, such as water, minerals and fossil fuels, to sustain operations. As an example, certain industries contribute to deforestation: despite forests being essential for climate regulation, biodiversity conservation and resource availability, corporate activities lead to their large-scale destruction, worsening the climate change phenomenon, among others. Also, the volume of waste produced by corporations, including packaging mineral materials and electronic waste, is a major environmental challenge, leading to high levels of pollution of landfills and oceans. Because of the growing climate change awareness, it is important for businesses to understand and reduce their ecological footprint to promote long term sustainability. Consequently, corporate initiatives, as international assignments, must be adjusted to align with sustainability efforts and responsible resource consumption. Related to this, the thirteenth Sustainable Development Goal is significant, as it urges the lowering of emissions. Firms should therefore lower the ones originated from corporate mobility. Additionally, the Goal number twelve advocates for responsible consumption and production, highlighting the need for MNCs to adopt eco-friendly practices when planning relocation. Lastly, SDG 11 focuses on sustainable cities and communities, highlighting the benefits of integrating expatriates into local communities rather than maintaining them alienated. The latter would increase the demand for housing, infrastructures and services, which could be otherwise available to the local population.

Related to and besides the UN 2030 Agenda for Sustainable Development, external pressures from stakeholders, including consumers, investors, regulators and competitors, tend to drive companies to integrate environmental considerations in their strategic decision-making, leading to a reduction in GHG emissions and other negative environmental impacts. Due to this intense pressure, companies are forced to go beyond incremental improvements and embed environmental considerations into their top strategic decisions, while taking pre-emptive actions to improve their environmental performance, rather than waiting for future regulatory changes to be enforced. From the business point of view, the market is paying close attention to corporate environmental

strategies: many companies are implementing reactive measures, emphasizing their environmental efforts, in response to the level of external pressure. Still, as climate change awareness continues to grow as well as the push from stakeholders on related matters, companies will likely be forced to take stronger actions, by fully integrating environmental considerations into their strategic planning. By proceeding this way, organizations will not only improve their reputation, but they will also gain cost efficiencies and innovation, by optimizing processes and adopting sustainable technologies.

While environmental sustainability concerns have been discussed in corporate strategy, they have not been systematically integrated into expatriate management. As outlined in the first part of this chapter ("Empirical evidence of the effect of the digital and climate change awareness on international assignments"), many companies have started tracking their sustainability initiatives and strategies for reporting, but expatriate programs are often overlooked in these assessments. Schmitz et al. (2023) recommend corporations to cover global mobility in their ESG reporting frameworks to measure carbon emissions originating from expatriate travel, including energy consumption in corporate housing and the environmental impact of relocation logistics. In fact, there is an urgent need for organizations to rethink international mobility, by including environmental considerations into expatriate policies and programs. One of the primary reasons for this statement is the growing recognition that climate change poses significant threats to global businesses: the former (climate change) is relevant to expatriate programs as it impacts the latter's feasibility, safety and sustainability. Accordingly, extreme weather events and rising sea levels and temperatures can make certain expatriate destinations unsafe or less viable. Secondly, tightening regulations on carbon emissions and the rising scrutiny from customers, investors and regulatory bodies, force MNCs to justify the necessity of maintaining expatriate-heavy business models. Indeed, flights are one of the main sources of CO_2 discharges in global mobility, as expatriates regularly travel for assignments, meetings and corporate functions. In addition to air travel, expatriates usually make a significant use of terrestrial transportation, corporate housing, and office spaces, which consume large amounts of energy and resources. Indeed, relocations generate a substantial quantity of waste, as they tend to involve temporary housing, as

well as furniture purchases, and shipments, contributing to excessive resource consumption and disposal waste.

One of the most straightforward and effective ways to mitigate these concerns is reducing work related travels and reconsider local hiring as an alternative to expatriate placements: as companies commit to the achievement of net-zero goals, they are being forced to reevaluate whether frequent international trips are justifiable or not. Instead of approving professional journeys for negotiations, training and meetings, among others, organizations are evaluating whether these objectives can be achieved through virtual alternatives. In this sense, the COVID-19 pandemic played a major role in accelerating this shift, as businesses became accustomed to video conferencing and remote collaboration. Nowadays, despite the resumption of travel in many sectors, companies are becoming more selective in assessing the necessity of employees being physically present elsewhere. As priorly mentioned, international assignees are provided with relocation support and housing, which come with high environmental and energy costs, due to the increased consumption resulting from maintaining multiple residencies. Therefore, many businesses are now opting for sustainable alternatives, such as virtual settings and local hiring. Concerning the latter, for instance, by investing in regional talent development and hiring host-country nationals instead of expatriates, the need for frequent international travels and accommodations is eliminated, contributing to the reduction of the company's carbon footprint. Moreover, local hires tend to possess a better understanding of their own cultural and regulatory environments than expatriates, which can improve business and market operations. Companies are also adopting policies that render travels more sustainable, such as internal carbon pricing mechanisms, where departments are held accountable for the environmental cost of their choices and employees are encouraged to use low-carbon transport options when available (for instance, trains instead of flights on shorter routes). There is also a growing trend of selecting eco-friendly accommodations with businesses preferring houses and hotels which prioritize sustainability. This shift is not just due to ethical considerations, rather it is becoming a business necessity with worldwide governments imposing stringent regulations on carbon emissions. Additionally, because sustainability is becoming a priority for investors, companies that fail to align with these expectations may face reputational and financial hurdles. At the same time, (younger) employees are demanding

more environmentally responsible practices from their employers, making sustainability a necessity for the attraction and retention of talent.

Despite these efforts and the increasingly pronounced role of climate change in shaping corporate decisions, there are challenges in integrating sustainability into international assignments. Some companies struggle to balance environmental objectives with the need for in-person presence, because, in many sectors, face-to-face interactions are critical for concluding deals and overseeing operations. Virtual tools, while having significantly improved, cannot entirely replace interpersonal communication. Because businesses must navigate the trade-offs between efficiency costs and sustainability, the future of international assignments lies in hybridity, i.e. the combination of virtual collaboration and physical presence; regional assignments and environmentally conscious policies. As a result of the growing influence of climate change on business strategies, MNCs must redesign their programs, reducing travel and rethinking the nature of expatriate assignments, to align with sustainability imperatives, comply with regulations and preserve global connections. By doing so, organizations may also gain a competitive edge, enabling talent attraction, fulfilling investor demands, and safeguarding international operations. The transition to sustainable expatriate management requires commitment from leaders, mobility professionals, and expatriates themselves, who all play a crucial role in shaping the future of international assignments in a world increasingly guided by climate challenges and concerns.

7. Conclusion

This thesis explores how and the extent to which international assignment practices have transformed worldwide, as a consequence of two major megatrends, i.e. digitalization and climate change. Indeed, the study has brought attention to and discussed the ways in which the global practice under scope is adapting to new technological advancements and environmental directives, by investigating their interaction and implications for organizations.

The traditional model of international assignments, focused on long-term expatriation, has always been a cornerstone of global business strategy. Indeed, multinational corporations have relied on expatriates to enable and facilitate knowledge transfer, ensure operational alignment and develop a global leadership. Even so, this approach involves major challenges (e.g. significant costs, logistical hurdles and adaptation issues). The advent of digitalization and the urgent need for sustainable business practices are obliging organizations to reconsider international assignments, resulting in new models which balance operational and cost efficiency and environmental responsibility.

The research outcomes of this thesis bring attention to the nature of digitalization, which serves both as an enabler and disruptor of global mobility: tech tools, such as high-speed internet, AI and virtual collaboration platforms, are redefining how businesses operate across borders. Virtual assignments, AI-assistance and hybrid models are emerging as alternatives to the physical relocation of employees, allowing companies to maintain global operations and engagement while reducing dependency on expatriate transfers. Despite the benefits brought by this shift, in terms of costs and efficiency, challenges are also present, such as regulatory compliance, employee engagement and cultural integration, among others. The literature on the topic of digital transformation supports the argument that while digital tools improve connectivity and knowledge transfer, they cannot fully replace the meaningful cross-cultural competencies developed via in-person international experiences.

Climate change awareness is another crucial transformative force shaping international assignments. In fact, the corporate sector is facing increasing pressures to align with sustainability goals, urging organizations to reassess both business travel and expatriate programs. Green mobility strategies, local hiring and carbon offsetting initiatives are

becoming central to corporate sustainability policies and frameworks: as empirical data highlights, MNCs are reducing long-term assignments and opting for eco-friendly alternatives, aligning with some of the principles outlined in the UN Sustainable Development Goals. The literature on corporate sustainability points out the necessity of integrating environmental concerns into global mobility policies. Indeed, it argues that sustainable expatriation is no longer optional but rather a business imperative.

Although digitalization and (climate-related) sustainability efforts present opportunities, challenges exist. The transition to virtual assignments is of concern for career development, organizational culture and inclusive leadership development. Likewise, while sustainable mobility policies contribute to the reduction of carbon emissions, they require adjustments in terms of talent and workforce management. In this scenario, the shift towards hybrid global mobility models, merging traditional expatriation with remote collaboration and local hiring, emerges as the most viable solution for MNCs, aiming to balance global integration with climate change concerns.

In conclusion, this thesis proves that international assignments are a watershed moment, molded by the digital revolution and climate change awareness. Indeed, many organizations have halted the expansion of their workforce through physical global relocation, utilizing technological advancements and sustainable values to redefine mobility strategies. This transformation reflects broader trends in global business, where agility, cost-effectiveness and environmental protection are becoming core components of strategic decision-making. In this sense, the evolution of international assignments is not only a response to external pressures, but a necessity to adapt to the changing landscape of global work. Future research could continue to explore how these trends will influence mobility in the long run, especially in relation to legal frameworks, leadership development and corporate culture in the digital age. Recent developments related to the Agenda 2030 should also be considered: with the Trump administration officially rejecting and denouncing UN SDGs (Segal, 2025), further changes will follow and, in a cascading manner, influence corporate mobility and international assignments. Indeed, the U.S. government has argued that SDGs are a form of soft global governance which undermines the sovereignty and interest of Americans. This rejection aligns with the Trump administration's broader retreat from global initiatives, such as the Paris Agreement and worldwide efforts in key climate financing. The resulting weakened

global unity, reduced funding (the already existing $4 trillion funding gap will potentially increase after the U.S. withdrawal), lack of support from a major economy and the slow progress toward key goals will certainly affect the way in which climate change is addressed, the urgency it commands and MNCs' actions.

8. References

Abbas, B. (2023). *The Impact of Remote Work on Employee Engagement - ClockIt*. Clockit.io. https://clockit.io/impact-of-remote-work-on-employee-engagement/

Abbas, R., & Michael, K. (2023). Socio-Technical Theory: A Review. In S. Papagiannidis (Ed.), *TheoryHub Book*. Newcastle University's Open Access platform. https://open.ncl.ac.uk/theories/9/socio-technical-theory/

Aibar-Guzmán, B., Raimo, N., Vitolla, F., & García-Sánchez, I. (2023). Corporate governance and financial performance: Reframing their relationship in the context of climate change. *Corporate Social Responsibility and Environmental Management*, *31*(3), 1469, 2588. https://doi.org/10.1002/csr.2649

Aksu, H. (2023). *Incorporating Digital Transformation: Impact on Organizational Structure and Decision*. Digitopia. https://digitopia.co/blog/incorporating-digital-transformation-impact-on-organizational-structure-and-decision/

Alberti, C. (2024). The Cost of Inaction. *Climate Policy Initiative*. https://www.climatepolicyinitiative.org/the-cost-of-inaction/

Ambasht, A. (2023). Real-Time data integration and analytics: Empowering data-driven decision making. *International Journal of Computer Trends and Technology*, *71*(7), 8, 14. https://doi.org/10.14445/22312803/IJCTT-V71I7P102

Anderson, A. A. (2009). *The Community Builder's approach to Theory of change. A Practical Guide to Theory Development.* (pp. 1, 37). The Aspen Institute. https://developmenteducation.ie/resource/the-community-builders-approach-to-theory-of-change-a-practical-guide-to-theory-development/

ANDERSON, J., & RAINIE, L. (2023). 3. Themes: The most harmful or menacing changes in digital life that are likely by 2035. *Pew Research Center: Internet and Technology*. https://www.pewresearch.org/internet/2023/06/21/themes-the-most-harmful-or-menacing-changes-in-digital-life-that-are-likely-by-2035/

Anwar, M. R., Liu, D. L., Macadam, I., & Kelly, G. (2012). Adapting agriculture to climate change: a review. *Theoretical and Applied Climatology*, *113*, 225, 245. https://doi.org/10.1007/s00704-012-0780-1

AON. (2023). 2023 International People Mobility Survey Report. In *aon.com*. AON. https://www.aon.com/getmedia/59d87c18-8c36-469d-8e92-8ac388baab51/international-mobility-survey-2023.pdf

AON. (2024). *International People Mobility Report 2024*. AON. https://www.aon.com/en/insights/reports/international-people-mobility-report

Bailetti, T. (2012). What Technology Startups Must Get Right to Globalize Early and Rapidly. *Technology Innovation Management Review*, *2*(10), 5, 16. https://doi.org/10.22215/timreview/614

Bailey, R., Barnes, A., & Crask, J. (n.d.). CLIMATE RESILIENCE: 5 STEPS TO STRENGTHEN SUPPLY CHAINS. In *marshmclennan.com*. MarshMcLennan. Retrieved February 9, 2025, from https://www.marshmclennan.com/web-assets/insights/publications/2023/august/2023-climate-resilience-five%20steps%20to%20strengthen%20supply%20chains.pdf

Ballards LLP. (2023). *What Are The Core Elements of Digital Transformation? Charting Your Course to a Digital Future*. Ballards LLP. https://ballardsllp.com/insights/core-elements-of-digital-transformation/

Bar Am, J., Doshi, V., Malik, A., Noble, S., & Frey, S. (2023). Consumers care about sustainability—and back it up with their wallets. In *mckinsey.com*. McKinsey. https://www.mckinsey.com/industries/consumer-packaged-goods/our-insights/consumers-care-about-sustainability-and-back-it-up-with-their-wallets

Barba-Sánchez, V., Meseguer-Martínez, A., Gouveia-Rodrigues, R., & Raposo, M. L. (2024). Effects of digital transformation on firm performance: The role of IT capabilities and digital orientation. *Heliyon*, *10*(6), 1, 8. https://doi.org/10.1016/j.heliyon.2024.e27725

Baxter, G., & Sommerville, I. (2010). Socio-technical systems: From design methods to systems engineering. *Interacting with Computers*, *23*(1), 4, 17. https://doi.org/10.1016/j.intcom.2010.07.003

Belderbos, R. A., & Heijltjes, M. G. (2005). The determinants of expatriate staffing by Japanese multinationals in Asia: Control, learning, and vertical integration. *Journal of International Business Studies*, *36*(3), 341, 354.

Berthoin Antal, A. (2000). Types of knowledge gained by expatriate managers. *Journal of General Management*, *26*(2), 32, 51.

Bhuwal, H. (2023). STATUS OF REMOTE WORK IN 2024. *EmpMonitor*. https://empmonitor.com/blog/status-of-remote-work-in-2023/

Black, J. S., Mendenhall, M., & Oddou, G. (1991). Toward a comprehensive model of international adjustment: An integration of multiple theoretical perspectives. *Academy of Management Review*, *16*(2), 291, 317.

Bolino, M. C. (2007). Expatriate assignments and intra-organizational career success: Implications for individuals and organizations. *Journal of International Business Studies*, *38*(5), 819, 835.

Bonache, J., & Brewster, C. (2001). Knowledge transfer and the management of expatriation. *Thunderbird International Business Review*, *43*(1), 145, 168.

Bonache, J., Brewster, C., & Suutari, V. (2001). Expatriation: A developing research agenda. *Thunderbird International Business Review*, *43*(1), 3, 20.

Boyacigiller, N. (1990). The role of expatriates in the management of interdependence, complexity and risk in multinational corporations. *Journal of International Business Studies*, *21*(3), 357, 381.

BP p.l.c. (2016). BP Energy Outlook 2016 edition: Outlook to 2035. In *bp.com*. https://www.bp.com/content/dam/bp/business-sites/en/global/corporate/pdfs/energy-economics/energy-outlook/bp-energy-outlook-2016.pdf

Brümmerstedt, K., & Fiedler, R. (2017). THE DIGITALISATION MEGATREND: WHY SEAPORTS SHOULD PARTICIPATE. *AUTOMATION and OPTIMISATION*, *73*, 48, 50. https://www.porttechnology.org/wp-content/uploads/2019/05/FRAUNHOFER2.pdf

Bucher, J., Bader, B., & Deller, J. (2023). Cross-Border Knowledge Transfer in the Digital Age: The Final Curtain Call for Long-Term International Assignments? *Journal of Management Studies*, *61*(5), 1792, 1821. https://doi.org/10.1111/joms.12971

Butcher, A. (2024). *How does the future of ski resorts look in the face of climate change?* National Geographic. https://www.nationalgeographic.com/travel/article/how-does-the-future-of-ski-resorts-look-climate-change

Cadez, S., Czerny, A., & Letmathe, P. (2019). *Idea #750: Stakeholder Pressure Leads to Significant Environmental Strategy Adoption*. Ideas for Leaders. https://ideasforleaders.com/Ideas/stakeholder-pressure-leads-to-significant-environmental-strategy-adoption/

Caligiuri, P. (2000). Selecting expatriates for personality characteristics: A moderating effect of personality on the relationship between host national contact and cross-cultural adjustment. *Management International Review*, *40*(1), 61, 80.

Caligiuri, P., Tarique, I., & Jacobs, R. (2009). Selection for international assignments. *Human Resource Management Review*, *19*(3), 251, 262. https://doi.org/10.1016/j.hrmr.2009.02.001

Casadei, C. (2023). *Viaggi di lavoro: attenzione ai costi e fattori Esg li riducono in un'azienda su due*. Il Sole 24 ORE. https://www.ilsole24ore.com/art/viaggi-lavoro-attenzione-costi-e-fattori-esg-li-riducono-un-azienda-due-AEueqkyD

CHAPMAN, M. (2025). Toyota's truck division Hino to pay $1.6 billion as part of emissions scandal. *AP: Business*. https://apnews.com/article/hino-toyota-justice-epa-fbi-nhtsa-f8d7157b86019a5bf3398c56e2f97162

Château, J., Rebolledo, C., & Dellink, R. (2011). An Economic Projection to 2050: The OECD "ENV- Linkages" Model Baseline. In *oecd.org*. OECD Publishing. https://www.oecd.org/content/dam/oecd/en/publications/reports/2011/12/an-economic-projection-to-2050-the-oecd-env-linkages-model-baseline_g17a2087/5kg0ndkjvfhf-en.pdf

Collings, D. G., Scullion, H., & Morley, M. J. (2007). Changing patterns of global staffing in the multinational enterprise: Challenges to the conventional expatriate assignment and emerging alternatives. *Journal of World Business*, *42*(2), 198, 213.

CommBank. (2024). *CommBank revolutionises banking by activating AI Factory with AWS*. Commbank. https://www.commbank.com.au/articles/newsroom/2024/09/cba-activates-ai-factory.html

Controllers Council. (2024). *Leveraging Predictive Analytics for Better Financial Planning*. Controllers Council. https://controllerscouncil.org/leveraging-predictive-analytics-for-better-financial-planning/

Dedrick, J. (2010). Green IS: Concepts and Issues for Information Systems Research. *Communications of the Association for Information Systems*, *27*. https://doi.org/10.17705/1CAIS.02711

Dey, S. K., Bose, S., Luo, L., & Shams, S. (2024). Impact of Corporate Climate Change Performance on Information Asymmetry: International Evidence. *Journal of International Accounting Research*. https://doi.org/10.2308/JIAR-

Dowling, P. J., Festing, M., & Engle, A. D. (2008). *International human resource management: Managing people in a multinational context* (5th ed.). Cengage Learning.

Ebi, K. L., Bole, A., Crimmins, A., Glass, G., Saha, S., Shimamoto, M. M., Trtanj, J., & White-Newsome, J. L. (2018). Human Health. In D. D'Onofrio (Ed.), *Impacts, Risks, and Adaptation in the United States: Fourth National Climate Assessment* (pp. 539, 571). U.S. Global Change Research Program. https://nca2018.globalchange.gov/chapter/14/#key-message-2

Edström, A., & Galbraith, J. R. (1977). Transfer of managers as a co-ordination and control strategy in multinational organizations. *Administrative Science Quarterly*, *22*(2), 248, 263.

ESPAS, & Gaub, F. (2019). GLOBAL TRENDS TO 2030 CHALLENGES AND CHOICES FOR EUROPE. In *Europa.eu*. European Strategy and Policy Analysis System (ESPAS). https://ec.europa.eu/assets/epsc/pages/espas/ESPAS_Report2019.pdf

European Commission. (2024). *The Megatrends Hub*. European Commission. https://knowledge4policy.ec.europa.eu/foresight/tool/megatrends-hub_en

Fähndrich, J. (2022). A literature review on the impact of digitalisation on management control. *Journal of Management Control*, *34*, 9, 65. https://doi.org/10.1007/s00187-022-00349-4

Feldman, D. C., & Thomas, D. C. (1992). Career management issues facing expatriates. *Journal of International Business Studies*, *23*(2), 271, 293.

Fiore, M., Contò, F., Spada, A., & Pellegrini, G. (2018). GHG and cattle farming: CO-assessing the emissions and economic performances in Italy. *Journal of Cleaner Production*, *172*, 3704, 3712. https://doi.org/10.1016/j.jclepro.2017.07.167

Forster, N. (2000). The myth of the international manager. *International Journal of Human Resource Management*, *11*(1), 126, 142.

GARLAND, N. (2021). *Virtual international assignments are expected to stay post-pandemic*. TheHRDIRECTOR. https://www.thehrdirector.com/business-news/covid19/virtual-international-assignments-are-expected-to-stay-post-pandemic-but-what-considerations-do-businesses-need-to-factor-in/

Gaur, A. S., Delios, A., & Singh, K. (2007). Institutional environments, staffing strategies, and subsidiary performance. *Journal of Management*, *33*(4), 611, 636.

GFoundry. (2024). *The Impact of Flexibility and Remote Work on Employee Satisfaction and Retention*. GFoundry. https://gfoundry.com/the-impact-of-flexibility-and-remote-work-on-employee-satisfaction-and-retention/?

Gleick, P. H. (2014). Water, Drought, Climate Change, and Conflict in Syria. *Weather, Climate, and Society*, *6*(3), 331, 340. https://doi.org/10.1175/WCAS-D-13-00059.1

Gong, Y. (2003). Subsidiary staffing in multinational enterprises: Agency, resources, and performance. *Academy of Management Journal*, *46*(6), 728, 739.

Goolgasian, C., Soule, V., & Krusell, E. (2025). Climate adaptation may cost trillions. Is your portfolio ready? *Wellington Management: Innovation, Climate, Climate Tech*. https://www.wellington.com/en-it/institutional/insights/climate-adaptation-may-cost-trillions

Govers, M., & van Amelsvoort, P. (2023). A theoretical essay on socio-technical systems design thinking in the era of digital transformation. *Gr Interakt Org*, *54*, 27, 40. https://doi.org/10.1007/s11612-023-00675-8

Grainger-Brown, J., & Malekpour, S. (2019). Implementing the Sustainable Development Goals: A Review of Strategic Tools and Frameworks Available to Organisations. *Sustainability*, *11*(5). 1381. https://doi.org/10.3390/su11051381

Gregersen, H. B., Hite, J. M., & Black, J. S. (1996). Expatriate performance appraisal in U.S. Multinational firms. *Journal of International Business Studies*, *27*(4), 711, 738.

Gullahorn, J. T., & Gullahorn, J. E. (1963). An extension of the U-curve hypothesis. *Journal of Social Issues*, *19*(3), 33, 47.

Gupta, S., & Rhyner, J. (2022). Mindful Application of Digitalization for Sustainable Development: The Digitainability Assessment Framework. *Sustainability*, *14*(5), 3114. https://doi.org/10.3390/su14053114

Haleem, A., Javaid, M., Singh, R. P., & Suman, R. (2021). Telemedicine for healthcare: Capabilities, features, barriers, and Applications. *Sensors International*, *2*(2021). https://doi.org/10.1016/j.sintl.2021.100117

Hamill, J. (1989). Expatriate policies in British multinationals. *Journal of General Management*, *14*(4), 18, 33.

Harris, H., & Brewster, C. (1999). An integrative framework for pre-departure preparation. In C. Brewster & H. Harris (Eds.), *International HRM: Contemporary issues in Europe* (pp. 223, 240). Routledge.

Harvey, M. (1998). Dual-career couples during international relocation: The trailing spouse. *International Journal of Human Resource Management*, *9*(2), 309, 331.

Harvey, M., & Miceli, N. (1999). Exploring inpatriate manager issues: An exploratory empirical study. *International Journal of Intercultural Relations*, *23*(3), 339, 371.

Harvey, M., Novicevic, M. M., & Speier, C. (2000). Strategic global human resource management: The role of inpatriate managers. *Human Resource Management Review*, *10*(2), 153, 175.

Harzing, A. W. K. (2001a). Of bears, bumble-bees and spiders: The role of expatriates in controlling foreign subsidiaries. *Journal of World Business*, *36*(4), 366, 379.

Harzing, A. W. K. (2001b). Who's in charge? An empirical study of executive staffing practices in foreign subsidiaries. *Human Resource Management*, *40*(2), 139, 158.

Harzing, A.-W., & Reiche, B. S. (2010). International Assignments. In A. Pinnington (Ed.), *International Human Resource Management* (pp. 3, 41). Sage Publications. https://www.researchgate.net/publication/234021842_International_Assignments

Hébert, L., Very, P., & Beamish, P. W. (2005). Expatriation as a bridge over troubled water: A knowledge-based perspective applied to cross-border acquisitions. *Organization Studie*, *26*(10), 1455, 1476.

Hedling, E., & Bremberg, N. (2021). Practice Approaches to the Digital Transformations of Diplomacy: Toward a New Research Agenda. *International Studies Review*, *23*(4), 1595, 1618. https://doi.org/10.1093/isr/viab027

Herring, D. (2020). *Are humans causing or contributing to global warming?* Climate.gov; NOAA. https://www.climate.gov/news-features/climate-qa/are-humans-causing-or-contributing-global-warming

Hocking, J. B., Brown, M. E., & Harzing, A.-W. . (2007). Balancing global and local strategic contexts: Expatriate knowledge transfer, applications and learning within a transnational organization. *Human Resource Management*, *46*(4), 513, 533.

Hofstede, G. (1980). *Culture's consequences: International differences in work-related values.* Sage.

Hofstede, G. (2001). *Culture's consequences: Comparing values, behaviors, institutions, and organizations across nations* (2nd ed.). Sage.

Howard, D. (2024). Aligning Talent With Digital Transformation. *Forbes*. https://www.forbes.com/councils/forbesbusinessdevelopmentcouncil/2024/04/11/aligning-talent-with-digital-transformation/

IMD. (2020). The future of the world will depend on digitalization. *IMD: All News*. https://www.imd.org/news/competitiveness/updates-future-of-the-world-will-depend-on-digitalization/

International Finance Corporation. (2022). *Climate Adaptation: It's Everybody's Business*. IFC. https://www.ifc.org/en/stories/2022/climate-adaption-everybodys-business

International Human Resource Management. (2019). In B. S. Reiche, A.-W. Harzing, & H. Tenzer (Eds.), *Google Books* (5th ed.). SAGE Publications. https://books.google.it/books?hl=en&lr=&id=WkBvDwAAQBAJ&oi=fnd&pg=PA159&dq=international+assignments&ots=gCFLA7_Wig&sig=UiPorH5eNUu2qU_dkFicZZtZbCU&redir_esc=y#v=onepage&q=international%20assignments&f=false

International Panel on Climate Change. (n.d.). *Working Group II Impacts, Adaptation and Vulnerability*. Retrieved February 8, 2025, from https://www.ipcc.ch/working-group/wg2/?idp=180

International Panel on Climate Change. (2018). Special Report: Global Warming of 1.5 ºC. In *ipcc* . https://www.ipcc.ch/sr15/

Jacob, J. (2024). *AI in Accounting Field: Transforming the Future of Finance*. Savant Labs. https://www.savantlabs.io/blog/ai-in-accounting-field-impact?

Johnston, I. (2016). *Global warming set to cost the world economy £1.5 trillion by 2030 as it becomes too hot to work | The Independent*. The Independent. https://www.independent.co.uk/climate-change/news/global-warming-climate-change-economic-effects-jobs-too-hot-to-work-india-china-a7143406.html

Joseph, J., & Sengul, M. (2025). Organization Design: Current Insights and Future Research Directions. *Journal of Management*, *51*(1), 249, 308. https://doi.org/10.1177/01492063241271242.

Kamarck, E. (2019). *The challenging politics of climate change*. Brookings. https://www.brookings.edu/articles/the-challenging-politics-of-climate-change/

Kamoche, K. (1997). Knowledge creation and learning in international HRM. *International Journal of Human Resource Management*, *8*(3), 213, 225.

Karpoff, Jonathan M., Lott, Jr., John R., & Wehrly, Eric W. (2005). The Reputational Penalties for Environmental Violations: Empirical Evidence. *The Journal of Law and Economics*, *48*(2), 653, 675. https://doi.org/10.1086/430806

Katsaliaki, K., Galetsi, P., & Kumar, S. (2022). Supply Chain Disruptions and resilience: a Major Review and Future Research Agenda. *Ann Oper Res*, *319*, 965, 1002. Springer. https://doi.org/10.1007/s10479-020-03912-1

Kazi, C., & Hastwell, C. (2021). Remote Work Productivity Study Finds Surprising Reality: 2-Year Analysis. *Great Place to Work: Insights*. https://www.greatplacetowork.com/resources/blog/remote-work-productivity-study-finds-surprising-reality-2-year-study

Kilpatrick, J., Berckman, L., Faver, A. D., Hardin, K., & Sloane, M. (2024). Restructuring the supply base: Prioritizing a resilient, yet efficient supply chain. *Deloitte Research Center for Energy & Industrials*. https://www2.deloitte.com/us/en/insights/industry/manufacturing/global-supply-chain-resilience-amid-disruptions.html

KPMG. (2024). Is sustainability good for financial performance? In *kpmg.com*. KPMG. https://kpmg.com/kpmg-us/content/dam/kpmg/pdf/2024/sustainability-good-financial-performances-final.pdf

Kraimer, M. L., Wayne, S. J., & Jaworski, R. A. (2001). Sources of support and expatriate performance: The mediating role of expatriate adjustment. *Personnel Psychology*, *54*(1), 71, 99.

Kraus, S., Jones, P., Kailer, N., Weinmann, A., Banegas, N. C., & Tierno, N. R. (2021). Digital Transformation: an Overview of the Current State of the Art of Research. *SAGE Open*, *11*(3), 1, 15. Sagepub. https://doi.org/10.1177/21582440211047576

Kwilinski, A., Lyulyov, O., & Pimonenko, T. (2023). Unlocking Sustainable Value through Digital Transformation: An Examination of ESG Performance. *Information*, *14*(8), 444. https://doi.org/10.3390/info14080444

Lall, U., AghaKouchak, A., Arumugam, S., Brown, C., McCabe, G., & Pulwarty, R. (2018). Water. In M. He (Ed.), *Impacts, Risks, and Adaptation in the United States: Fourth National Climate Assessment, Volume II* (pp. 145, 173). U.S. Global Change Research Program. https://nca2018.globalchange.gov/chapter/3/#key-message-1

Lazarova, M. B., & Cerdin, J.-L. . (2007). Revisiting repatriation concerns: Organizational support versus career and contextual influences. *Journal of International Business Studies*, *38*(3), 404, 429.

Lazarova, M., & Caligiuri, P. (2001). Retaining repatriates: The role of organizational support practices. *Journal of World Business*, *36*(4), 389, 401.

Liddle, B. (2013). Impact of population, age structure, and urbanization on carbon emissions/energy consumption: evidence from macro-level, cross-country analyses. *Population and Environment*, *35*(3), 286, 304. https://doi.org/10.1007/s11111-013-0198-4

Lindsey, R. (2023). *Climate change: Global Sea Level*. Climate.gov; National Oceanic and Atmospheric Administration. https://www.climate.gov/news-features/understanding-climate/climate-change-global-sea-level

LSE. (2024). Climate litigation against companies is on the rise, report finds . *Press Release*. https://www.lse.ac.uk/granthaminstitute/news/climate-litigation-against-companies-is-on-the-rise-report-finds/#:~:text=The%20report%20confirms%20that%20there,risk%20in%20financial%20decision%2Dmaking.

Madakam, S., Ramaswamy, R., & Tripathi, S. (2015). Internet of Things (IoT): A Literature Review. *Journal of Computer and Communications*, *3*(5), 164, 173. https://doi.org/10.4236/jcc.2015.35021

Malik, R., & Janowska, A. A. (2018). Megatrends and their use in economic analyses of contemporary challenges in the world economy. *Research Papers of Wroclaw University of Economics*, *523*, 209, 220. https://doi.org/10.15611/pn.2018.523.18

Malik, R., & Janowska, A. A. (2019). The next 100 years–applying megatrends to analyze the future of the Polish economy. *Nier´ Owno´ Sci Społeczne a Wzrost Gospodarczy*, *57*, 119, 130. https://doi.org/10.15611/PN.2018.523.18

Manyika, J., Lund, S., Bughin, J., Woetzel, L., Stamenov, K., & Dhingra, D. (2016). Digital globalization: The new era of global flows. In *McKinsey*. McKinsey Global Institute. https://www.mckinsey.com/capabilities/mckinsey-digital/our-insights/digital-globalization-the-new-era-of-global-flows

Marr, B. (2023). The Impact Of Digital Transformation On Business Models: Opportunities And Challenges. *Forbes: Innovation*.

https://www.forbes.com/sites/bernardmarr/2023/10/12/the-impact-of-digital-transformation-on-business-models-opportunities-and-challenges/

Marschan-Piekkari, R., Welch, D., & Welch, L. (1999). In the shadow: The impact of language on structure, power and communication in the multinational. *International Business Review*, *8*(4), 421, 440.

Mathews, R. (2024). Climate Challenges: Enhancing supply chain resilience to weather events. *Thebci.org*. https://www.thebci.org/news/climate-challenges-enhancing-supply-chain-resilience-to-weather-events.html

Mattar, S. D., Jafry, T., Schröder, P., & Ahmad, Z. (2021). Climate justice: priorities for equitable recovery from the pandemic. *Climate Policy*, *21*(10), 1307, 1317. https://doi.org/10.1080/14693062.2021.1976095

Maurer, T., & Nelson, A. (2021, March). *THE GLOBAL CYBER THREAT*. International Monetary Fund. https://www.imf.org/external/pubs/ft/fandd/2021/03/global-cyber-threat-to-financial-systems-maurer.htm

Mayo Clinic. (2024, September 5). *Telehealth: Technology meets health care*. Mayo Clinic. https://www.mayoclinic.org/healthy-lifestyle/consumer-health/in-depth/telehealth/art-20044878

Meier, O., & Traber, Y. (2021). The Challenges of International Remote Working. *BRINK – Conversations and Insights on Global Business*. https://www.brinknews.com/the-challenges-of-international-remote-working/

Mokyr, J., & Strotz, R. (1998). The Second Industrial Revolution, 1870-1914. In *Northwestern University*. Northwestern University. https://faculty.wcas.northwestern.edu/jmokyr/castronovo.pdf

MUSTAPHA, A. (2024). Digital Inclusion and the Global Tech Divide: How the Digital Revolution is Leaving Some of Us in the Digital Dark Ages. [Review of *Digital Inclusion and the Global Tech Divide: How the Digital Revolution is Leaving Some of Us in the Digital Dark Ages.*]. *Cyber & Artificial Intelligence, Technology, Uncategorized*. https://georgetownsecuritystudiesreview.org/2024/10/30/digital-inclusion-and-the-global-tech-divide-how-the-digital-revolution-is-leaving-some-of-us-in-the-digital-dark-ages/

National Research Council. (2013). How Climate Events Can Lead to Social and Political Stresses. In *Climate and Social Stress: Implications for Security Analysis* (pp. 75, 95). National Academies Press. https://nap.nationalacademies.org/read/14682/chapter/6

Naughtin, C. K., Schleiger, E., Bratanova, A., Terhorst, A., & Hajkowicz, S. (2024). Forty years in the making: A systematic review of the megatrends literature. *Futures*, *157*, 1, 15. https://doi.org/10.1016/j.futures.2024.103329

Negandhi, A. R. (1987). *International management*. Allyn and Bacon.

Nikolaou, I., Evangelinos, K., & Leal Filho, W. (2015). A system dynamic approach for exploring the effects of climate change risks on firms' economic performance. *Journal of Cleaner Production*, *103*, 499, 506. https://doi.org/10.1016/j.jclepro.2014.09.086

NOAA. (2024a). *Climate change impacts*. National Oceanic and Atmospheric Administration (NOAA); United States government. https://www.noaa.gov/education/resource-collections/climate/climate-change-impacts

NOAA. (2024b). *How Does Climate Change Affect Coral reefs?* Noaa.gov; National Ocean Service. https://oceanservice.noaa.gov/facts/coralreef-climate.html

NOAA. (2024c). *Is sea level rising?* Noaa.gov; NOAA. https://oceanservice.noaa.gov/facts/sealevel.html

NOAA. (2025). *Ocean Acidification*. National Oceanic and Atmospheric Administration; U.S. Department of Commerce. https://www.noaa.gov/education/resource-collections/ocean-coasts/ocean-acidification

Nutz, M., & Stebegg, F. (2022). Climate change adaptation under heterogeneous beliefs. *Mathematics and Financial Economics*, *16*, 481, 508. https://doi.org/10.1007/s11579-022-00314-8

Oberg, K. (1960). Cultural shock: Adjustment to new cultural environments. *Practical Anthropology*, *7*, 177, 182.

Oddou, G., Gregersen, H. B., Black, J. S., & Derr, C. B. (2001). Building global leaders: Strategy similarities and differences among European, U.S., and Japanese multinationals. In T. M. Kühlmann & G. K. Stahl (Eds.), *Developing global business leaders: Policies, processes, and innovations.* (pp. 99, 116). Quorum Books.

Omnipresent Team. (2024). *The Advantages of Remote Work for Global Employers*. Omnipresent.com; Omnipresent. https://www.omnipresent.com/articles/benefits-of-remote-work-for-employers?

Pankratz, N., Bauer, R., & Derwall, J. (2023). Climate Change, Firm Performance, and Investor Surprises. *Management Science*, *69*(12), 7352, 7398. https://doi.org/10.1287/mnsc.2023.4685

Pascucci, F., Savelli, E., & Gistri, G. (2023). How Digital Technologies Reshape marketing: Evidence from a Qualitative Investigation. *Italian Journal of Marketing*, *2023*, 27, 58. Springer. https://doi.org/10.1007/s43039-023-00063-6

Pasmore, W., Winby, S., Mohrman, S. A., & Vanasse, R. (2018). Reflections: Sociotechnical Systems Design and Organization Change. *Journal of Change Management*, *19*(2), 67, 85. https://doi.org/10.1080/14697017.2018.1553761

Pausenberger, E. (1987). Unternehmens- und Personalentwicklung durch Entsendung. *Personalführung*, *20*(11-12), 852, 856.

Paycheck. (2024). Consequences and Financial Penalties: The Hidden Cost of Non-Compliance for Your Business. *Paychex WORX Blog*. https://www.paychex.com/articles/human-resources/non-compliance-protecting-your-business

Pedersen, C. L. (2022). *Cracking the Culture Code for Successful Digital Transformation*. MIT Sloan Management Review. https://sloanreview.mit.edu/article/cracking-the-culture-code-for-successful-digital-transformation/

Perkins-Kirkpatrick, S. E., & Lewis, S. C. (2020). Increasing trends in regional heatwaves. *Nature Communications*, *11*(3357). https://doi.org/10.1038/s41467-020-16970-7

Perlmutter, H. V. (1969). The tortuous evolution of the multinational corporation. *Columbia Journal of World Business*, *4*(1), 9, 18.

Perry, E. (2021). 12 challenges of working from home & how to overcome them. *BetterUp: Well-Being*. https://www.betterup.com/blog/challenges-of-working-from-home

Phatak, A. V. (1989). *International management.* PWS-Kent Publishing Company.

Pons, M., Bikfalvi, A., Llach, J., & Palcic, I. (2013). Exploring the impact of energy efficiency technologies on manufacturing firm performance. *Journal of Cleaner Production*, *52*, 134, 144. https://doi.org/10.1016/j.jclepro.2013.03.011

Qiong, W., Hong, Z., Ran, M., Yiwen, Z., & Hongru, Z. (2023). Digital Economy, Employment Quality and Capital Allocation Efficiencies. *Atlantis Highlights in Computer Sciences*, 36, 50. https://doi.org/10.2991/978-94-6463-326-9_5

Rangaswamy, E., Nawaz, N., & Changzhuang, Z. (2022). The impact of digital technology on changing consumer behaviours with special reference to the home furnishing sector in Singapore. *Humanit Soc Sci Commun* , *9*(83). https://doi.org/10.1057/s41599-022-01102-x

Riusala, K., & Suutari, V. (2004). International knowledge transfers through expatriates. *Thunderbird International Business Review*, *46*(6), 743, 770.

Robertson, J., Ferreira, C., & Paschen, J. (2021). Reading Between the Lines: Understanding Customer Experience With Disruptive Technology Through Online Reviews. *Australasian Marketing Journal*, *29*(3), 215, 224. https://doi.org/10.1177/1839334921999487

Roessel, R. v. (1988). *Führungskräfte-Transfer in internationalen Unternehmungen.* Wirtschaftsverlag Bachem.

Rutledge, K., McDaniel, M., Teng, S., Hall, H., Ramroop, T., Sprout, E., Hunt, J., Boudreau, D., & Costa, H. (2024). *Urban Heat Island* (J. Evers, Emdash Editing, & K. West, Eds.). National Geographic. https://education.nationalgeographic.org/resource/urban-heat-island/

Sandvik Coromant. (n.d.). *Defining the Third Industrial Revolution*. Sandvik Coromant. Retrieved February 3, 2025, from https://www.sandvik.coromant.com/en-gb/services/manufacturing/defining-the-third-industrial-revolution

Schmeltz, M. T., & al. (2016). Economic Burden of Hospitalizations for Heat-Related Illnesses in the United States, 2001–2010. *International Journal of Environmental Research and Public Health*, *13*(9).

Schmitz, M. A., Ommen, E., & Karlshaus, A. (2023). Sustainable Expatriate Management: Rethinking International Assignments. *AIB Insights*, *23*(4). https://doi.org/10.46697/001c.74200

Segal, M. (2025). *U.S. Rejects UN Sustainable Development Goals*. ESG Today. https://www.esgtoday.com/u-s-rejects-un-sustainable-development-goals/

Shaffer, M. A., Harrison, D. A., & Gilley, K. M. (1999). Dimensions, determinants and differences in the expatriate adjustment process. *Journal of International Business Studies*, *30*(3), 557, 581.

Shanmugasundaram, M., & Tamilarasu, A. (2023). The impact of digital technology, social media, and artificial intelligence on cognitive functions: a review. *Frontiers in Cognition*, *2*. https://doi.org/10.3389/fcogn.2023.1203077

Smith, D. (2024). *Predictive Analytics in Accounting: Enhancing Financial Forecasts with AI*. Accounting for Everyone. https://accountingforeveryone.com/predictive-analytics-in-accounting-leveraging-ai-for-better-financial-forecasts/

Spreitzer, G. M., McCall, M. W., & Mahoney, J. D. (1997). Early identification of international executive potential. *Journal of Applied Psychology*, *82*(1), 6, 29.

Stahl, G. K., Miller, E. L., & Tung, R. L. (2002). Toward the boundaryless career: A closer look at the expatriate career concept and the perceived implications of an international assignment. *Journal of World Business*, *37*(3), 216, 227.

STOXX. (2017). Capturing Megatrends: Digitalization. *STOXX*. https://stoxx.com/capturing-megatrends-digitalization/

Suutari, V., & Brewster, C. (2000). Making their own way: International experience through self-initiated foreign assignments. *Journal of World Business*, *35*(4), 417, 436.

Swinburn, B. A., Kraak, V. I., Allender, S., Atkins, V. J., Baker, P. I., Bogard, J. R., Brinsden, H., Calvillo, A., De Schutter, O., Devarajan, R., Ezzati, M., Friel, S., Goenka, S., Hammond, R. A., Hastings, G., Hawkes, C., Herrero, M., Hovmand, P. S., Howden, M., & Jaacks, L. M. (2019). The Global Syndemic of Obesity, Undernutrition, and Climate Change: The Lancet Commission report. *The Lancet*, *393*(10173), 791, 846. https://www.thelancet.com/journals/lancet/article/PIIS0140-6736(18)32822-8/fulltext

Tahvanainen, M., Worm, V., & Welch, D. (2005). Implications of short-term international assignments. *European Management Journal*, *23*(6), 663, 673.

Tan, D., & Mahoney, J. T. (2002). An empirical investigation of expatriate utilization: Resource-based, agency, and transaction costs perspectives. In *Office of Research Working Paper Number 02-0129*. University of Illinois at Urbana-Champaign.

Tarique, I., Schuler, R., & Gong, Y. (2006). A model of multinational enterprise subsidiary staffing composition. *International Journal of Human Resource Management*, *17*(2), 207, 224.

The Corporate Environmentalists. (2023). The Impact of Corporate Activities on the Environment. *LinkedIn*. https://www.linkedin.com/pulse/impact-corporate-activities-environment-1e/

Thomas, D. C. (1998). The expatriate experience: A critical review and synthesis. In J. L. Cheng & R. B. Peterson (Eds.), *Advances in international comparative management* (p. Vol. 12: 237,273). JAI Press.

Tung, R. L. (1981). Selection and training of personnel for overseas assignments. *Columbia Journal of World Business*, *16*(2), 68, 78.

Tung, R. L. (1998). American expatriates abroad: From neophytes to cosmopolitans. *Journal of World Business*, *33*(2), 125, 144.

Turrentine, J. (2022). *What Are the Causes of Climate Change?* NRDC. https://www.nrdc.org/stories/what-are-causes-climate-change

U.S. Climate Resilience Toolkit. (2017). *Coastal Erosion | U.S. Climate Resilience Toolkit*. Climate.gov. https://toolkit.climate.gov/coastal-erosion

UNDP. (2024). *The world's largest survey on climate change is out – here's what the results show*. UNDP Climate Promise. https://climatepromise.undp.org/news-and-stories/worlds-largest-survey-climate-change-out-heres-what-results-show

UNEP, & FAO. (2021). Ecosystem restoration key to future of people and planet, new report. In *unep.org*. https://www.unep.org/resources/ecosystem-restoration-people-nature-climate

United Nations. (n.d.-a). *Assuring and improving quality public digital learning for all*. United Nations. Retrieved February 3, 2025, from https://www.un.org/en/transforming-education-summit/digital-learning-all

United Nations. (n.d.-b). *The Impact of Digital Technologies*. United Nations. Retrieved February 3, 2025, from https://www.un.org/en/un75/impact-digital-technologies

United Nations. (2015). *Transforming our world: The 2030 agenda for sustainable development*. United Nations. https://sdgs.un.org/2030agenda

Resolution adopted by the General Assembly on 25 September 2015: Transforming our world: the 2030 Agenda for Sustainable Development, 70/1 (2015). https://documents.un.org/doc/undoc/gen/n15/291/89/pdf/n1529189.pdf

Urbaniec, M., Małkowska, A., & Włodarkiewicz-Klimek, H. (2022). The Impact of Technological Developments on Remote Working: Insights from the Polish Managers' Perspective. *Sustainability*, *14*(1), 552. https://doi.org/10.3390/su14010552

US EPA. (2024). *Smart Growth and Climate Change*. US EPA. https://www.epa.gov/smartgrowth/smart-growth-and-climate-change

US EPA. (2025). *Climate Change Indicators: Drought*. US EPA. https://www.epa.gov/climate-indicators/climate-change-indicators-drought

Veit, D. J., & Thatcher, J. B. (2023). Digitalization as a problem or solution? Charting the path for research on sustainable information systems. *Journal of Business Economics*, *93*, 1231, 1253. https://doi.org/10.1007/s11573-023-01143-x

Vorecol Editorial Team. (2024). *Remote Work and Digital Transformation*. Vorecol.com. https://vorecol.com/blogs/blog-remote-work-and-digital-transformation-9962?

Walden University. (n.d.). *How Is Digital Technology Changing Our Interactions With Each Other?* Www.waldenu.edu. Retrieved February 3, 2025, from https://www.waldenu.edu/online-bachelors-programs/bs-in-psychology/resource/how-is-digital-technology-changing-our-interactions-with-each-other

Wan, J., Li, X., Dai, H.-N. ., Kusiak, A., Martínez-García, M., & Li, D. (2020). Artificial Intelligence-Driven Customized Manufacturing Factory: Key Technologies, Applications, and Challenges. *Proceedings of the IEEE*, *109*(4). https://doi.org/10.1109/JPROC.2020.3034808

Weiskopf, S. R., Rubenstein, M. A., Crozier, L. G., Gaichas, S., Griffis, R., Halofsky, J. E., Hyde, K. J. W., Morelli, T. L., Morisette, J. T., Muñoz, R. C., Pershing, A. J., Peterson, D. L., Poudel, R., Staudinger, M. D., Sutton-Grier, A. E., Thompson, L., Vose, J., Weltzin, J. F., & Whyte, K. P. (2020). Climate change effects on biodiversity, ecosystems, ecosystem services, and natural resource management in the United States. *Science of the Total Environment*, *733*. https://doi.org/10.1016/j.scitotenv.2020.137782

Welch, D. E., Worm, V., & Fenwick, M. (2003). Are virtual assignments feasible? *Management International Review*, *43*(Special Issue 1), 95, 114.

Whelan, T., Atz, U., Van Holt, T., & Clark, C. (2021). ESG AND FINANCIAL PERFORMANCE: Uncovering the Relationship by Aggregating Evidence from 1,000 Plus Studies Published between 2015 – 2020. In *stern.nyu.edu*. NYU: STERN. https://www.stern.nyu.edu/sites/default/files/assets/documents/NYU-RAM_ESG-Paper_2021%20Rev_0.pdf

Xu, J., She, S., & Liu, W. (2022). Role of digitalization in environment, social and governance, and sustainability: Review-based study for implications. *Frontiers in Psychology*, *13:961057*. https://doi.org/10.3389/fpsyg.2022.961057

Yan, A., Zhu, G., & Hall, D. T. (2002). International assignments for career building: A model of agency relationships and psychological contracts. *Academy of Management Review*, *27*(3), 373, 391.

Yu, H., Bansal, P., & Arjaliès, D.-L. (2023). International business is contributing to environmental crises. *Journal of International Business Studies*, *54*, 1151, 1169. https://doi.org/10.1057/s41267-022-00590-y

Zawadzki, A., Fantini, L., & Covazzi, G. (2023). Coming to Grips with Corporate Climate Risk. *BCG: CLIMATE RISK, ADAPTATION, and RESILIENCE*. https://www.bcg.com/publications/2023/coming-to-grips-with-corporate-climate-risk

Zhang, J., Zhao, W., Cheng, B., Li, A., Wang, Y., Yang, N., & Tian, Y. (2022). The Impact of Digital Economy on the Economic Growth and the Development Strategies in the post-COVID-19 Era: Evidence From Countries Along the “Belt and Road.” *Frontiers in Public Health*, *10*. https://doi.org/10.3389/fpubh.2022.856142