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International Risk Management: Implications of the Digital Revolution

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MADRID | Octubre 2025

Aknowledgements

I would like to express my gratitude to everyone who has provided me with the academic and emotional support that made this project a reality.

First and foremost, I would like to acknowledge the director of this thesis, Laura Fernandez Mendez. Laura has been instrumental in the successful development of this dissertation, thanks to her extensive knowledge of the literature, theoretical frameworks, and methodologies in the field of international business. Above all, I would like to highlight two aspects of Laura's personality that have provided me with the most essential tool in any PhD: motivation. First, her pragmatism and can-do attitude helped me forge ahead with the development of the work in some crucial milestones. Most of all, her joyful approach to academic research has helped me at several difficult moments throughout the dissertation development process.

I would also like to thank all the professors at ICADE who have helped me during this process. In particular, I would like ot highlight the support of all the teachers of the training program, especially Carmen Meneses, Isabel Carreño, and Carlos Martinez. Also critical have been all the people involved in the management and support of the CETIS program. The advice of both program directors, Carmen Fullana and Carmen Valor, has provided me with the guidance necessary to achieve my goals. I would also like to mention the endless support and patience of Juan Jose Barbachano, whose knowledge of the process has been invaluable.

To Professor Dimitry Sharapov, I will be forever grateful for allowing me to undertake a research visit at Imperial College London. I have had the privilege of discussing several aspects of my thesis and of research in general with him and the Imperial team, and their insights have helped steer my work in the correct direction.

Last but not least, I would like to thank my family and friends for their support and patience during the whole process. Specifically, I would like to thank my wife, Arancha, and sons, Alejandro and Pedro, who not only have given me emotional support but also have provided splendid sounding boards to reflect on my ideas and comment on my drafts.

To all of them, I extend my sincerest gratitude for their support and patience, and I ask for their forgiveness for any mistakes I might have made during the process.

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This dissertation includes a study that was published in the European Journal of International Management. The adjustment of the Journal's formatting style and that of the overall thesis resulted in impractical and inefficient. In such cases, the University of Comillas statutes permit the researcher to modify the font type, heading style, page layout, page numbering, and design of tables and figures to ensure consistency with the rest of the dissertation.

Chapter 1 is based on the published paper. The content remains unchanged, but we have renumbered the tables to align them with the order in the dissertation. The reference of the published paper is as follows:

Halpern, C., & Fernández-Méndez, L. (2025). The role of digitalisation in firms' international value creation: an integrative conceptual framework and a research agenda. European Journal of International Management, 27(5), 1–42.

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Authorship and use of AI declaration

The author of this thesis has been the *principal author* of this dissertation. His roles in the development of the three chapters of the thesis (using CRediT taxonomy) included: Conceptualisation; Data curation; Formal analysis; Funding acquisition; Investigation; Methodology; Project administration; Resources; Software; Visualisation; and Writing - original draft. The Director of the thesis played the following roles: Supervision, Validation and Writing - review & editing.

In this thesis, the artificial intelligence-based spell-checking tool Grammarly was utilised for proofreading. No other AI tools have been used. After using this tool/service, the author reviewed and edited the content as needed and takes full responsibility for the content of the publication.

Summary

The current thesis focuses on the impact of digitalisation on the resources and capabilities that MNEs and exporting companies use for international risk management. By international risk management (IRM), we refer to the actions a company takes to protect its performance from unexpected events in its international operations (Miller, 1992). In our work, we focus on the impact of digitalisation on the potential operational responses that follow once the strategic and financial responses have been laid out. In this context, digitalisation refers to *'the process of transforming the essence of an organisation's products, services, and processes into Internet-compatible data packages'* (Banalieva & Dhanaraj, 2019 p.1373).

Each of the three chapters attempts to study different aspects in this respect, from the general to the specific. We begin by understanding the process by which digitalisation adds value to international activities in general, including risk management. We proceed by examining the decision-making processes, the role of perceptions and propensity, and the impact of digitalisation within the IRM context. Finally, we develop a quantitative study of part of these relationships in a specific context: the International Trade Credit Risk (ITC).

Chapter 1 Summary

The goal of the first chapter is to explore how internationalisation and digitalisation interact to create value for firms. While the literature has studied this relationship from a myriad of perspectives (Hazlehurst & Brouthers, 2018; Reuber & Fischer, 2011; Vadana et al., 2019), we analysed the topic from a broader perspective and updated the body of knowledge on the subject to include the new digital-related trends.

To achieve this, we conducted a systematic review of the literature using relevant keywords for both dimensions. This yielded a set of approximately 102 articles covering various perspectives, including topics (strategy and marketing, among others), industries (for instance, digital or industrial, among others), and types of firms (such as MNE and ventures).

Our main contribution to the current literature is a conceptual model for creating value through the application of digitalisation to internationalisation efforts, which we call Digital International Value Creation (DIVC). This value is created through the application of Digital Resources (such as a knowledge platform) to International Value Creation Opportunities (such as exporting or risk management).

Digital Resources can be approached from generic, strategic, or specific (front-end, back-end, or intelligence) perspectives. An example of the latter is the use of big data for decision-making in remote environments (Yamin & Sinkovics, 2006). Meanwhile, International Value Creation Opportunities can be strategic (e.g., related to market presence, asset protection, or value chain redefinitions) or managerial (including marketing and sales, operations, or controlling). One example of this is the protection of knowledge assets when internationalising (Del Giudice et al., 2019).

In this conceptual framework, we define three possible avenues for value creation: 'International Going Digital', 'Digital Going International', and 'Going International with Digital'. In the first scenario, global companies utilise digital technology to enhance their operations. In the second scenario, digital platforms expand into other countries. In the third scenario, a firm implements new technologies to support its internationalisation efforts.

The characteristics of the firm under analysis, as well as the environment in which it operates, influence the process followed along these paths. Larger firms possess larger resources to travel these paths, while smaller firms (especially new ventures) can be nimbler (Coeurderoy et al., 2012). Firms in asset-light industries (such as digital platforms) will travel faster along these paths (Tran et al., 2016), but they can also face specific digital risk, such as the virtuality trap. Ultimately, B2C and B2B firms will employ distinct approaches when evaluating their options (Eid et al., 2006). Regarding the environment, firms must consider legal, infrastructure (both physical and technological) and cultural aspects of both the host and home countries.

The chapter concludes by identifying potential avenues for future research based on this conceptual framework. One specific area where research is scarce is the use of digital technologies in managing international risk. We will examine this issue in detail in the following chapters.

Chapter 2 Summary

In line with the research opportunities identified in the first chapter, the goal of the second chapter is to study the relationship between digitalisation and international risk in depth. The uniqueness of our approach lies in focusing on the behavioural aspect of this relationship, meaning the perceptions and propensities of individual managers. We also examine the organisational level, focusing on how the development of specific resources, such as information, knowledge, speed, and agility (Damodaran, 2008) influences these perceptions and propensity.

We built on a Sitkin & Pablo framework for understanding executive decision-making in risky contexts. This framework explores organisational, individual, and problem aspects, along with their relationship with the behaviour of the individual in these contexts (Sitkin & Pablo, 1992).

With this framework in mind, we conducted a set of interviews with 20 top-level managers from 15 countries working in relevant MNEs. Most of the firms studied had more than 5,000 employees and operated in over 11 countries. The majority of the individuals interviewed were C-suite or held relevant top-level positions, and belonged to 14 different nationalities. We analysed public information of the companies and developed semi-structured interviews, finally analysing all the data following a two-level coding approach (Urquhart, 2012).

International operations are indeed a risky context and are affected by the perceptions and propensities of MNEs' managers. Our interviews highlighted the factors impacting these perceptions and propensities. Individual factors include experience, cultural distance, and the individual's position within the organisation (Kraus et al., 2015). Firm factors that surfaced during the interviews included its industry and the type of risk-taking culture (Liesch et al., 2011). Problem-related factors included different perceptions regarding political or health risks. All of these factors influenced the managers' decision-making, motivating them to develop systems and processes to mitigate adverse risk events in the future, with the COVID-19 pandemic being the most frequently cited example of a risk event. All interviewees agreed on the importance of new technologies in these efforts and provided relevant examples of their application.

In parallel, digitalisation decisions are another risky context where similar factors apply. Indeed, Digital Risk is a new type of risk to be considered by MNE managers. Individual

functional responsibilities and IT exposure play a role when evaluating this risk. The industry and culture of the organisation also alter the perception of digital opportunities and risks. Finally, the characteristics of the problem also affect the decision-making in this context.

One key concept that emerged during the interviews was the "risk event" (Rogers, 1997). Here, a risk event refers to an unpredictable event that significantly affects the performance of the firm and its individual stakeholders. We argue that the decisions made before and after these events shape the "outcome-history" or experience for both the firm and the individual.

Based on this concept, we contribute to current research by proposing a model that integrates international risk evaluation and decision-making processes with digitalisation evaluation and decision-making processes. In the international decision-making phase, individual, organisational, and problem factors affect propensities and perceptions regarding international risk, which, in turn, influence the behaviour of individuals and their decisions. These decisions lead to an internationalisation outcome in response to specific risk events. This outcome, in turn, builds firm and individual experience, results in the development of resources (through new systems and processes), and affects perception and propensity again. Digitalisation and the digital risk decision process follow a similar path, with digital perceptions and propensity influencing behaviour and outcomes, and, therefore, experience.

We argue that both processes interact as digitally advanced firms can build capabilities that can alter the perception and propensity of managers in their international activities. This can be beneficial, such as when enhancing a firm's knowledge assets (Bouncken & Barwinski, 2021) or harmful, such as excessive confidence that generates the virtuality trap (Yamin & Sinkovics, 2006).

This process can be contemplated dynamically. As firms evolve digitally, they develop resources that allow managers to gain a deeper understanding of the international environment. Perception tends to grow in line with this enhanced knowledge. At the same time, executives also become more aware of digital risks, and their perception and propensity to take these risks evolve in parallel.

We conclude the chapter by highlighting the limitations of our research and proposing new avenues for additional research. In particular, the potential for quantitative testing of certain parts of our model.

Chapter 3 Summary

Following the logic developed in Chapter 2, the third chapter aims to validate the impact of digitalisation on the IRM process, which begins with the experience acquired by firms through previous risk events.

Previous literature in the field has focused on the strategic perspective of the IRM process (Eduardsen & Marinova, 2020; Miller, 1992). However, in this chapter, we focus on the operational process, dividing it into two stages: assessment/assumption and accommodation/mitigation. The first stage involves evaluating risk and the corresponding decisions that entail a certain level of risk exposure. The second stage consists of accommodating this level of risk and mitigating upcoming risk events (Eduardsen & Marinova, 2020; Yamin & Sinkovics, 2006).

We contribute to the current literature by examining the mechanisms that allow digital capabilities to affect the risk management process in both phases.

Regarding the first phase, previous research has demonstrated a relationship between a firm's experience in international activities and the level of risk it assumes (Buckley et al., 2016), with a higher experience leading to a higher risk assumed. We argue that this relationship is developed through the building and deployment of information and knowledge resources as needed. Digital capabilities will help companies build these resources (for example, using Big Data) and deploy them (such as using AI to analyse the risks of a new opportunity) for a more optimal risk assumption (De la Torre & Moxon, 2001; Liu et al., 2022).

In the second phase, a natural relationship exists between the risk assumed and the firm's final risk performance. Firms can moderate this relationship by building and deploying speed and flexibility resources to accommodate and mitigate the impact of assumed risks in subsequent risk events. We argue that digital capabilities will help companies in building (for example, through developing advanced inventory management

systems) and deploying these resources (for example, using video conferencing for remotely solving exceptional risk events) to reduce the effects of the risk assumed in the first phase (Strange, 2020; Wresch, 2004).

All of these relationships will be influenced by various firm-specific factors (such as industry, size, and profitability) and the target country's characteristics (including political stability, business environment, and digital infrastructure).

To demonstrate these relationships, we use a specific context: the International Trade Credit Risk (ITC), which is the credit risk that companies assume when exporting to distant countries, and is a type of international risk seldom covered by the existing literature (Pridotkienė et al., 2006; Seifert et al., 2013).

In conducting our analysis, we utilised three sources of information. First, we gathered comprehensive firm data (including general firm data and credit risk data) from a major global trade credit insurer database. We filtered the information for MNEs and created a panel comprising close to 4,000 firms in 235 target countries over 15 years, resulting in nearly 310,000 entries. We complemented this information with digitalisation data obtained through a web-scraping tool. Finally, we included information from the host countries obtained from the World Bank Indicators database.

Our regression analysis proves the moderating effect of digitalisation on the relationship between experience and risk assumed, enabling firms to optimise their risk exposure decisions. Our findings do not support the adverse effects of technology, e.g., the "virtuality trap".

In the second phase, our findings also support the moderating effect of digitalisation in the relationship between risk assumed and final risk performance (the higher the digitalisation, the higher the strength of the relationship). However, this effect is relatively low, likely because of the importance of physical presence in mitigating trade credit risk (Leontieva et al., 2019).

We also examined the impact of firm and country characteristics. The firm industry indeed played a significant role in the first phase. The level of political stability and digital infrastructure of the target country affected the relationships studied in both phases.

We conclude the chapter by acknowledging that this quantitative analysis is limited in both scope and type of risk assumed, and that there may be future research opportunities to study the application of digital to the IRM process in other types of international activities (like FDI) and different kinds of international risk (like political risk).

Resumen

La presente tesis se centra en estudiar el impacto de la digitalización en los recursos y en las capacidades que utilizan las empresas multinacionales y las empresas exportadoras para gestionar los riesgos que surgen al operar en otros países. Por gestión de riesgos internacionales (IRM, por sus siglas en inglés) nos referimos a las medidas que toma una empresa para proteger sus resultados frente a acontecimientos inesperados en sus operaciones internacionales (Miller, 1992). En este trabajo, nos enfocamos en las acciones operativas de gestión de riesgo que se adoptan tras la toma de decisiones estratégicas y financieras de alto nivel. En este contexto, la digitalización se refiere al «proceso de transformar la esencia de los productos, servicios y procesos de una organización en paquetes de datos compatibles con Internet» (Banalieva & Dhanaraj, 2019 p.1373).

Cada capítulo de esta tesis intenta abordar distintas cuestiones, desde una perspectiva más general hasta concluir con un análisis más específico. En primer lugar, se comienza por la comprensión del proceso mediante el cual la digitalización añade valor a las actividades internacionales en general, incluida la gestión de riesgos. A continuación, se estudian los procesos de toma de decisiones, el papel de las percepciones y la propensión y el impacto de la digitalización en el contexto de la IRM. Por último, se desarrolla un estudio cuantitativo sobre una de estas relaciones en un contexto específico: el riesgo de crédito comercial internacional (ITC, por sus siglas en inglés).

Resumen del capítulo 1

El objetivo del primer capítulo es explorar cómo la globalización y la digitalización interactúan para generar valor para las empresas. Si bien la literatura ha estudiado esta relación desde distintas perspectivas (Hazlehurst y Brouthers, 2018; Reuber y Fischer, 2011; Vadana et al., 2019), nuestro enfoque supone abordar el tema desde una perspectiva más amplia, considerando las últimas tendencias en la digitalización.

Para ello, hemos realizado una revisión sistemática de la literatura utilizando palabras clave relevantes para ambas dimensiones. Esto ha dado como resultado un conjunto de aproximadamente 102 artículos que abarcan diversas perspectivas, incluyendo funciones (estrategia y marketing, entre otros), industrias (por ejemplo, digital o industrial, entre otras) y tipos de empresas (como multinacionales o start-ups).

Nuestra principal contribución a la literatura actual es medianteun modelo conceptual para la creación de valor mediante la aplicación de la digitalización a las iniciativas de internacionalización, que denominamos Creación de Valor Internacional Digital (DIVC, por sus siglas en inglés). Este valor se crea mediante la aplicación de Recursos Digitales (como una plataforma de conocimiento) a Oportunidades de Creación de Valor Internacional (como la exportación o la gestión de riesgos).

Los Recursos Digitales pueden estudiarse desde perspectivas genéricas, estratégicas o específicas (front-end, back-end o inteligencia). Un ejemplo de esto último es el uso de big data para la toma de decisiones en entornos alejados (Yamin y Sinkovics, 2006). Por su parte, las Oportunidades de Creación de Valor Internacional pueden ser estratégicas (por ejemplo, relacionadas con la presencia en el mercado, la protección de IP o las reconfiguraciones de la cadena de valor) o de gestión (incluyendo marketing y ventas, operaciones o control). Un ejemplo de estas puede ser la protección del conocimiento mientras se opera en el extranjero (Del Giudice et al., 2019).

En este marco conceptual, definimos tres posibles caminos para la creación de valor: «Internacional convirtiéndose en digital», «Digital convirtiéndose en internacional» y «Convirtiéndose en internacional a través del digital». En el primer escenario, las empresas globales utilizan la tecnología para optimizar sus operaciones. En el segundo escenario, las plataformas digitales se expanden a otros países. En el tercer escenario, una empresa implementa nuevas tecnologías para apoyar sus esfuerzos de internacionalización.

Las características de la empresa analizada, así como el entorno en el que opera, influyen en el proceso seguido a lo largo de estos escenarios. Las empresas más grandes disponen de mayores recursos para realizar estos recorridos, mientras que las más pequeñas (en especial las nuevas empresas) pueden ser más ágiles (Coeurderoy et al., 2012). Las empresas de sectores con pocos activos tangibles (como las plataformas digitales) recorrerán estas vías con mayor celeridad (Tran et al., 2016), pero también pueden enfrentarse a riesgos digitales específicos, como la "virtuality trap". Finalmente, las empresas B2C y B2B emplearán enfoques distintos a la hora de desarrollar sus estrategias (Eid et al., 2006). En lo que respecta al entorno, las empresas deben tener en cuenta los aspectos legales, de infraestructura (tanto física como tecnológica) y culturales tanto del país de acogida como del país de origen.

El capítulo concluye identificando posibles vías para futuras investigaciones basadas en este marco conceptual. Un área específica donde la cobertura de las investigaciones actuales es limitada es el uso de las tecnologías digitales en la gestión del riesgo internacional. Examinaremos esta cuestión en detalle en los siguientes capítulos.

Resumen del capítulo 2

En línea con las oportunidades de investigación detalladas en el primer capítulo, el objetivo del segundo capítulo es estudiar en profundidad la relación entre la digitalización y el riesgo internacional. La originalidad del enfoque de este capítulo radica en el aspecto conductual de esta relación, es decir, en las percepciones y propensiones de los directivos a cargo de la internacionalización de la empresa. También analizamos el problema a nivel de la empresa y cómo el desarrollo de recursos específicos, como la información, el conocimiento, la velocidad y la agilidad (Damodaran, 2008), puede influir en estas percepciones y propensiones.

Partimos del marco conceptual propuesto por Sitkin y Pablo para comprender la toma de decisiones por parte de los gestores en contextos de riesgo. Este marco explora los aspectos de la organización, del individuo y del problema, junto con su relación con el comportamiento del decisor en este tipo de contextos (Sitkin y Pablo, 1992).

Teniendo en cuenta este marco, realizamos una serie de entrevistas a 20 altos directivos de 15 países que trabajan en empresas multinacionales relevantes para nuestro estudio. La mayoría de las empresas analizadas tenían más de 5000 empleados y operaban en más de 11 países. Las personas entrevistadas pertenecían al Comité de Dirección (o eran altos directivos relacionados con nuestra problemática) y provenían de 14 nacionalidades diferentes. Analizamos la información pública de cada una de las empresas para, a continuación, elaborar entrevistas semiestructuradas. Para finalizar, todos los datos obtenidos se analizaron mediante un enfoque de codificación de dos niveles (Urquhart, 2012).

Las operaciones internacionales son, sin duda, un contexto de riesgo y se ven afectadas por las percepciones y propensión de los directivos de las empresas multinacionales. Las entrevistas pusieron de relieve los factores que influyen en ellas. Entre los factores relativos al individuo se incluyen la experiencia previa, la distancia cultural y el puesto que

ocupa la persona dentro de la organización (Kraus et al., 2015). Entre los factores relativos a la empresa que surgieron durante las entrevistas se encontraban el sector y el tipo de cultura de asunción de riesgos existente en la compañía (Liesch et al., 2011). Entre los factores relacionados con los problemas abordados, destacaron las diferentes percepciones sobre los riesgos políticos o sanitarios. Todos estos factores influyeron en la toma de decisiones de los directivos, motivándolos a desarrollar sistemas y procesos para mitigar los efectos de posibles futuros eventos de riesgo. En nuestras entrevistas, y dado el período en el que se realizaron, la pandemia de COVID-19 fue el ejemplo de evento de riesgo más citado. Todos los entrevistados coincidieron en la importancia de la tecnología digital en el apoyo a estos esfuerzos de prevención y mitigación de riesgo y proporcionaron múltiples ejemplos de su aplicación.

De forma paralela, las decisiones de digitalización son otro contexto de riesgo en el que se pueden aplicar conceptos similares. De hecho, el riesgo digital constituye una amenaza emergente que los directivos de las empresas multinacionales deben tener en cuenta. Las responsabilidades funcionales del individuo y su exposición a las tecnologías de la información desempeñan un papel importante a la hora de valorar dicho riesgo. El sector y la cultura de la organización también alteran la percepción de las oportunidades y los riesgos digitales. Por último, las características del problema también inciden en la toma de decisiones en este contexto.

Un concepto clave que surgió durante las entrevistas fue el de «evento de riesgo» (Rogers, 1997). Para este estudio, un evento de riesgo se refiere a una circunstancia impredecible que afecta de manera significativa el rendimiento de la empresa y de sus stakeholders. Argumentamos que las decisiones tomadas antes y después de estos eventos constituyen la «historia de resultados» o, dicho de otra manera, constituyen la experiencia acumulada tanto por la empresa como por el individuo.

Basándonos en este concepto, nuestra contribución a la investigación realizada hasta ahora se basa en la propuesta de un modelo que integra los procesos de evaluación y toma de decisiones relativos a los riesgos internacionales junto con los procesos de evaluación y toma de decisiones relativos a la digitalización. En la toma de decisiones sobre internacionalización, los factores del individuo, de la organización y del problema afectan a las propensiones y la percepción del riesgo internacional, lo que, a su vez, influye en el comportamiento de las personas y en sus decisiones. Estas decisiones, cuando los ejecutivos se enfrentan a eventos de riesgo específicos, derivan en los resultados finales

de los esfuerzos de internacionalización de la empresa. Estos resultados, a su vez, construyen la experiencia acumulada por la empresa y por los individuos, dando lugar al desarrollo de recursos (a través de nuevos sistemas y procesos) que afectan de nuevo a la percepción y la propensión. La digitalización y el proceso de decisión sobre el riesgo digital siguen un camino similar, en el que las percepciones y la propensión digitales influyen en el comportamiento y los resultados y, por lo tanto, en la experiencia.

Proponemos un modelo en el que ambos procesos interactúan, ya que las empresas digitalmente avanzadas pueden desarrollar capacidades que pueden alterar la percepción y la propensión de los directivos en sus actividades internacionales. Esto puede ser beneficioso, como cuando se mejora la adquisición de conocimientos de una empresa (Bouncken y Barwinski, 2021), o perjudicial, como cuando se genera una confianza excesiva derivada del uso de las nuevas tecnologías, la "virtuality trap" (Yamin y Sinkovics, 2006).

Este proceso puede analizarse desde una perspectiva dinámica. A medida que las empresas avanzan en su transformación digital, desarrollan recursos digitales que permiten a los directivos adquirir una comprensión más profunda del entorno internacional. La percepción y la propensión tienden a crecer en consonancia con este mayor conocimiento. Al mismo tiempo, los ejecutivos también se vuelven más conscientes de los riesgos digitales, y su percepción y propensión a asumirlos evolucionan en paralelo.

Concluimos el capítulo destacando las limitaciones de nuestra investigación y proponiendo nuevas vías para futuras investigaciones. En particular, destacamos las oportunidades para realizar pruebas cuantitativas de ciertas partes de nuestro modelo.

Resumen del capítulo 3

Continuando con la lógica desarrollada en el capítulo anterior, el tercer capítulo tiene como objetivo validar el impacto de la digitalización en el proceso de IRM, que comienza con la experiencia adquirida por las empresas a través de los eventos de riesgo vividos por la organización en el pasado.

Los estudios previos en este campo se han centrado en la perspectiva estratégica del proceso de IRM (Eduardsen y Marinova, 2020; Miller, 1992). Sin embargo, en este capítulo nos centramos en el proceso operativo, dividiéndolo en dos etapas: evaluación/asunción y adaptación/mitigación. La primera etapa consiste en la evaluación del

riesgo y las decisiones correspondientes que derivan en un cierto nivel de exposición al riesgo. La segunda etapa consiste en acomodar este nivel de riesgo y mitigar posibles eventos de riesgo futuros (Eduardsen y Marinova, 2020; Yamin y Sinkovics, 2006).

Contribuimos a la literatura actual al examinar los mecanismos que permiten que las capacidades digitales incidan en el proceso de gestión de riesgos en ambas fases.

Comenzando por la primera fase del proceso, trabajos anteriores han demostrado que existe una relación entre la experiencia de una empresa en actividades internacionales y el nivel de riesgo internacional que asume (Buckley et al., 2016): cuanto mayor es la experiencia, mayor es el riesgo asumido. Argumentamos que esta relación se desarrolla mediante la construcción y el despliegue de recursos de información y conocimiento. Las capacidades digitales ayudarán a las empresas a construir estos recursos (por ejemplo, mediante el empleo de Big Data) y a desplegarlos (como el uso de la IA para analizar los riesgos de una nueva oportunidad) derivando en una asunción de riesgos más óptima (De la Torre y Moxon, 2001; Liu et al., 2022).

En la segunda fase, existe una relación natural entre el riesgo asumido y los resultados finales de la empresa en materia de riesgos. Las empresas pueden moderar esta relación al construir y desplegar recursos de velocidad y flexibilidad para adaptarse y mitigar el impacto de los riesgos asumidos en eventos de riesgo posteriores. Sostenemos que las capacidades digitales ayudarán a las empresas a construir (por ejemplo, a través de sistemas avanzados de gestión de inventarios) y a desplegar estos recursos (por ejemplo, mediante videoconferencias para resolver de forma remota eventos de riesgo excepcionales) con el fin de compensar los efectos del riesgo asumido en la primera fase (Strange, 2020; Wresch, 2004).

Todas estas relaciones se verán influidas por diversos factores específicos de cada empresa (como el sector, el tamaño y la rentabilidad) y por las características del país de destino (incluidas la estabilidad política, el entorno empresarial y la infraestructura digital).

Para demostrar estas relaciones, utilizamos un contexto específico: el riesgo de crédito comercial internacional (ITC), es decir, el riesgo de crédito que asumen las empresas cuando exportan a países lejanos. Por otro lado, también constituye un tipo de riesgo internacional poco abordado en la literatura actual (Pridotkienè et al., 2006; Seifert et al., 2013).

Para realizar nuestro análisis, utilizamos tres fuentes de información. En primer lugar, extraemos datos sobre las empresas objetivo (incluidos datos generales sobre las empresas y datos sobre el riesgo crediticio) de la base de datos de una de las aseguradoras de crédito líderes a nivel mundial. Filtramos dicha información para el segmento de empresas multinacionales, lo cual permite crear un panel compuesto por cerca de 4000 empresas en 235 países de destino, a lo largo de 15 años, lo que da como resultado un total de 310.000 registros. En segundo lugar, complementamos esta información con datos sobre digitalización obtenidos mediante una herramienta de web scraping. Por último, incorporamos información sobre los países de acogida obtenida de la base de datos de indicadores del Banco Mundial.

Nuestro análisis demuestra el efecto moderador de la digitalización en la relación entre la experiencia y el riesgo asumido, lo que permite a las empresas optimizar sus decisiones de exposición al riesgo al utilizar la tecnología digital. Nuestros hallazgos no respaldan posibles efectos adversos de este uso, por ejemplo, la «virtuality trap».

En la segunda fase, nuestros resultados también respaldan el efecto moderador de la digitalización en la relación entre el riesgo asumido y los resultados finales de la gestión del riesgo (cuanto mayor es la digitalización, mayor es la relación). Sin embargo, este efecto es mínimo, probablemente debido a la importancia de la presencia física en la mitigación del riesgo de crédito comercial (Leontieva et al., 2019).

También examinamos el impacto de las características de las empresas y de los países de destino. El sector de la empresa desempeñó un papel significativo en la primera fase. El nivel de estabilidad política y la infraestructura digital del país de destino afectaron a las relaciones estudiadas en ambas fases.

Concluimos el capítulo enumerando las limitaciones de este análisis cuantitativo, tanto en su alcance como en el tipo de riesgo asumido, y mencionando las oportunidades de investigación futuras que pueden surgir. Entre otras oportunidades proponemos estudiar la aplicación de la digitalización a otros enfoques de internalización (por ejemplo, la inversión extranjera directa) o estudiar otros tipos diferentes de riesgo internacional (por ejemplo, el riesgo político).

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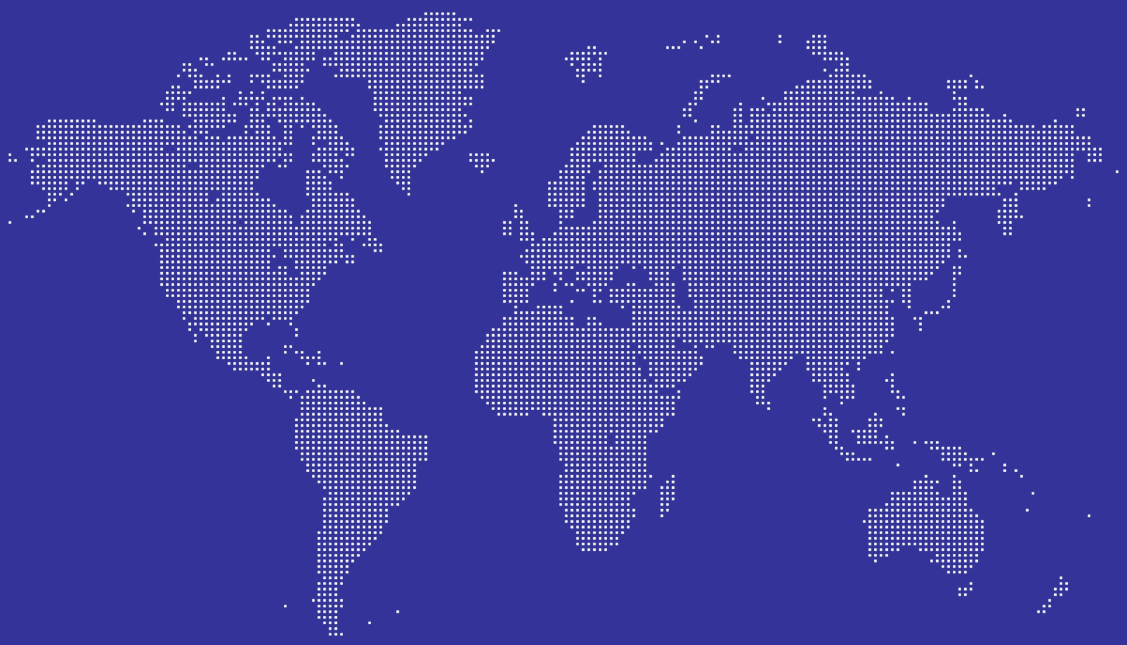
INTRODUCTION



More than ever, multinational firms face an environment fraught with increasing risks and uncertainties. From unexpected crises, such as COVID-19, to new tariff wars, the once-stable and growing global business environment is constantly under threat. Indeed, 63% of respondents in a World Bank survey describe the future global outlook as stormy or turbulent, indicating a high likelihood of global catastrophes within the next 10 years (World Economic Forum, 2024). Firms must cope with all these risks and prepare for new, unexpected changes in the environment that may arise in the future. To achieve this, companies engage in International Risk Management (IRM) activities that help them mitigate both expected and unexpected risks, thereby reducing the frequency of adverse events and their impact. Indeed, this is one of the key activities of any MNE executive involved in international business (Ghoshal, 1987).

IRM is a complex endeavour. Firms can enhance their risk profile by utilising financial or strategic risk management (Miller, 1992). Additionally, they can make more operational decisions to cope with specific risk events.

To achieve this, firms need state-of-the-art systems, processes, and information to stay ahead of potentially damaging risk events. One way to achieve excellence in this effort is to utilise technology. The evolution of new digital technologies in recent years has been staggering. One example is the evolution of AI models, which are having an impact in almost all areas of business. Equity investments in AI are growing at a rate of nearly 22%, on average, from 2022 to 2024 (McKinsey Global Institute, 2025). These new types of technologies have the potential to strengthen a firm's IRM. Indeed, they have been helpful, for example, in the pandemic, where digitally savvy firms were able to cope with the disruption of their retail activities through advanced online shopping (Yohn, 2020) or with the realignment of their supply chains (Strange, 2020). However, in addition to its benefits, digitalisation brings its own set of risks to MNEs, one of which is an altered perception of the international risk level assumed when operating in specific contexts (Yamin & Sinkovics, 2006).

Therefore, firms can benefit significantly by adequately improving their IRM with digital technologies, specifically by developing a conscious and rational model of applying digitalisation to their assessment of the level of IR they assume and to its mitigation.

Previous research in the International Business field has focused on specific aspects of the interaction between technology and internationalisation, primarily examining the use of technology to facilitate sales abroad (Hagsten et al., 2017) or to enhance supply

chain efficiency (Strange & Zucchella, 2017). However, there is little coverage of its application in IRM. Furthermore, IR research has primarily focused on the strategic and financial aspects of IR at the firm level, with limited coverage of managers' decisions in operational risk management, which significantly affects the outcomes of the firm's efforts (Eduardsen & Marinova, 2020).

Therefore, given these gaps, this dissertation aims to contribute to current research by examining the impact of digitalisation on firms' IRM efforts and how it affects their managers' decisions. We attempt to answer the general research question:

> *"How does digital technology impact the IRM of firms?"; in particular, "How does digitalisation affect the decisions of managers regarding the level of risk assumed and its outcomes?"*

To achieve this, our first contribution, based on the Resource-Based View (Barney, 1996), involves developing a theoretical framework to understand how digitalisation and internationalisation interact to add value for firms. First, digitally advanced firms can create value when applying their capabilities in their internationalisation efforts. Second, multinational corporations can utilise digital technologies to enhance their international operations. Ultimately, non-digital or global corporations can leverage digital technologies to expand their geographical presence. IRM will be a specific case in each of these dimensions.

Focusing specifically on value creation through IRM, part of the literature supports that the problem is essentially behavioural (Acedo & Galán, 2011). Managers make decisions on the risk assumed by their companies when operating internationally. However, these decisions are affected by the managers' perception of international risk and their individual propensity to it (Sitkin & Pablo, 1992). We contribute by proposing a model on how the availability of digital capabilities in the firm develops specific resources, which, in turn, will affect these perceptions and propensities. In our model, digitalisation will allow better information and knowledge of potential risk contexts, changing the perception of managers. In parallel, it will also create speed and agility, countering potential adverse effects and therefore altering their propensity (Damodaran, 2008).

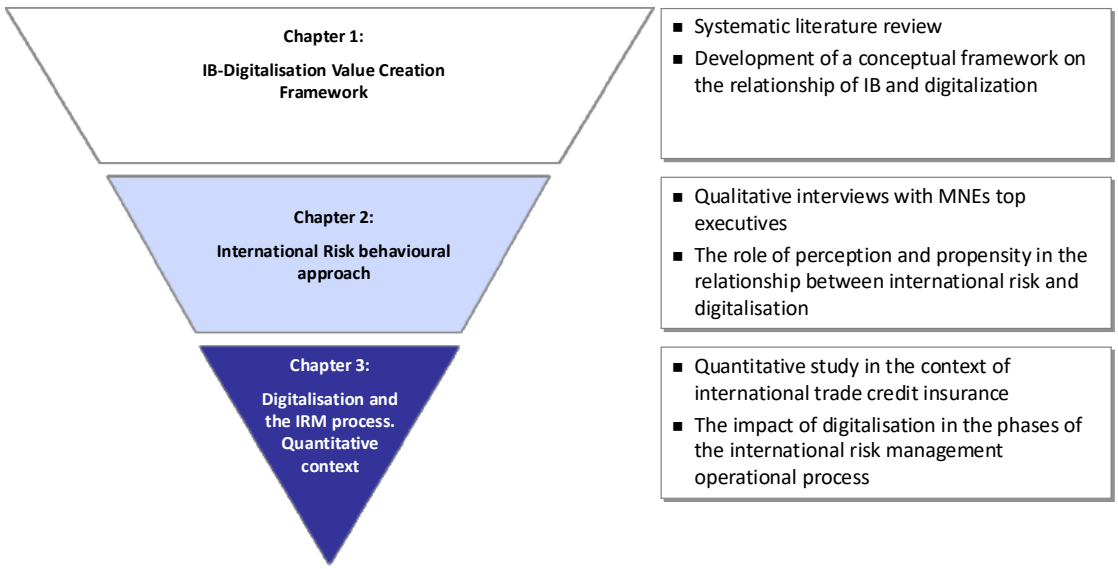
Following this logic, we propose a mechanism by which digitalisation affects the resources mentioned above in the context of the IRM process. The presence of digital capabilities enables firms to more effectively build and deploy information and knowledge resources in response to their experiences, and then deploy them when

needed to assess and mitigate international risk. Likewise, digital capabilities will also help to build speed and flexibility and to deploy them when trying to mitigate the impact of risk events.

We can summarise this dissertation by stating that digital capabilities can help firms develop resources that add value through IRM efforts. However, they can also influence their perceptions of IR and, consequently, moderate the impact of their previous experience on their assumption of risk and on their efforts to mitigate adverse risk events.

This dissertation is structured as three distinct chapters (please see Figure 0.1). In the first part, we review the current literature on the interaction between IB and digitalisation, and propose a model for value creation in this space. In the second chapter, we focus on the behavioural aspect of the problem by conducting interviews with top-level managers from several multinational enterprises (MNEs) worldwide and examining the impact of digitalisation on their perceptions and propensity for risk. In the final chapter, we conduct a quantitative analysis to assess the impact of digital technology on the relationship between international experience, risk assumption and risk mitigation.

Figure 0.1.
Structure of the thesis

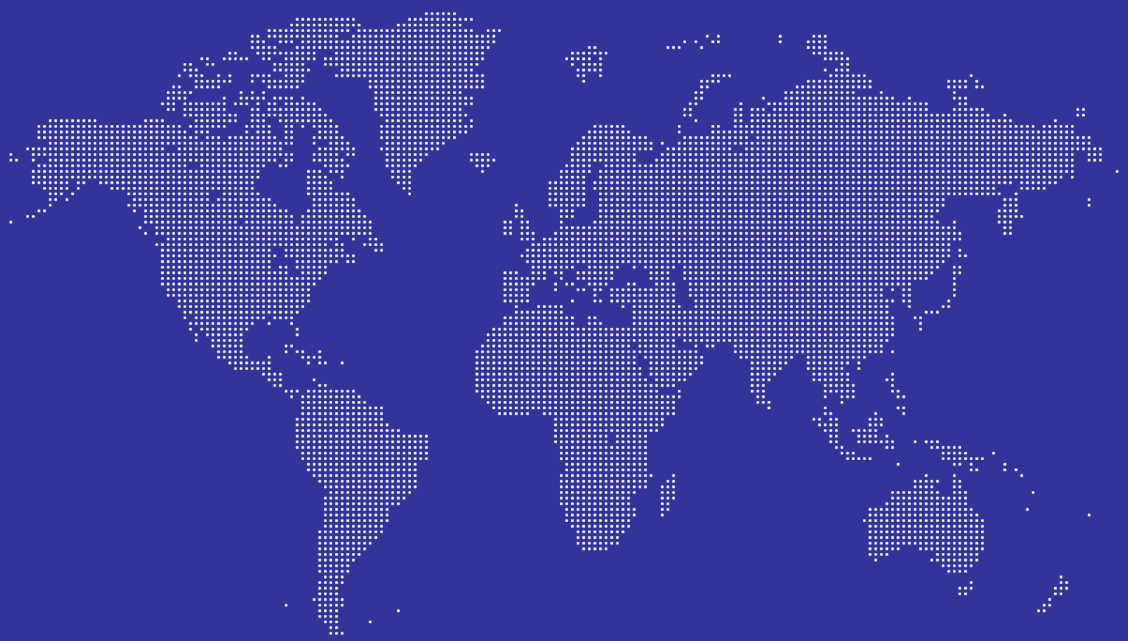


The final section of the document summarises the main conclusions drawn from this dissertation.

Chapter 1

THE ROLE OF DIGITALISATION IN FIRMS' INTERNATIONAL VALUE CREATION: AN INTEGRATIVE CONCEPTUAL FRAMEWORK AND A RESEARCH AGENDA

'The Internet is becoming the town square for the global village of tomorrow.' (Bill Gates, 2009)



Abstract: The new digital revolution promises to impact the way firms operate internationally even more profoundly than previous technology innovations have. This chapter reviews the most relevant literature on the intersection between digital technologies and international business to identify possible avenues of value creation in both the international and digital dimensions. Firms can achieve Digital International Value Creation by developing digital resources and using them in international value-creation opportunities. We identify three different value-creation paths that we label: International Going Digital, Digital Going International, and Going International with Digital. Environmental factors and the attributes of firms moderate this value-creation model. We believe that our framework will help academics and practitioners to analyse the complex implications of digital technologies in a global context, both their opportunities and their risks

Keywords: International Business, Digital, Information Technology, Multinational, MNE, Global Company, Resources, Value Creation, Literature Review, Framework, Research Agenda

1.1 Introduction

Information and Communication Technologies (ICT) have always played a crucial role in all areas of International Business (IB). They have the potential to increase the efficiency of Multinational Enterprises (MNEs) and exporting companies, and even to allow them to redesign their strategy. Recent trends in the international environment and new digital technologies will further emphasise this role.

This study focuses on how digitalisation can help firms create value in an international context. To this end, we develop a conceptual framework based on the concept of Digital International Value Creation (DIVC), which draws on accepted definitions of value creation and digitalisation in the literature. We consider value created by the firm as *'the sum of the values appropriated by all the participants in a business model, over all transactions that the business model enables'* (Amit and Zott, 2001, p.515). This definition focuses on the firm but includes all participants (e.g. clients, suppliers, among others). We extend this definition to the international field: value is created when the firm delivers higher customer value or greater transaction efficiencies (including better risk management) at the international level. We use the term digitalisation to refer to '*the process of transforming the essence of an organisation's products, services, and*

processes into Internet-compatible data packages' (Banalieva and Dhanaraj, 2019, p.1373).

Studying digitalisation in the international context has become especially relevant in the business environment generated by the COVID-19 pandemic. Firms that were digitally advanced before the pandemic are flexible enough to deal with the lockdown and its consequences (Guillén, 2020; Narayandas et al., 2020; Yohn, 2020). For instance, disruption in firms' global value chains has been a central problem during this crisis (Strange, 2020). Digital technology has helped with the reconfiguration and management of these chains. However, those firms that retained their traditional business models suffered significant disruption.

Scholars have studied this application of technology in IB from myriad perspectives, from strategy to operations or marketing, and from new ventures to MNEs. In recent years, rapid changes in international and digital environments have been followed by rapid growth in the number of studies in this field. It is reasonable, therefore, to review the current state of the literature, grouping all possible perspectives and taking into account the latest research.

We found seven reviews that have analysed the literature at the digital–IB intersection. Most of these reviews considered specific relationships between aspects of digitalisation and certain IB topics. Van Geffen et al. (2013) analysed the literature on electronic human resource management systems (e-HRM) in MNEs. Likewise, Pittaway et al. (2004) examined the role of innovation in general, and in multinational companies in particular. Other studies have taken a more strategic approach: Tallon et al. (2019) focused on the impact of technology on organisational agility, and Watson et al. (2018) studied the role of digital technologies in market entry. From a different perspective, Vadana et al. (2019) and Reuber and Fischer (2011) explored how technology impacts new-venture internationalisation. From a more general perspective, Hazlehurst and Brouthers (2018) quantify and classify the current research on the use of technology in the IB and strategy fields, identifying possible research gaps. There is room to develop an additional literature review from a general perspective, but specialised only in the international dimension. A literature review updated to reflect all possibilities of today's digital technologies and focused more on possible business applications and value creation opportunities rather than the status of the research. Such a review will allow us to establish a conceptual framework that can help not only scholars identify research opportunities but also

practitioners design new value-creating strategies, being this the main contribution of our work.

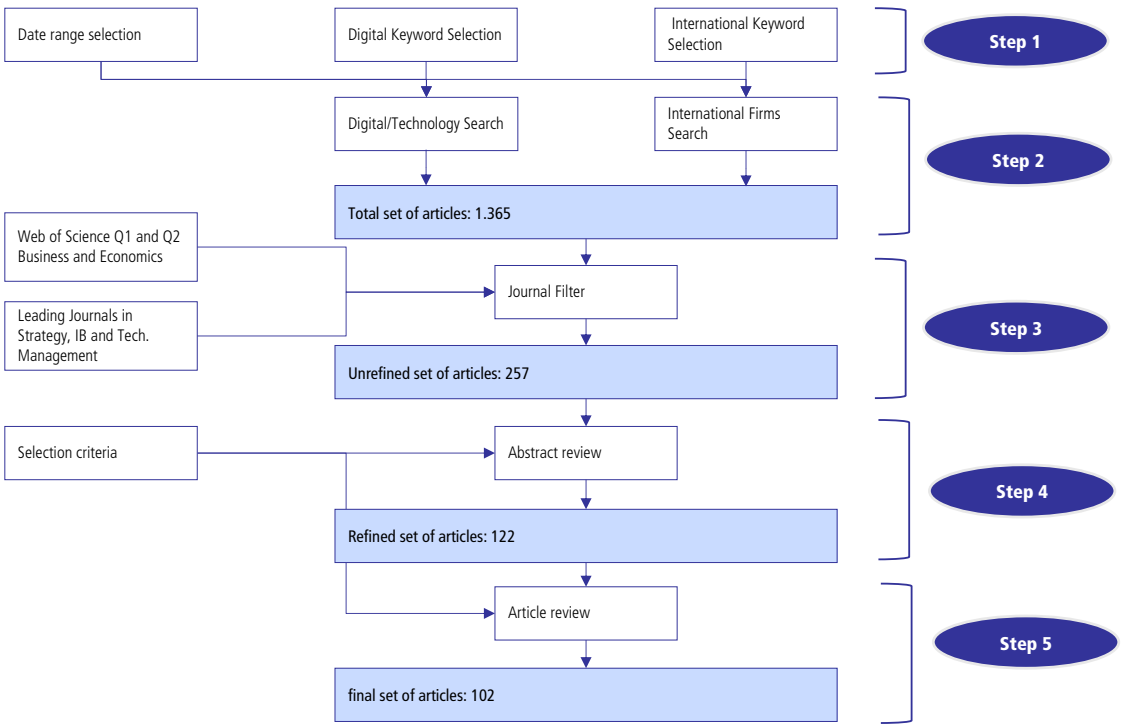
We structure the paper as follows. In Section 1.2, we explain the methodology used to develop our search and present a quantitative overview of the selected articles. Section 1.3 offers our review of the literature, which we discuss in Section 1.4, presenting the conceptual framework that emerges from it. Finally, in Section 1.5, we use that framework to set a research agenda and note the limitations of our study.

1.2 Methodology and overview of results

1.2.1 Methodology

We built a five-step methodology (see Figure 1.1) inspired by Paul and Criado (2020) and Cuervo-Cazurra et al. (2018) and in line with similar literature reviews (Mostafiz et al., 2020; Watson et al., 2018).

Figure 1.1.
Overview of the literature search methodology



Source: Elaborated by the authors

In the first step, we developed two separate lists of keywords. From the international firm perspective, we selected 'MNE', 'MNC', 'multinational', and 'international*'. From the digital/technology perspective, we faced the difficulty that digitalisation is a recent concept, with few relevant articles available mentioning it explicitly. However, the literature has approached similar topics using other key terms. During the 1980s and the 1990s, the rise of technologies like Enterprise Resource Management (ERP) and Electronic Data Interchange (EDI) transformed MNEs' value chains. For these years, we could not find equivalent concepts for digitalisation; however, the literature used the term *new technologies* to address similar issues. At the end of the 1990s, the advent of the Internet and lower storage and communication costs transformed IB. Small companies were able to create web pages and start selling abroad immediately. The concepts commonly used at that time were *e-business* and *virtual*. Now, in the era of smartphones and big digital platforms such as Google and Facebook, the most frequently used word is *digital.* Our final list for the digital perspective included, therefore, all these keywords: 'new technology*', 'e-business', 'virtual', and 'digital*'. As we sought a general perspective, we excluded concepts specific to areas of the firm, such as e-commerce, e-HRM, or Industry 4.0. In this first step, we also set the date range for our search as 1989 onwards. This was the year when the World Wide Web was invented, and EDI started to become standard for cross-country transactions.

In the second step, we focused our search using the Web of Science (WOS) in preference to other databases, as it has guaranteed scientific content, strict filtering and anti-manipulation policies, and offers many resources for searching and collecting metadata (de Souza et al., 2020; de Winter et al., 2013; Martín-Martín et al., 2018). WOS covers all major journals relevant to our topic, and other studies in this field have made use of it (Cuervo-Cazurra et al., 2018; de Souza et al., 2020; Watson et al., 2018; Øyna & Alon, 2018). Within this database, we developed a separate search for each keyword list using the '*SUBJECT*' field (including Title, Abstract, Author keywords, and Keywords detected by WOS). We joined searches with the Boolean operator '*AND*', and limited our results to the '*BUSINESS ECONOMICS*' WOS research area. To focus on research-oriented content, we limited the results to the '*ARTICLES*' and '*REVIEWS*' document types. The result was a total of 1,365 articles

In the third step, we filtered this search by publication. As our primary goal was to develop a conceptual framework, we focused on journals classified in WOS in the '*BUSINESS*', '*BUSINESS FINANCE*', and '*MANAGEMENT*' categories and included in the

Q1 and Q2 JCR quartiles. To complement our set, we added 29 other relevant journals not included in these quartiles. We selected well-known journals from the fields of IB, Strategy, and, to enable cross-fertilisation, Management of Technology. (See Appendix 1 for a complete list of journals included in our search). After applying this filter, we obtained an unrefined set of 257 articles.

In the fourth step, we manually reviewed all the articles' abstracts, excluding those unrelated to our research. We excluded all articles discussing the following topics:

- country comparisons (e.g., international comparisons of venture capital impact in new technology ventures)
- technologies specific to a particular industry but not ICT-related (e.g., oil pumping technologies)
- global industries using technology but not for an IB problem (e.g., air travel reservation systems)
- government policies (e.g., analysis of government programmes to promote technology usage for exporting)
- firms in the ICT industry but where the technology was not relevant to the issue studied
- virtual teams' studies where technology was not a priority (e.g., analysing language barriers)
- technology as a tool for the study but not its object (e.g., virtual surveys)
- development of technologies in certain countries (e.g., analysis of the drivers behind technology development in South Korea).

All identified literature reviews were included. Where there was doubt about the content of an article, we retained it. This manual selection resulted in a set of 122 articles.

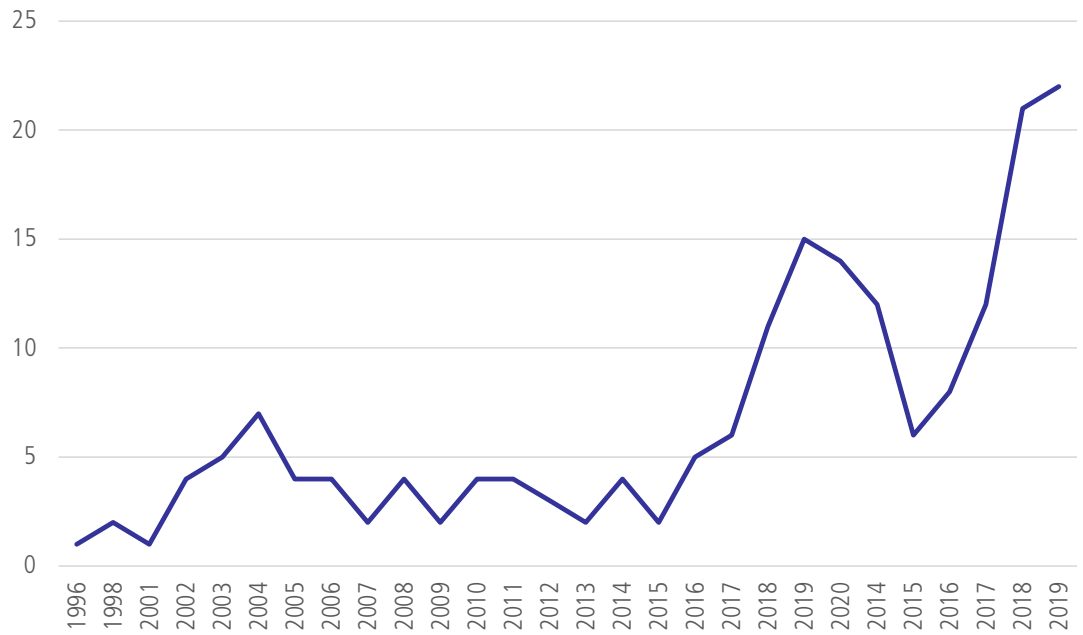
In the final step, we read all articles in detail and discarded those that did not meet our criteria and had not been detected as such during the abstract review. The final sample included 102 articles (see Appendix 2).

1.2.2 Overview of results

We made a preliminary quantitative analysis of the articles to help us understand the current development of academic research at the intersection between digital and IB and guide our literature review.

Figure 1.2 depicts the evolution of the selected articles over time (reflecting publication year, which includes a certain lag from the beginning of the studies). Before 2001, the number of articles was limited, and they mainly discussed traditional ICT technologies (often labelled 'new technologies'). In 2001, probably because of the dot-com frenzy, technology-related articles increased, with most citing e-commerce or e-business. There was a slight decline in subsequent years as interest in Internet-based technologies faded. This period was followed by a steep rise after 2015, mainly related to the advent of smartphones and new digital technologies.

Figure 1.2.
Evolution of the number of articles by publication year (final set) (1996-2019)



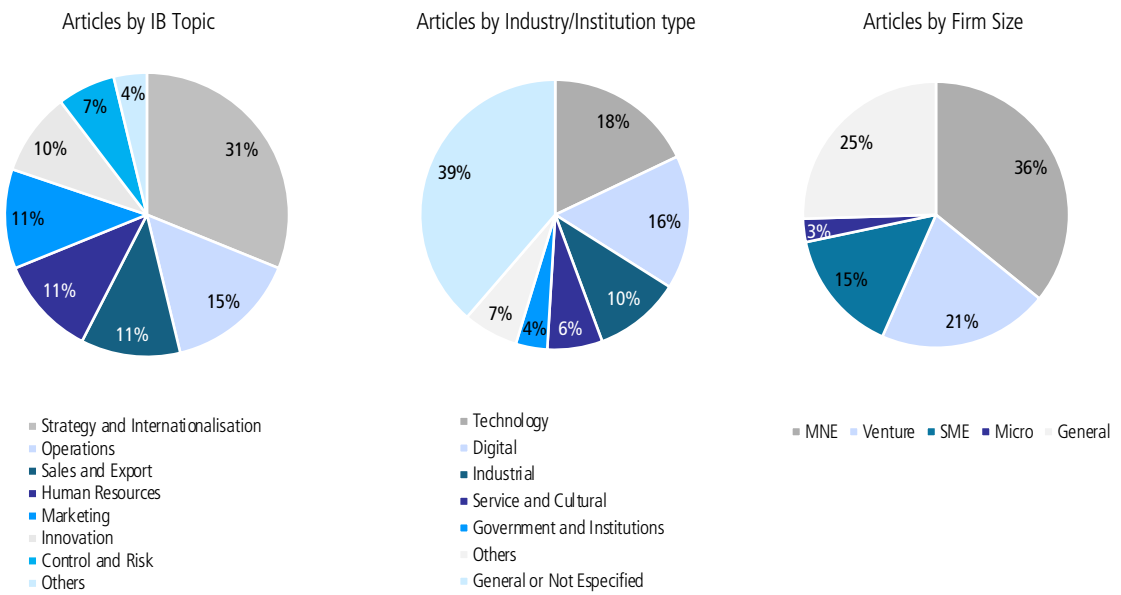
Source: Elaborated by the authors based on a Web of Science search

We also classified our final set of articles according to three criteria: IB topic, institution type, and size (Figure 1.3). Our first classification was according to the type of IB topic addressed by the article. In line with the aims of our search, most articles (31% of the total) used a general perspective and analysed firms' strategy and internationalisation. More specific studies focused mainly on operational issues (15%), marketing (11%), commercialisation (11%), human resources applications (11%) and innovation (10%). Control and risk played a secondary role (7%).

We also classified articles according to industry or institution type. As many as 39% studied the application of technology to IB without specifying a particular industry. Unsurprisingly, in the remaining articles, the firms that brought more interest belonged to the technology industry and specifically the digital one (referring to non-hardware connected applications), with 18% and 16% of the articles, respectively. Industrial and manufacturing industries accounted for 10% of the studies. Services also had a significant presence, at 6%. Finally, 4% of the articles studied government and public institutions, such as universities.

For the international firm size, most attention was devoted to MNEs, at 36% of the articles; however, it is worth noting a focus on new businesses (21%). Many articles examined the rapid internationalisation from the outset of certain businesses ('Born Globals'). Small and Medium Enterprises (SMEs) also had significant representation, with 15% of the total sample. The rest of the articles, including those that did not specify the firm type, formed the remaining 28%.

Figure 1.3.
Distribution of articles according to IB topic, industry, and firm typology (final set)



Source: Elaborated by the authors based on a Web of Science Search

Regarding theoretical lenses, in our sample, we found three theories commonly used to explain the application of technologies to IB. First, articles based on internalisation/transaction cost theories in IB (Buckley, P. J. & Casson, 1985; Caves, 2007; Williamson, 1979) argue that technologies bring transaction and search cost reductions that lead to different internalisation decisions for MNEs (Zeng et al., 2019). Second, studies using the Resource-Based View (Barney, 1991, 1996; Peteraf, 1993) see technology as a resource that allows firms to gain competitive advantage internationally. For instance, Granstrand (1998) developed a framework to explain how technology firms engage in technology diversification, and how resources created in the process allow firms to increase their economies of scale and scope and to diversify into new businesses and geographies. The third theoretical lens is Dunning's (1980) eclectic paradigm, which brings together disparate theories defining three types of advantages that firms can use internationally: Ownership, Location and Internalisation. Some articles have argued that this paradigm, complemented by the network theory, can reveal how technology impacts firms' international development (Singh & Kundu, 2002). However, this has generated controversy, with some authors claiming that the network advantage (Banalieva & Dhanaraj, 2019) is not a specific advantage type (Hennart, 2019).

The previously mentioned network theory (Granovetter, 1992; Johanson & Mattsson, 2015) has also been used to analyse how corporations relate to each other in the digitalised international arena (Brouthers et al., 2016). Other studies have revisited the internationalisation process theory, or 'Uppsala' model (Johanson & Vahlne, 1977), in the light of new digital technologies and how they impact transaction governance (Coviello et al., 2017). Finally, it is worth mentioning the use of the TOE (Technology, Organization and Environment) framework (Tornatzky & Fleischer, 1990) to study, from an IT perspective, the adoption of new technologies by firm employees (Zhu et al., 2004).

1.3 Literature review

We can view digital technologies as resources that firms can use in addressing particular international issues, and their application will be different depending on several variables at the level of the firm, environment, and/or context. According to this logic, we use three different perspectives to classify the articles in our review. The first perspective, *international business areas for digital application*, considers articles that have analysed the different IB areas where technology can have a significant impact. Studies can take a more general view that focuses on strategy applications (Coviello et al., 2017) or a more specific one that examines particular topics, such as outsourcing (Lehdonvirta et al., 2019) or distribution channels (Houman Andersen, 2005).

The second perspective, *technology applications in an international setting*, groups studies according to the type of technology resource or capability they consider, from e-commerce (Singh & Kundu, 2002) to additive manufacturing (Hannibal & Knight, 2018).

Finally, *firm typology and environmental factors* can be used as criteria to group the articles. Firm typology can be characterised by size, offering, or product; for instance, we find studies specific to SME problems (Hagsten et al., 2017) and others focusing on firms with business-to-business (B2B) offerings (Eid et al., 2006). Articles have also assessed the impact of the environment on digital strategies, from regulatory (Coeurderoy & Murray, 2008) to cultural approaches (Berthon et al., 2008).

1.3.1 International business areas for digital application

As technology improves speed and lowers search and transaction costs, it has created opportunities for firms in their global operations, from market entry decisions to day-to-day supply chain operations. We can classify articles that address these opportunities into two main categories: strategic and managerial.

Building on Porter's (1996) vision of strategy, a new technology can be applied to improve the firm's **strategic** position if it can change the competitive position. In other words, it can affect the industry structure or the firm's value chain. Within this perspective, articles have studied the impact of digitalisation on market presence, asset creation and protection, and value-chain redefinition.

We found many examples of technologies helping companies to address new markets. In some cases, they influenced the entry decision, allowing the use of alternative entry modes (Houman Andersen, 2005; Katsikeas et al., 2020; Morgan-Thomas & Bridgewater, 2004; Watson et al., 2018). Other studies have reviewed factors related to location choice (Benmamoun et al., 2019; Coeurderoy et al., 2012). There has also been interest in technology's effects on the firm's internationalisation process itself. For instance, digital platforms can make some resources more portable, enabling faster internationalisation with easier transferability across countries (Coviello et al., 2017).

A primary advantage of MNEs is their knowledge assets. Some scholars have analysed how firms innovate, create, and protect this knowledge (Del Giudice et al., 2019; Forsans & Balasubramanyam, 2010; Pittaway et al., 2004; Zhu & Kraemer, 2005). However, the new digital international context brings not only opportunities but also new appropriation risks that the firm has to manage, including foreign country piracy (Gopal & Sanders, 1998; Pezderka & Sinkovics, 2011; Raymond et al., 2015; Yamin & Sinkovics, 2006).

Redefinition of the firm's boundaries in its value chain is a central avenue of value creation mentioned in the literature. With the higher speed and lower costs that technology brings, companies can make new decisions on which activities should be developed internally and externally, at home or abroad, that completely change the configuration of their value chain (Cano-Kollmann et al., 2018; Hannibal & Knight, 2018; Kim, D. et al., 2018; Strange & Zucchella, 2017; Tran et al., 2016; Zeng et al., 2019).

Besides the strategic impact, scholars have also considered how technologies create managerial improvements in functional areas of the company dealing with international expansion. We can classify these areas as marketing, operations, and control.

In the marketing area, since the introduction of e-commerce, technology has transformed the MNE's relationship with its customers. Studies have revealed that companies can now easily reconfigure their distribution or prescription channels in host countries (Houman Andersen, 2005) or improve their sales and commercial capabilities (Morgan-Thomas & Bridgewater, 2004; Symeonidou et al., 2017). Advanced website personalisation also improves the adaptation of a firm's offering to the host country's characteristics (Benmamoun et al., 2019, 2020; Vendrell-Herrero et al., 2018). However, commercialising through virtual channels and platforms brings new types of risks and challenges that firms have to manage. Some examples are information exposure when operating on open platforms or intellectual property appropriation (Jean et al., 2020; Pezderka & Sinkovics, 2011). As relationships become virtual, customers' options grow, and switching costs fall. Several studies have shown how this change turns a firm's brand and reputation into a critical asset for maintaining its competitive position (Andersson & Xiao, 2016; Foltean, 2019; Murphy & Scharl, 2007; Reuber & Fischer, 2011; Sheth, 2020).

Many scholars have focused on how firms' operations change as they use digital technologies to improve their efficiency. They find new ways of acquiring resources (Carayannis & Popescu, 2005) by outsourcing and offshoring (Ashton et al., 2010; Ho et al., 2003; Leek et al., 2003; Lehdonvirta et al., 2019), or even through co-creation with customers (Mariussen & Ndlovu, 2012). Companies also use digital technologies in their production and supply chain management (Banker & Mitra, 2007; Jean, 2014) and in developing and managing their Research and Development (R&D) networks (Colombo et al., 2009; Gassmann & Zedtwitz, 2003; Khanagha et al., 2018). We also found examples of digital technology use in talent and team management (Ashton et al., 2010; Egan et al., 2002; Garavan & O'Brien, 2013; Gassmann & Zedtwitz, 2003; Gong et al., 2018; Morgan et al., 2004; Pauleen & Yoong, 2001; Zakaria & Mohd Yusof, 2018). It is worth mentioning the importance given in the literature to the management of virtual teams. Even as global interactions become virtual, or perhaps because of this, people still matter for the enterprise's success.

Finally, a primary issue when operating abroad is controlling the company's activities in diverse environments. Some articles have addressed how new technologies change the methods that firms use to control their operations overseas (Khanagha et al., 2018; Lal, 2002; Zeng et al., 2019). Companies use the new tools for gathering information, controlling day-to-day operations (Houman Andersen, 2005), and even auditing (Barrett et al., 2005). Other articles have considered how companies prevent and deal with internal corruption and ethical problems in foreign operations (Jean & Tan, 2019; Tan & Tan, 2012).

1.3.2 Technology applications in an international setting

A second perspective to classify the literature relates to which technology applications can improve a firm's international performance. Here, we look at the different technology-based business applications considered in the articles rather than at the technologies themselves. One example is e-commerce, which pertains more to the application (direct-selling) than the technology (Internet and secure payment). Thus, we classify articles into three different categories: generic, strategic, and specific.

Several scholars have developed **generic** studies of digital technology's impacts in specific international contexts. They have used aggregated concepts such as 'e-business' when referring to Internet technologies (Lal, 2002; Piscitello & Sgobbi, 2004; Zhu et al., 2006) or 'digitalisation' when referring to all of today's possibilities (Banalieva & Dhanaraj, 2019; Cassetta et al., 2019; Coviello et al., 2017; Ojala et al., 2018).

Other scholars have focused on the **strategic** implications and advantages that digital technology brings to international companies. One advantage is disintermediation. We found several examples of technology allowing multinationals to interact directly with customers or suppliers without the need for local intermediaries (Houman Andersen, 2005; Zeng et al., 2019). Another advantage is agility, as digitally enabled firms can make and implement decisions rapidly in response to sudden changes (Banalieva & Dhanaraj, 2019; Khanagha et al., 2018; Nambisan et al., 2019; Tallon et al., 2019). Finally, some studies have explored how companies innovate to stay ahead of competitors (Hannibal & Knight, 2018; Hughes et al., 2010; Nambisan et al., 2019; Pittaway et al., 2004; Ray & Ray, 2011).

Most studies have focused on more **specific** technology concepts. We can classify these into three groups: those related to the interface with third parties (front-end), those that are concerned with internal operations (back-end), and those that increase the knowledge that allows the firm to make better decisions (intelligence).

For front-end activities, the most cited application of technology is e-commerce, defined as *'use of the digital mediated networks to conduct commercial transactions'* (Benmamoun et al., 2019, p.319). We found several examples of how e-commerce is used by different types of firms and in different contexts (Benmamoun et al., 2019; Eid et al., 2006; Hagsten et al., 2017; Macchion et al., 2017; Singh & Kundu, 2002). Smaller companies use digital platforms to engage in international trade (Banker & Mitra, 2007; Ojala et al., 2018; Zeng et al., 2019), while MNEs integrate digital initiatives with other distribution channels abroad (multichannel) (Eid et al., 2006; Houman Andersen, 2005; Vadana et al., 2019; Watson et al., 2018). Companies also use online possibilities to enhance their reputation and brand awareness, including e-visibility (Levina & Vilnai-Yavetz, 2015; Reuber & Fischer, 2011) and online marketing and social media (Eid et al., 2006; Foltean, 2019; Leek et al., 2003; Murphy & Scharl, 2007; Ramírez & Tejada, 2019; Sheth, 2020; Sigfusson & Chetty, 2013; Vendrell-Herrero et al., 2018).

Corporations can also improve their back-end international operations by applying digital technologies. Many articles have shown how firms use platforms to manage employees and other resources remotely (Ashton et al., 2010; Cano-Kollmann et al., 2018; Garavan & O'Brien, 2013; Lehdonvirta et al., 2019) or to enhance collaboration with suppliers or partners in host countries (Berthon et al., 2008; Jean et al., 2014). In the manufacturing industry, earlier technologies facilitated today's globally distributed production facilities (Morgan et al., 2004). More recent technologies, such as additive manufacturing or the Internet of Things (IoT), have the potential to reconfigure the global value chain (Bouncken & Barwinski, 2021; Hannibal & Knight, 2018). The evolution of this trend is currently known as Industry 4.0 and has been studied in some recent articles (Chen, 2020; Sinkovics & Sinkovics, 2020; Strange & Zucchella, 2017). However, none of these new opportunities is feasible without a proper implementation (Eid et al., 2006; Khanagha et al., 2018) and integration with current IT systems (Jean, 2014; Zhu et al., 2004).

Finally, we found articles on how companies use the possibilities of digitalisation to build their intelligence. Tools such as big data and machine learning are used to gather data

and develop algorithms that aid managers' decision-making in distant environments (Strange & Zucchella, 2017; Yamin & Sinkovics, 2006). More importantly, they are used to build the firm's knowledge and improve its innovation process (Cano-Kollmann et al., 2018; Hannibal & Knight, 2018; Raymond et al., 2015; Øyna et al., 2018).

1.3.3 Firm typologies and environmental factors

All the opportunities and risks in our review have different implications for firms, depending on their characteristics and the environments in which they operate. Scholars have focused on three principal **firm attributes** that affect the impact of the new digital technologies: size, nature of the offering, and customer type.

The firm's size affects the quantity and quality of its resources, but can also make it less agile (Wang, 2020; Zhu et al., 2004). Thus, scholars have examined how technologies affect international operations in different size categories. Micro-companies can leverage new platforms to access customers globally (Lehdonvirta et al., 2019), and new ventures or 'born global' companies use digital technologies to begin internationalisation early in their lives (Ammirato et al., 2019; Autio, 2017; Coeurderoy et al., 2012; Efrat & Shoham, 2011; Hughes et al., 2010; Jean et al., 2020; McDougall, Patricia Phillips & Oviatt, 1996; Monaghan et al., 2020; Park & Bae, 2004; Shaheer & Li, 2020; Sigfusson & Chetty, 2013; Symeonidou et al., 2017; Øyna et al., 2018). Lack of financial and technical capabilities can mean that SMEs face a disadvantage when going international. However, the literature has shown that the Internet can help them interact internationally by using e-commerce and other approaches (Cassetta et al., 2019; Chen, 2020; Del Giudice et al., 2019; Hagsten et al., 2017; Kromidha & Robson, 2020; Lal, 2002; Morgan-Thomas, 2009; Piscitello & Sgobbi, 2004; Raymond et al., 2015). Conversely, studies have considered current complex MNEs operating around the world and their use of new technologies to improve the efficiency of their existing operations (Adamovic, 2018; Andersson & Xiao, 2016; Kanter, 2008; Loane et al., 2006; Morgan et al., 2004).

The literature has also established that the nature of a firm's offering profoundly influences the impact of technology in its global supply chain (Cassetta et al., 2019; Leek et al., 2003; Reuber & Fischer, 2011; Yamin & Sinkovics, 2006). Having a physical product that must be manufactured and delivered (Houman Andersen, 2005; Macchion et al., 2017; Piscitello & Sgobbi, 2004) is different from having an intangible offering, such as

financial services or entertainment products (Cahen & Borini, 2020; Grönroos, 2016; Vendrell-Herrero et al., 2018; Zhu et al., 2004). There is extensive research on a new breed of companies known as digital services multinational corporations, or platforms. These companies face their own internationalisation risks and opportunities (Brouthers et al., 2016; Coviello et al., 2017; Hennart, 2019; Li, J. et al., 2019; Ojala et al., 2018; Shaheer & Li, 2020; Singh & Kundu, 2002; Tan & Tan, 2012; Zeng et al., 2019). One example could be their tendency to approach new markets using their home-country business model (Zeng et al., 2019).

The final relevant firm attribute is the type of customers it serves. Articles on Business to Consumer (B2C) companies have shown that they can obtain significant advantages from automating interactions with global customers, focusing on e-commerce and online marketing activities (Vendrell-Herrero et al., 2018). However, studies on Business to Business (B2B) firms have shown that they tend to develop relationships with clients through more traditional means, using technology to improve their back-end operations (Berthon et al., 2008; Eid et al., 2006; Leek et al., 2003).

When a company operates in a global context, the **environment** in the different countries where it is present influences its digital strategy. Studies have considered environment-related factors, including institutions, infrastructure, culture, and technology adoption (by both companies and consumers). Although some articles have looked at the impact of these factors in the home market (Benmamoun et al., 2019; Jean & Tan, 2019), most have discussed this in the host country context.

One important subject of study is how institutional and legal environments influence technology application. For example, home-country institutions can encourage the internationalisation of small companies indirectly through e-commerce promotion or other policies and programmes (Bruton et al., 2014; Lal, 2002; Löfsten & Lindelöf, 2003), while host-country institutions can either promote or discourage the digital presence of multinationals (Eid et al., 2006; Jean & Tan, 2019; Watson et al., 2018). The host country's legal environment also has a significant impact regarding the protection of the firm's proprietary knowledge (Berthon et al., 2008; Coeurderoy & Murray, 2008; Gopal & Sanders, 1998; Tan & Tan, 2012). Studies have also shown the crucial role of the host country's infrastructure. For example, physical logistics infrastructure can affect e-commerce deliveries (Watson et al., 2018), digitally enabled partners can help rede-

fine the company value chain (Dunn & Yamashita, 2003; Jean, 2014), and telecommunications infrastructure can limit Internet connectivity and adoption, thereby affecting firms' digital strategies (Hannibal & Knight, 2018; Lal, 2002; Prahalad & Hammond, 2002).

Many scholars have addressed how the cultural environment affects international digital initiatives. Some countries, such as China, appreciate face-to-face interactions more than others (Li, W., 2010; Walker & Harland, 2008). Specific cultural settings can favour corruption or fraud (Berthon et al., 2008; Gopal & Sanders, 1998). Several articles have studied these effects through the concept of psychic distance (Johanson & Wiedersheim-Paul, 1975). For instance, technology changes the way companies perceive this distance, raising the risk of falling into the 'virtuality trap' (i.e. when companies' perception that they know enough about foreign markets through their virtual presence causes them to assume greater risks than necessary) (Pezderka & Sinkovics, 2011; Yamin & Sinkovics, 2006).

Finally, some scholars have examined how consumers' and companies' adoption of new forms of doing business, such as e-commerce, can affect a firm's choice of target country when deploying new digital strategies (Prahalad & Hammond, 2002; Watson et al., 2018).

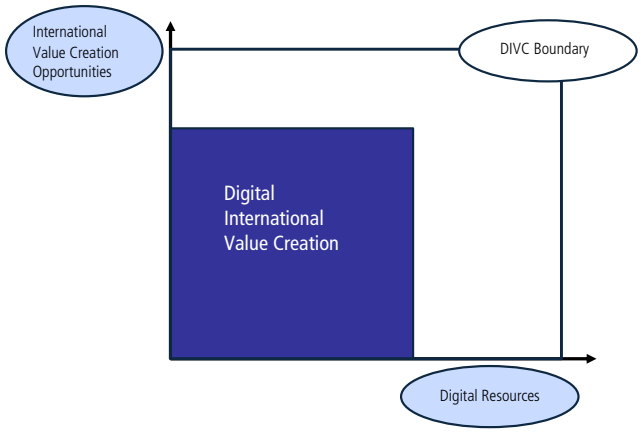
1.4 Digital International Value Creation: an integrative framework

The majority of articles in our review have analysed how digital technology helps firms to improve their performance from a certain international perspective; that is, firms use Digital Resources to improve their international performance. We can define digital resources as a coherent set of digital technologies and capabilities that allow the firm to transform parts of its business model into new data-based and connected ones, thereby improving the firm's efficiency and effectiveness (i.e., increasing its value). These digital resources are applied by firms to create value in an international context.

As mentioned in the introduction, we use the concept of value created by the firm as *'the sum of the values appropriated by all the participants in a business model, over all transactions that the business model enables'* (Amit and Zott, 2001, p.515). The firm can achieve this value creation through higher value for customers or greater transaction efficiencies. One possible avenue of value creation will be risk management as it

improves transaction efficiencies. Previous studies (e.g., Click, 2007), have adopted other perspectives of international value creation when analysing, for instance, international strategic management related topics. However, Amit and Zott (2001) value-creation perspective takes a more holistic vision that, by including all participants, allows the uncovering of more potential research opportunities in the intersection of digitalisation and IB.

Figure 1.4.
Two dimensions for Digital International Value Creation analysis



Source: Elaborated by the authors

Bringing both ideas together, we can define the new term Digital International Value Creation (DIVC) as the creation of value brought about by the application of digital resources to international value-creation opportunities. This concept will help us to understand the options, enabled by technology, that allow firms to create value across national borders.

With this concept and leveraging in our literature review, we can construct the basis of our framework. In Figure 1.4, we represent DIVC graphically, building on its two main dimensions (digital resources and international value-creation opportunities). We plot the value that a firm creates through its digitalisation and internationalisation efforts. The more 'digitalised' the firm is, the more digital resources it has, and the wider the area representing DIVC. Conversely, as the firm becomes more global, it has more opportunities to apply these resources, and the area representing DIVC becomes taller.

The boundaries in this figure represent the limitations of this value creation model. In the digital dimension, the current status of the technology and the firm's capabilities might limit the application of new digital resources. In the international dimension, the current international presence and business model of the firm can limit its options for international value creation opportunities.

Our review of the literature identifies three different paths in this international value-creation model that we refer to as 'International Going Digital', 'Digital Going International', and 'Going International with Digital' (see Figure 1.5).

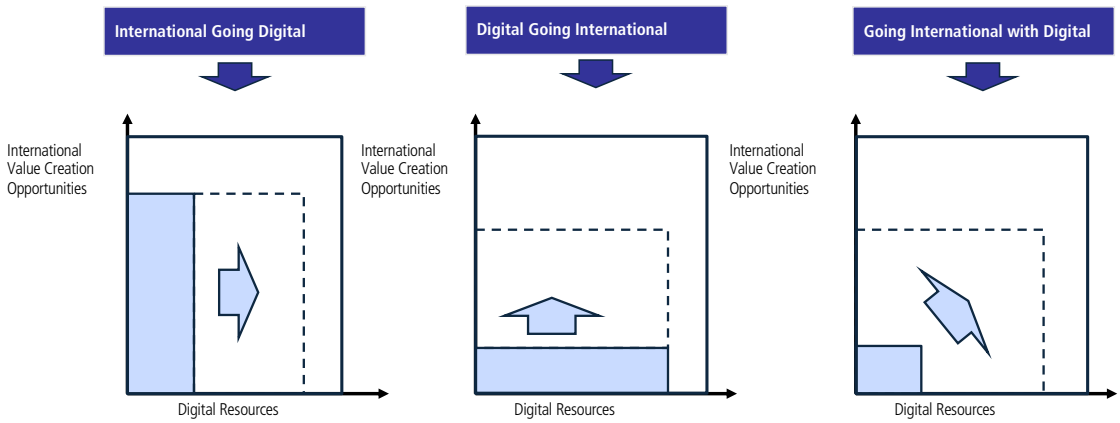
The first path for value creation (international going digital) is for an already global company (e.g. an MNE) to embrace a digital way of doing things (e.g. a knowledge platform) and apply it to help the company with its international operations (e.g. coordinating the global R&D efforts). In our framework, such a firm grows in its digital resources and applies them to already available international value creation opportunities. Many of the reviewed articles study these transitions by analysing a wide range of problems, from partner collaboration to human resource management (Ashton et al., 2010; Eid et al., 2006; Jean, 2014; Vendrell-Herrero et al., 2018). An example of a company following this path is DuPont. In its operations in India, DuPont uses Internet kiosks to provide agricultural information and tools that give improved access to customers (Prahalad & Hammond, 2002).

In the second path in our framework (digital going international), the firm has many digital resources and tries to apply them to new international value-creation opportunities as it increases its internationalisation (e.g., when establishing a local presence). When crossing borders, digital services companies have specific opportunities (such as the fast access of new digital firms to foreign markets (Shaheer & Li, 2020) and face specific challenges (such as the lack of adaptation to host countries (Zeng et al., 2019). Therefore, their internationalisation process differs from the more conventional ones due to variations in the network, ownership, location, and internalisation advantages (Singh & Kundu, 2002). Scholars have studied two main firm types that fit this typology: big digital platforms (Li, J. et al., 2019; Zeng & Glaister, 2016; Zeng et al., 2019) and new digital ventures (Shaheer & Li, 2020). One example of this path is Facebook's crowdsourcing of its translation activities to accelerate its internationalisation. The company used learning tools and incentive systems to integrate a dispersed network of translators that helped it establish operations in new countries (Tran et al., 2016).

The third path for value creation (going international with digital) represents a relatively domestic firm that is not very advanced in digital technology and adopts digital approaches to pursue its internationalisation. In our framework, firms acquire new digital resources that provide new international value-creation opportunities. This possibility is especially relevant for smaller companies within traditional industries (Lehdonvirta et al., 2019; Pezderka & Sinkovics, 2011; Reuber & Fischer, 2011; Watson et al., 2018). For instance, small textile firms in the Italian district of Prato used e-business to address new markets, develop relationships with their international clients, and increase their global visibility (Piscitello & Sgobbi, 2004).

These three paths to growth are not absolute. We can imagine intermediate scenarios, such as an MNE having already adopted certain digital approaches but using a new one to improve the efficiency of some of its operations abroad.

Figure 1.5.
Avenues for Digital International Value Creation

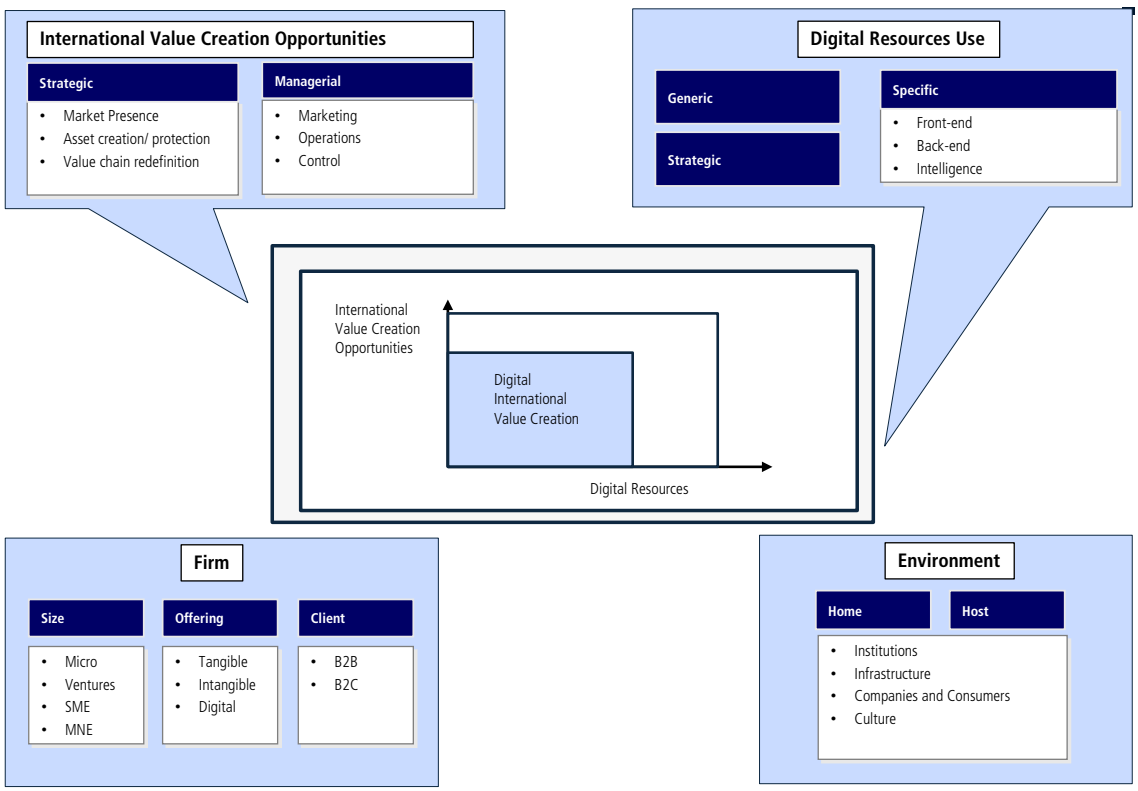


Source: Elaborated by the authors

Our study aims to help identify possible research opportunities and design new business strategies. For this purpose, a more detailed framework is useful. We, therefore, use the literature review presented in Section 3 to elaborate on the two dimensions of the initial framework and its possible moderators. The full conceptual framework is shown in Figure 1.6.

In summary, and in line with our review, international value-creation opportunities can be classified as strategic (market presence, asset creation and protection, and value-chain redefinition opportunities) or managerial (marketing, operations, and control opportunities). Digital resources can be generic, strategic, or specific (including front-end, back-end, and intelligence resources). As we also showed in the literature review section, the relationship between dimensions is moderated by firm type (size, offering, and type of client) and the environment where it operates (institutions, infrastructure, culture, and adoption by customers and companies) in both the home and the host countries.

Figure 1.6.
Complete framework for Digital International Value Creation



Source: Elaborated by the authors

1.5 Conclusions, research agenda and limitations

In recent decades, technology has changed the way firms approach international expansion. Unsurprisingly, new digital technologies are profoundly impacting firms, offering many strategic and tactical options.

Our review brings together two separate fields, digital technologies and IB, that are becoming closer every day. Although there have been other reviews and conceptual proposals about this intersection (Hazlehurst & Brouthers, 2018; Pittaway et al., 2004; Reuber & Fischer, 2011; Tallon et al., 2019; Vadana et al., 2019; Van Geffen et al., 2013), most of them have limited their scope to specific functional areas, such as marketing (Watson et al., 2018), or to a particular firm type, such as new ventures (Vadana et al., 2019). Our conceptual framework is novel in that it integrates the different aspects of value creation in different contexts and includes an updated set of possible digital approaches.

We believe this framework can help both practitioners and academics. It will be useful for practitioners as a strategic map for determining new opportunities for value creation and their associated challenges and risks. It will help academics to identify new avenues for research and to design and select appropriate constructs and variables (including the different moderating factors identified here).

By adopting our conceptual framework, future research can advance along three different lines to explain how companies can use digital resources in new international value-creation opportunities.

Studies can examine how MNEs can increase their digital resources and capabilities and apply them across their international operations (international going digital), on how digital firms can profit globally from their vast digital resources (digital going international), and on how small domestic firms can go international by applying their newly acquired digital resources (going international with digital). Future work can study each of these three lines from the perspective of opportunities or of risk mitigation. In our review, we found that existing research has focused on opportunities, both on the growth side (such as improved access to consumers) and the operational side (for example, reconfiguring the supply chain). Talent-management opportunities are also well covered, with many articles studying the application of technology to team management and talent creation.

However, technology brings not only opportunities but also many challenges and risks. Digital technologies impact traditional IB risk and also create new types of risks (Pezderka & Sinkovics, 2011). Despite their importance, in the literature there is limited coverage of the implications of technology on risk and risk management. Few studies have focused on how firms can apply digital technologies to manage traditional IB risks, and studying this application in detail in areas such as credit risk management could be worthwhile. Moreover, the new types of risk that technology brings to IB open up a rich area of future research. As mentioned above, an interesting example is the so-called virtuality trap (Yamin & Sinkovics, 2006), which is related to the familiar concept of psychic distance in IB (Johanson & Wiedersheim-Paul, 1975).

This example shows us the importance of the environment in the study of risk. Other examples include how institutions and the legal environment can help firms to protect their knowledge assets against appropriation and to promote the infrastructure needed to reduce the risks of digital initiatives and their adoption. However, this environment is becoming more and more hostile to international activities. Accordingly, future research should focus on how firms can navigate and reduce international risks such as political, regulatory, or legal risks, as well as cultural distance effects. For example, institutional variables can moderate the effect of digital resources in different firms' strategic international decisions, such as location choice, entry mode selection, and divestiture. In this connection, it would be useful to compare the strategies used by different types of firms to deal with, or influence, the institutional environment. In this sense, a recent study by Curchod et al. (2020), based on the institution-based view of IB, analyses the firm's subsidiaries' strategies in the institutional environment in the case of an online platform (a digital company going international, considering our framework).

From a different perspective within environmental management, there are also opportunities to study the role of digital technology in MNEs' non-market strategies. For example, a recent study developed a conceptual framework linking big data and non-market literatures (Liedong et al., 2020), presenting different ways in which big data contributes to the development of specific political capabilities used by firms to deal with the domestic non-market environment. Future research could expand and test that framework in an international value-creation context. Other opportunities to study the application of digital to non-market strategies present themselves in the areas of Corporate Social Responsibility (CSR) and sustainability. One such study has already shown

how a large technology MNE uses digital technologies for the economic development of impoverished communities in India (Dunn and Yamashita, 2003).

As we have shown in our framework, DIVC also changes depending on the type of firm. Therefore, it makes sense to analyse the internationalisation paths of different companies, as it also moderates the digital value created by them. Although there have been a number of articles exploring this path in the relationship with technology-based born-globals, we believe that there remain research opportunities in more traditional types of companies, especially SMEs.

Future research could also examine how digital can improve security and flexibility to help MNEs create value in a post-pandemic world. Studies can focus on certain digital resources (such as distributed manufacturing or videoconferencing) and their potential use in this environment (e.g., transforming their value chains to minimise face-to-face contact).

Our study is subject to certain limitations that can also lead to new research opportunities. For example, by design, we conducted our study from the perspective of the firm. It would be interesting to develop alternative frameworks from different angles, adopting, for instance, a country-level perspective to analyse political and economic dimensions and the opportunities that digital technologies offer for limiting the impact of new barriers to trade and investment. At a micro level, a behavioural approach could be applied to understand the microfoundations of the behaviour of decision-makers in the face of complex global-digital transitions.

As explained above, we limited our review to a general technology perspective, since more specific concepts (including e-commerce) had already been explored. However, as more recent digital technologies mature, new and more specific concepts require attention, such as the Internet of Things (IoT), smart companies, and the sharing economy. Likewise, although we made the decision not to explore specific technologies (as doing so would have limited the applicability of our framework), we note the absence of and need for studies of one of the most promising technology trends for IB, the distributed ledger or block-chain. This can be an interesting opportunity for further research.

In the coming years, firms will need to adapt to a changing global and technological landscape, and it will be more important than ever to align their strategy and operations

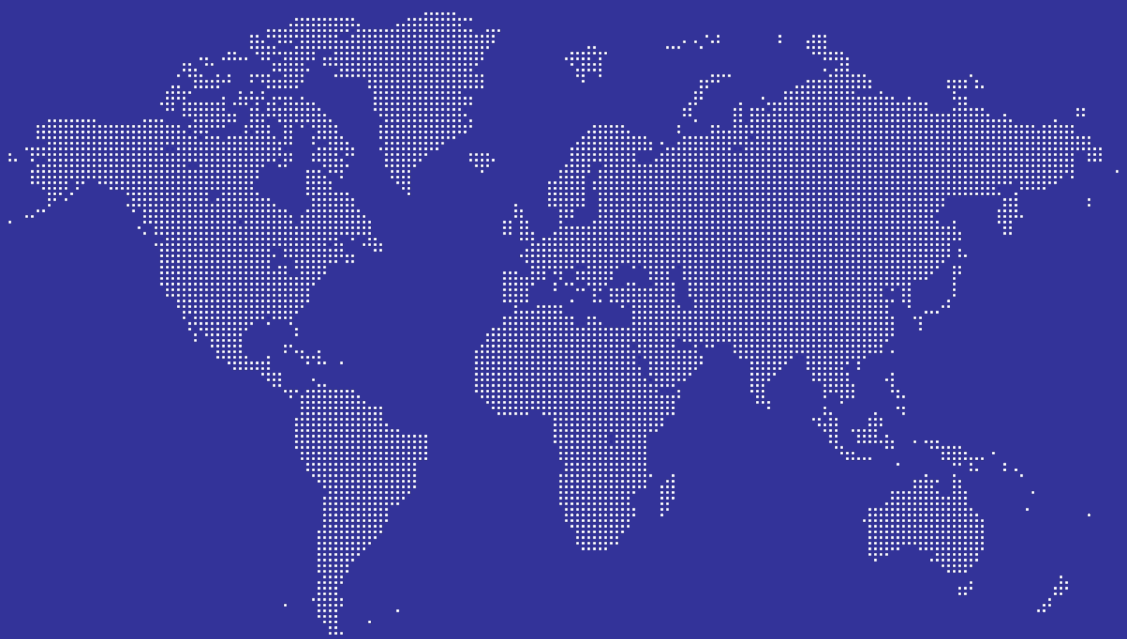
in order to achieve DIVC. Following the arrival of the COVID-19 pandemic and the lockdown of almost all countries and economies in the world, digital technologies have proved vital to the continuation of economic activities and to the attempts to control the pandemic. In this new environment, characterised by high uncertainty and continuous changes, firms will need to innovate and dynamically adapt their international operations (reconfiguration of the value chain, coordination among subsidiaries, managerial styles, among others) in order to create value for their stakeholders. Digital technologies will play a key role in achieving this goal.

Chapter 2

PROPENSITY AND PERCEPTION OF INTERNATIONAL AND DIGITAL RISK: AN EVOLUTIONARY TRADE-OFF

'The biggest risk is not taking any risk... In a world that is changing really quickly, the only strategy that is guaranteed to fail is not taking risks.'

Mark Zuckerberg



Abstract: Executives in multinational enterprises (MNEs) must deal with evolving international risk and digitalisation challenges. Their perception and propensity are crucial in making decisions in these contexts. To understand this effect, we interviewed 20 top decision-makers in relevant MNEs worldwide. From the analysis, some interesting findings emerged. As firms advance in digitalisation, we argue that they build resources that improve executives' international risk management and adjust their perception and propensity accordingly. However, as managers become more aware of digital potential and challenges, their perception and propensity to the new digital risks also change. We propose a model that can help academics and practitioners better understand the impact of digital technologies in their international risk management decisions and the role that perceptions and propensity play in the process.

Keywords: Digital resources, Multinational, International Risk, Risk Management, Digitalisation, Trade-off.

2.1 Introduction

In recent times, global risks have been growing in both likelihood and impact (World Economic Forum, 2020). The management of these risks is considered to be one of the critical activities of MNEs' executives (Ghoshal, 1987) and it is also one of the key value creation opportunities for corporations, as the variability of their profits can be mainly explained by the existence of risk and uncertainty in their operations (Knight, 1921).

At the same time, technology has become an essential resource for managing the complexity of global value chains. For example, e-commerce has been a significant force behind the development of international trade (United Nations Conference on Trade and Development, 2006) . More recently, new digital technologies such as artificial intelligence, the internet of things, blockchain and 3-D printing are changing how companies address international business operations (Strange & Zucchella, 2017). These trends have accelerated due to the COVID-19 pandemic.

Digital technologies add value to corporations by helping executives address the previously mentioned international risk (IR) challenges (Halpern & Fernández-Méndez, 2025). This can be done by improving the management of IRs both strategically and operationally (Eduardsen & Marinova, 2020). However, digitalisation decisions can also be a source of new types of digital risks with their own international dimension. For our

purposes, digital risks (DR) will mean any kind of risk brought by the implementation of digital technologies, from people and implementation problems to regulatory or IP appropriation issues (Bouncken & Barwinski, 2021; Chaudhary, 2004; Frynas, 2002).

In line with this reasoning, our study focuses on how these digital technologies can help add value through MNEs' IR management and on the effect that risk brought in by technology can have in an international setting. Therefore, we look at the intersection of two dimensions, digitalisation in international business (IB) and IR management. There has been extensive research covering both dimensions. Most of these studies have focused on the use of digital technologies in IB (previously ICT, new technologies or e-business) (Hazlehurst & Brouthers, 2018; Reuber & Fischer, 2011; Vadana et al., 2019). Also, IR has been a well-developed field (Eduardsen & Marinova, 2020). However, there is limited coverage on the intersection of IR and digitalisation research (Halpern & Fernández-Méndez, 2025). Some exceptions are works like Pezderka and Sinkovics (2011), studying the relationship between IR and internet technology in a setting of internationalising SMEs. However, these authors do not deal with other types of firms (such as MNEs), the effects of newer digital technology in IR management (for instance, artificial intelligence) or the role of the individuals in the decision-making process.

We contribute to the existing knowledge in the field by studying the intersection of digitalisation and IR management in MNEs. Specifically, we add to this literature by approaching this problem from the perspective of the individual as well as from the perspective of the firm. We analyse the role of propensity and perception (key factors in the final decision-making when facing risk (Sitkin & Pablo, 1992)) in the behaviour of executives when facing two distinct risky settings: internationalisation and digitalisation. To achieve this goal, we carried out semi-structured interviews as this method helps capture information on the behaviour of top decision-makers in large organizations such as MNEs. Our selection of subjects adds to the overall quality of the study as it is composed of 20 top-level decision makers, and it is diversified in terms of individual characteristics (e.g. position, age, and location, among others) and firm characteristics (e.g. in terms of industry, size, and location) (Welch & Piekkari, 2017; Yeung, 1995).

Our analysis delivers some compelling contributions. Building on Sitkin and Pablo's (1992) model of risk behaviour, we complement the theory with a framework on how MNEs' executive perception and propensity to IR and DR change with the digital ad-

vancement of their firms. We argue that as firms digitalise, they gain resources of information, speed, knowledge, and flexibility that will allow them to deal better with IR. As these increased resources affect the different drivers that influence IR propensity and perception, managers' behaviour evolves. Simultaneously, during this process, they become more aware of the new digital risks (DR), which in turn changes their perception and propensity. In summary, as managers and companies advance digitally, they shift their risk management priorities from traditional international risks to new digital risks. This relationship aligns with Miller's perspective on integrated risk management and the trade-off among different risk types (Miller, 1992).

2.2 Literature review and conceptual background

Sitkin and Pablo (1992) propose an integrated model where risk propensity and risk perceptions play a central role in managers' risk behaviour in a risky context. In their article, they define risk perceptions as "*a decision maker's assessment of the risk inherent in a situation*", risk propensity as "*an individual's risk-taking tendencies*" and risk behaviour as *"decision-making behaviour in risky contexts".* In their model, the **organization**'s characteristics, the **individual**, and the **problem** addressed will influence this decision-making process through eight drivers. Each of these drivers will affect either decision-maker risk propensity or risk perception and, therefore, their final behaviour.

When considering risk propensity, they consider the impact of risk preferences (individual preferences of certain types of risks above others), inertia (tendency to handle problems as in the past) and outcome history (results of previous risk-based decisions). Concerning risk perception, their model suggests the influence of problem framing (if the problem is positively or negatively framed), management team homogeneity (how homogeneous is the profile of the executive team), social influence (the culture of the organization and the profile of the leaders), problem familiarity (experience and knowledge of the executives over the context considered) and control systems (process-based or outcome-based control systems) as key main drivers for risk propensity.(Sitkin & Pablo, 1992). All these factors will finally influence the behaviours of individuals through their altered propensity and perception.

We complement this model by specifically looking at how the participation of managers in certain "risk events" affects their experience (a subset of possible outcome histories). These events are critical circumstances that challenge individuals and organizations and

that can have a short-term and long-term impact on executives' risk perception and propensity (De Villa, María Andrea & Rajwani, 2013; Rogers, 1997). Some examples of a risk event could be an internal failure in the organization (e.g., an accident in a manufacturing facility) or a worldwide event (e.g., a pandemic or a war).

2.2.1 The role of risk propensity and perception in international risk management

The internationalisation of firms is a risky context in which we can apply the previously explained model. Decisions in this context are critical for organizations and are subject to many types of risks. Miller categorises these risks and uncertainties, mentioning that managers may perceive three major types and their subtypes: general-environment risks (i.e., political, government policy, economic, social and natural), industry-specific risks (i.e., input market, product market and competitive) and firm-specific risks (i.e., operational, liability, R&D, credit and behavioural uncertainties) (Brouthers & Brouthers, 1995; Miller, 1992). These risks also appear in local contexts, but they differ in a global setting. As Miller points out, these risks do not move independently; therefore, it makes sense to analyse them from an integrated perspective (Miller, 1992), as we do in our study.

Making decisions on managing these risks is one of the critical tasks of executives in MNEs (Ghoshal, 1987). These decisions balance the potential growth with the risk they assume (Acedo & Galán, 2011; Kiss et al., 2013). There is evidence that the role of qualitative perceptions can be more relevant in these decisions than quantitative-based criteria (Eduardsen & Marinova, 2020; Oetzel, J., 2005). Along these lines, scholars have looked at the role of perceptions (Acedo & Florin, 2007; Acedo & Galán, 2011; Sato et al., 2020) and propensity (Buckley, P. J. et al., 2017) when making decisions on internationalisation and risk management. Therefore, we can conclude that it is reasonable to consider the model of Sitkin and Pablo (1992) to frame our research and analyse the effects of organizational, individual and problem characteristics on managers' risk perception, propensity, and behaviour.

Regarding the organization characteristics, research has shown that the firm's industry is one of the main factors to consider. IR is not perceived equally by an oil major or a digital platform executive due to their different international risk exposures (Pan & Tse, 2000; Zhao et al., 2004). Also, scholars have shown that a firm's size and experience influence the perception of IR. Managers in large and more experienced firms tend to

have a lower perception of the risks involved in international activities (Acedo & Florin, 2006; Claver et al., 2008; Kiss et al., 2013; Leitch, 2010; Oetzel, J., 2005; Shrader et al., 2000).

When considering individual characteristics, literature has studied in-depth the impact of cultural distance on IR behaviour (Delerue & Simon, 2009; Kraus et al., 2015; Pan & Tse, 2000), with managers perceiving a higher risk in countries less related to them. In addition, the literature has studied how a manager's profile, experience, and position influence their risk preferences (Claver et al., 2008; Ellstrand et al., 2002; Sato et al., 2020; Shrader et al., 2000; Sitkin & Pablo, 1992).

The approach to different types of problems also affects the perception of managers. For instance, the behaviour differs when dealing with political issues (De Villa, María Andrea & Rajwani, 2013; Ellstrand et al., 2002; Giambona et al., 2017; Kraus et al., 2015) or when dealing with alliances and partners (Das & Teng, 1998; Olson & Wu, 2011; Pan & Tse, 2000).

Of all these factors, managers' accumulated experience plays a vital role in the final decision-making (risk behaviour). This experience is mainly built by their participation in risk events and how their firms reacted to these events, how well the prevention systems worked, how fast they responded and how the events finally affected the individuals (Rogers, 1997).

Experiences with risk events prompt executives and their firms to develop strategies, processes, systems, and a culture that effectively manage IR. Some scholars have studied how these initiatives reduce the perception of the importance of IR (Claver et al., 2008; Delios & Henisz, 2003; Gabrielsson & Gabrielsson, 2013). However, these efforts have a limited overall impact because all IRs are interconnected, and successfully managing one type of risk can inadvertently raise another. For example, developing partnerships to avoid the lack of familiarity with a particular country raises the risk of opportunistic behaviour (Miller, 1992).

From this perspective, we can say that a firm must build specific resources and capabilities to manage IR successfully. Damodaran (2008) mentions four key resources that help firms deal with risks like those faced in international operations: information, speed, knowledge, and flexibility. Building these resources affects different parts of the risk behaviour model. One well-known example is when executives perceive that these

resources make their company better prepared for international risk events, which changes their IR propensity perception and, therefore, their decision-making (Pezderka & Sinkovics, 2011).

One of the tools for building these resources is technology. IT technologies can help with better data or improved operational systems in prevention and mitigation (Manuj & Mentzer, 2008; Teymouri & Ashoori, 2011). More advanced digital technologies can bring more of these advantages to the firm.

2.2.2 Digitalisation and digital risk and their role in international risk management

The use of digitalisation in IB problems is a key value-creation opportunity for corporations. Halpern and Fernández-Méndez (2025) propose two main avenues for achieving this goal. The first one is for digitally advanced firms to use their existing digital resources in new international value-creation opportunities (Shaheer & Li, 2020; Singh & Kundu, 2002; Zeng & Glaister, 2016; Zeng et al., 2019). A second path is for global firms to adopt new digital technologies that add value to their existing international operations (Ashton et al., 2010; Vendrell-Herrero et al., 2018). Our study focuses on this second path.

Researchers have looked at how managers decide on new digital technologies depending on their perception of their business potential (Benlian & Haffke, 2016; Ferri et al., 2021; Mbama et al., 2018; Tomicic-Pupek et al., 2020), its limitations and implementation difficulties (Brindley & Ritchie, 2003; Chaudhary, 2004; Frynas, 2002), and its risks (Ferri et al., 2021; Pezderka & Sinkovics, 2011; Tomicic-Pupek et al., 2020).

In fact, digitalisation, besides all its business potential, exposes the firm to a new kind of risk: digital risks (DR). The literature shows many examples, from regulatory or politically related risks (Ferri et al., 2021; Frynas, 2002), technology know-how and intellectual property protection (Coeurderoy & Murray, 2008; García-Canal et al., 2008; Gopal & Sanders, 1998) to cybersecurity risks (Scott, 2004). Some of these risks are international (such as complying with different data protection standards), but most of them are the same as local digital risks, but behave differently in a global context (Bouncken & Barwinski, 2021; Frynas, 2002; Pezderka & Sinkovics, 2011).

Therefore, digitalisation is another risky context where management must make decisions. Again, risk perceptions and propensity and therefore, the organization, individual and problem characteristics will influence this decision-making (Sitkin & Pablo, 1992).

Looking at organizational characteristics, several studies have shown that the offering of the firm influences the DR perception of managers as it changes between manufacturing, service or even digital companies (Cassetta et al., 2019; Karamchandani et al., 2020; Leek et al., 2003; Molla & Deng, 2009; Yamin & Sinkovics, 2006).

At the individual level, research has shown that a manager's attitude towards DR also depends on their experience with technology and their position in the organization (Benlian & Haffke, 2016; Bouncken & Barwinski, 2021).

The problem being addressed by digitalisation will also affect this dynamic. It is not the same to confront, for example, customer's digital adoption (Mbama et al., 2018) than to deal with potential difficulties in the implementation of the technologies (Chaudhary, 2004). As we have commented before, one of the key areas where managers must make these types of decisions is IR management. Indeed, digitalisation may improve firms' resources for preventing and mitigating IRs (Manuj & Mentzer, 2008; Teymouri & Ashoori, 2011).

Previous research has studied specific examples of how digital technologies can help build these resources. For example, big data and data analytics can improve knowledge assets (Bouncken & Barwinski, 2021; Brindley & Ritchie, 2003) and access to risk-related information (Acciarini et al., 2021; Araz et al., 2020; Brindley & Ritchie, 2003; Bubnova et al., 2018; Ivanov et al., 2019; Yang et al., 2021). Other studies have shown how digitalisation improves firms' flexibility (Ivanov et al., 2019; Karduck et al., 2007) and speed (Ivanov et al., 2019), allowing managers to respond swiftly to threats.

These resources influence, in turn, managers' perceptions and propensity. One example of such influence is the "virtuality trap", when companies perceive that they know enough about foreign markets through their virtual presence, leading them to assume higher risks than necessary (Pezderka & Sinkovics, 2011; Yamin & Sinkovics, 2006).

2.2.3 Research question

Scholars have studied many problems related to IR and the application of technology to IB problems. However, there is little coverage on how digitalisation affects IR management (both as a value-creation tool and as a source of risk). As we have seen, risk perceptions and propensity will play a crucial role in studying this problem. Therefore, we propose the following research question:

> *"How does digitalisation influence MNEs executives' behaviour (and their perception and propensity) in international risk management decisions?"*

2.3 Methodology

2.3.1 Approach and method

To answer this research question, we intend to develop a theoretical framework to try to capture the different mechanics and their relationships in our context (digitalisation, international risk and decision-making). One of the best methods to build such a framework is a qualitative inductive approach based on semi-structured interviews, following the guidelines of the Grounded Theory (Piekkari et al., 2009; Urquhart, 2012). Additionally, this approach helps capture information on perceptions and behaviours (Bryman et al., 2018; Saunders et al., 2009) from professionals such as international executives (Welch et al., 2002; Yeung, 1995). When following this approach, we tried to use a double-level perspective, looking at the individual and the firm level, as both personal and organizational characteristics influence risk behaviour (Sitkin & Pablo, 1992) . Considering all this, we developed our research in three main phases: design, execution, and analysis.

One key aspect of our design was sampling. We tried to address the four points addressed by Robinson (2014): universe, size, strategy, and sourcing. When considering the study **universe,** we decided to focus on top-level executives of MNEs. This universe fits our research goal well, as these individuals are involved in IR management and digitalisation-related decisions (individual level) and can give an informed opinion on the firm and industry context (firm level). Nevertheless, it also improves the quality of the research, as the higher the position of the informants, the more powerful and reliable the data (Macdonald & Hellgren, 1998; Welch et al., 2002). Considering this universe

and our goal of building a theoretical framework, we decided on a target sample **size** of around 20 interviews that fitted well with other similarly oriented qualitative studies (Guest et al., 2006; Robinson, 2014; Welch et al., 2002). Regarding the sample **strategy**, following the concept of theoretical sampling and in order to be able to make comparisons and arrive at meaningful insights for our framework (Glaser & Strauss, 2017; Robinson, 2014; Urquhart, 2012; Yeung, 1995), we organised our research around groups in three dimensions: Geographical location, as it can capture contextual differences in an international setting (Piekkari et al., 2009), the industry, as it has a relevant effect on the impact of digital technologies in international business (Halpern & Fernández-Méndez, 2025) and the position of the informant in the organization, as it can give us different perspectives (digital, international or general management) on the decisions being made (Claver et al., 2008; Ellstrand et al., 2002; Sato et al., 2020; Shrader et al., 2000). However, this universe and strategy meant some challenges, as interviewing elites in an IB context, such as our informants, can raise issues such as access, power imbalance, openness, and feedback (Welch et al., 2002). We attempted to address some of these issues through our sample **sourcing**. One of the researchers is a senior executive and alumni of one of the leading global business schools (with more than 80.000 members worldwide). Using the personal connections of the researcher with several of the school's alumni and its database, we were able to access top-level MNEs executives with all the required attributes, but without the problem of power imbalance or openness (Fitz, 1994; Welch et al., 2002). This approach also helped with potential language and cultural barriers, as all informants had a fluent level of English and a similar understanding of IB key concepts.

Our design also included a preliminary definition of the information we wanted to obtain from public sources (such as industry reports, companies' annual reports, LinkedIn profiles, and press releases) and from the interviews (information from both firms' strategies and individuals' perceptions). Regarding the interview guide, we had to consider that elite informants act as their company's representatives and centre their discourse on the firm's perspective (Fitz, 1994; Welch et al., 2002). To complement this perspective, we designed an initial interview guide (see Appendix 3) with a structure following the main themes of our research (digitalisation and international risk), but that also included some questions oriented toward their perception/propensity that we could use in a less structured way during the execution of the interviews.

In the execution phase, we obtained a list of potential interviews, taking into account the sourcing considerations discussed before. We prioritised the informants based on their fit to our sample universe (i.e., their capacity to give proper IR and/or digitalisation insights) and some practical execution concerns (Robinson, 2014). We obtained the individuals' consent for the interview, explained their rights under current EU law and fulfilled all required ethical considerations. To complement these interviews, we gathered and analysed all the relevant public information on the informants' profiles and their companies' characteristics. Due to the COVID-19 situation, under which this research was done, and the subjects' dispersed locations around the globe, we were forced to conduct the interviews via a videoconferencing tool. This communication channel had no apparent disadvantages due to the non-personal character of the interviews (Robinson, 2014; Sedgwick & Spiers, 2009). Also, it helped with access problems inherent to geographically dispersed informants (Welch et al., 2002). During the interviews, we confirmed that each of our subjects had been involved in internationalisation and digitalisation decisions relevant to our research. Finally, we transcribed and analysed each interview. We followed an interactive process, considering the results of the analysis of the first interviews, when executing the following ones (Urquhart, 2012).

Finally, considering the previously gathered public information (about both the individual and the firm), we analysed the interviews using the N-Vivo software. We first went through an open coding phase. In line with expectations (Guest et al., 2006), few relevant codes were generated after the 18th interview. We decided to limit our analysis to 20 interviews, as we understood we had reached the saturation point (Fusch & Ness, 2015). After completing this process, we built a draft framework that we used for second-level coding (Urquhart, 2012) and validated it through a small set of short interviews with some selected informants.

2.3.2 Sample characteristics

Our final sample of 20 interviews fitted all our design requirements. We believe that it contributes to the overall quality of our research as it is unique due to its diversity in industries and countries and the top-management positions of the informants (see Table 2.1 and Table 2.2).

Table 2.1.
Participants' characteristics

SUBJECT POSITIONS INCLUDED	SUBJECT NATIONALITIES INCLUDED	SUBJECT COUNTRY OF OPERATIONS
CMO	Chile	Italy
Division CEO (4)	Denmark	Chile
Division Head	EAU	EAU
Divisional CIO	France (4)	Ecuador
Executive Vice President	Germany	France
Founder and CEO	India (2)	Germany (2)
Global CEO	Italy	Malasia
Global CIO	Malasia	Mexico
Global GM	Nigeria	Nigeria
Group CFO	Spain	Rusia
Head of Digital Strategy	Sweden	Singapore
Head of M&A, Divisional CFO	Switzerland	Spain
Head of Reinvent, Trading & Shipping	UK (2)	Sweden
International Director	USA (2)	UK
Regional CEO		USA (5)
Regional Sales		

Source: Interviews and LinkedIn profiles

Table 2.2.
Firms' characteristics

INDUSTRIES INCLUDED	FIRM COUNTRIES INCLUDED (HEADQUARTERS)
Automotive	Chile
Energy (3)	France (4)
Extraction	Germany (2)
Finance	Italy
Goverment	Japan
Hard goods	Luxemburg
Luxury (2)	Malasia
Media (4)	Nigeria
Publishing	Sweden
Retail	Switzerland
Transport	UK (2)
Utilities	USA (3)

COMPANIES BY SIZE (EMPLOYEES)		
Group	**Employees**	**Firms**
SMALL	500-5000	3
MEDIUM-SMALL	5000-30000	4
MEDIUM-LARGE	30000-60000	4
LARGE	60000-100000	3
VERY LARGE	100000-200000	4

COMPANIES BY GLOBAL REACH (COUNTRIES)	
Countries	**Firms**
1-10	4
11-50	7
51-100	2
101-150	5
151-220	2

Source: Companies' annual reports and web pages. Interviews.

Our interview subjects come from more than 14 different nationalities and 15 different locations (including countries in Europe, America, Asia, and Africa). The responsibilities of our interviewees within their organizations include all the perspectives that are interesting for our research, including general management, international management, and technology positions.

Our executives belong to 20 companies in 13 different industries, with their headquarters located in 13 different countries. These firms have various sizes, but they include several very large MNEs (11 of which have more than 30.000 employees). All firms have a relevant global footprint, and many are physically present in a significant number of countries (16 are present in more than ten countries).

2.4 Findings

2.4.1 Perceptions and propensity in international risk with a digital perspective

2.4.1.1 FACTORS AFFECTING PERCEPTION AND PROPENSITY OF INTERNATIONAL RISK

During our interviews, we confirmed that many of the factors that Sitkin and Pablo predicted could influence decision-making in an international risk context (Sitkin & Pablo, 1992). The individual, the organization, and the problem characteristics all influenced the propensity and perception of IR.

One example of the influence of individuals' characteristics on risk propensity is the cultural distance of the subject from the target country when taking internationalisation decisions. Although a very personal effect, in the literature, we have seen that technology can have a role in reducing this distance (Yamin & Sinkovics, 2006).

> [s953] "[…] between a German and a US executive, the US executive would generally be more positive, more optimistic, more in a salesman position"
>
> [s936] "I remember when I started in Venezuela a few years ago, I was very, very far from France."
>
> [s964] "The globe, it's smaller. It's smaller. And also, I would say the culture barrier is lower when you work in a digital form. Yeah. So the culture barrier has been reduced, I would say."

Another individual factor that influenced the IR perception and propensity was the individual's previous and current position in the organization. Direct exposure to international markets has a role. However, more importantly, executives in general manager positions were more aware of the importance of internationalisation in the search for scale, something critical in the digital world.

> [s600] [INTERNATIONAL BACKGROUND] "I was the head of retail for our international business. So I have a very good sense of our presence and business opportunities and operations and regulations in all these markets "
>
> [s348] [GENERAL MANAGEMENT] "it's very important in a digital ecosystem that you're able to scale solutions. It's all around how fast can you move, […] so it's really important that international organizations are able to scale"

In the interviews, we found more evidence of how IR perception was related to the organization characteristics. The firm's industry, culture, and ownership were among the factors that influenced the perception of different risk types. The firm's industry influences the prioritisation of different types of risks. The more digitally advanced industries were more concerned about risks such as data protection regulations, while more traditional industries focus on more tangible risks such as people or channel risks.

> [MEDIA EXECUTIVE] [s635] "Because GDPR in Europe and the California data protection law is requiring much more strict laws and regulations around data protection and privacy."
>
> [FINANCE EXECUTIVE] [s600] "And you have to make sure you hire the right people in the right roles based on that."
>
> [AUTOMOTIVE EXECUTIVE] [s942] "We help the partner with our knowledge. We send people to help him to do the good quality level because anyway we cannot kill the brand."

The firm's ownership and enterprise culture's view of risk-taking was one critical factor influencing the executive's perception of IR. This risk-taking position was materialised in certain decisions, such as the autonomy given to local units.

> [s635] "The first one is our DNA, our ownership. The fact that we are owned by […] They are not as eager to see short-term results. […] That allows us more stability, and a more sustainable and forward-looking strategy."
>
> [s348] "I think our culture is very strong and it is a competitive advantage, while still really trying to empower the local business units to have quite a bit of autonomy. And that's a tricky balance [for international operations]"

Also, the nature of the problem influenced how executives perceived the risk. During our interviews, executives mentioned a wide variety of IR types. However, they frequently mentioned political and regulatory risks as their main concerns. One of the reasons for this was the unpredictability of the associated risk events. Moreover, due to the timing of the interview, unexpected health risks (with the usual references to COVID-19) were frequently mentioned. In both cases, the non-systematic nature of the risks limited the application of process and technology approaches for their prevention. Although, as we will see, that was not the case for mitigation measures, quite the contrary.

> [s331] "[…] the political risk is going to be a determinant as to whether or not you want to deal in that country."
>
> [s311] "So the political risk also […] Tomorrow, it could be gone because the government makes up some excuse, takes it away from you. And that has happened to us in a few places.
>
> [s953] "Nobody expected COVID, but when the bad thing happens, how do you try to mitigate the bad effects of the risk?"

2.4.1.2 DECISION-MAKING AND OUTCOME HISTORY

The perception and propensity affected by these factors influenced the decisions taken by the executives. These decisions resulted in risk-related strategies, processes, and policies finally implemented by their firms.

> [s623] "With our level of internationalization, I am concerned about local knowledge and legal certainty […] we always go through a previous consulting project with one of the Big Four to see if what we are doing is reasonable"
>
> [s630] "every five years as a company you know that one of your big countries […] will have an issue. Economic issue, social unrest, now pandemia, whatever. And as a consequence of that […] you put in place a process on how to mitigate things"

Even with these processes in place, managers faced certain risk events (both positive and negative), the decisions they made in those situations and the results they obtained built their accumulated experience. This "outcome history" influenced the managers' perception and propensity to each type of IR and, therefore, the choices of new risk management actions and strategies. Due to the timing of the interviews, the most cited example of a risk event was the COVID-19 pandemic. In this event, digital technology played a vital role in the mitigation of the effects of the event. As we will see later, this

has allowed organizations to learn about the applicability of digital technologies to the mitigation of IR.

> [s365] "…compliance issue in Brazil or in Spain […], then we would overcorrect by making absolutely sure that every single leader working in that market was personally interviewed or trained. You need to overcorrect to make sure that you learn from the mistake"
>
> [s632] "And when we made a mistake in the selection of partners […] it's usually turned out badly. So I think, probably, the single most important thing that we do when we're going into a new market-- into an emerging market is partner selection, and the team that we have on the ground to work with those partners."
>
> [s600] "we have put up a huge legal and compliance infrastructure too [..] but once in a while, you do get into trouble like in the COVID, a couple of our credit funds had a lot of defaults in them. And so we closed down a couple of funds in India. So the regulator gets upset"
>
> [s417] "I think COVID is one example of [international] risk that digital has helped mitigate, no? Because it happened. Nobody could see it happen. But it has helped us mitigate in video conferencing, fast reaction, and everything, no, agile and everything."

Besides mitigation, one of the examples of the strategies that executives implement after a specific event has passed and its outcome is known, is building monitoring systems to avoid being confronted with the consequences of similar events. Digital technology plays a crucial role in today's organizations in developing these tools. From a more theoretical perspective, we can see this as companies building resources to deal with IR.

> [s942] "So that means that we have a strong procedure. […], we have governance rules, meaning that I cannot appoint a new partner in terms of business before having an official validation [...] ethics side, financial side, everything."
>
> [s417] "The second point is that when you have done this, the distributors have to share continuously their data in order for you to understand really the performance."

The more developed these resources are, the higher the propensity to IR and the lower its perception. If no new events (outcome history) prove these perceptions wrong, this process reaches a point where executives no longer perceive these risks as such but as business as usual (their perception is affected). The application of digital tools will enhance this effect.

> [s630] That [Supply chain risk] , for me, I do not look at it as a risk because in big a multinational you always have procurement [...] But I did not feel that it was a risk. It was more in the business plan something we need to anticipate, but not too much of a risk."
>
> [s348]" I think we've got pretty good capabilities at managing risk.[...], being in our industry for a while now and operating in so many different countries. We've seen a lot of what kind of things can hit us."

2.4.2 Perceptions and propensity in digitalisation and digital risk with an international perspective

2.4.2.1 FACTORS AFFECTING PERCEPTION AND PROPENSITY OF DIGITALISATION AND DIGITAL RISK

Concerning digitalisation, executives mentioned many initiatives of their firms and were generally aware of the potential of the new technologies, but also concerned about the potential risks that came with them. As was the case with international risks, our interviewees mentioned several individual, organization and problem factors that influenced their decision-making when considering new digital initiatives.

Regarding individual characteristics, propensity and perception of the different digital risks in a global context and their impact seemed to be affected significantly by the experience and position of the executive with IT and digital technologies. As expected, the more digital the managers' profile, the higher the focus on cyber risks, while the more sales-oriented the profile, the higher the importance of client-oriented risks.

> [TECHNOLOGY PROFESSIONAL] [s348] " Cyber is probably one of the newest ones that we're seeing now. And we're all trying to figure out how do we get better at that as well. But just like you've seen in this colonial pipeline example where the perpetrators are probably somewhere in the eastern block, and how do you do anything about that?"
>
> [SALES PROFESSIONAL] [s635] "So the newest digital tendencies and hot topics are definitely automation, artificial intelligence, and those areas we think about and act on every single day, not just for our own business, but also for our clients."

When considering organization, as expected, the industry of the subject firm was an essential factor affecting DR perception. The more "intangible" the offering of a firm, the higher the perception of digital opportunities, but also of DR.

> [MEDIA EXECUTIVE] [s838] "So the first thing is to see digitalisation as an opportunity as well as a threat, which it absolutely has been. So our digital products now make up about 30% of our revenue, and it's highly profitable and a high margin business."
>
> [TRANSPORT EXECUTIVE] [s623] "There is a risk in the appearance of alternative, substitutive products, it is not a risk it is a reality [...] How do you fight it?"

Also, the firm's culture played a vital role, as some firms were more entrepreneurial in focus than others and were willing to assume higher DR than others. Besides the overall culture of the company, interviewees also frequently emphasised the importance of aligning the leadership and the rest of the team to succeed in the different digital initiatives. These challenges were made even more complicated due to the global nature of the interviewees' firms.

> [s311] "So even in my business, which I thought was sophisticated, once we had AI and data lakes come in and data scientists, there was a huge resistance by these sophisticated people [...]. and there was like a cultural rejection."
>
> [s635] "[...] quite often, you see top leaders, the executive board, or even the board, the board of directors, being comprised of too many people who don't have the right background, or who are too much alike."
>
> [s954] "And we need that experience. So from a management perspective, this is a balance, I would say. The timing and the speed, it's a balance. […] Perhaps it's different from country to country. […] controlling, reporting, and stuff like that is getting more and more and more digitalized."

Regarding the problem characteristics, executives mentioned how the new digital risks (including regulatory, talent or cybersecurity risks) could affect their business. These impacts have, in most cases, an international nature.

> [s630] "[...] the biggest risk that we are put in front of us was the risk on security and data breach. Why? Because the law in Europe and in the US is that your private data are private."
>
> [s554] "And those people who have all the experience [digital], they're very, very highly marketable, right? Everybody is looking for the same person."
>
> [s635] "I mean, Facebook data was just breached, right, two weeks ago. We have a number of clients who have had challenges. [...]. So we, obviously, need to spend a lot more resources in proactively identifying all of the potential pitfalls and risk areas, educating our teams, putting in place controls and compliances."

2.4.2.2 DECISION-MAKING AND OUTCOME HISTORY

The perception and propensity to digitalisation (both its potential and its risks) will influence the decisions taken by the executives and the strategies and policies (regarding, for example, leaders, teams, customers, among others) that their firms put in place for the digital environment. For example, cultural issues lead to talent and immersion initiatives, and the potential to know more about the customers leads to the gathering of data on them.

> [s708]. "That's core banking. That's not digital. Let's talk about digital. Let's talk about omnichannel. Let's talk about retail. Let's talk about crypto. Let's talk about fintech" They don't understand. […] it's our responsibility as a board and as management to upscale the talent, make them understand technology. Everybody needs to be technology literate."

> [s838] "You can. But also the creation of that e-book or book is exactly the same process. So for a lot of people's jobs, it was no different. […] . We also reorganized quite early, to anticipate a big growth in the digital markets, in a way before they came"

> [s417] "I think it's a key point because if you can be part of the digital revolution, you start thinking about the business models to reach the customer. Okay? You remember we developed with Stanford a new way to create the experience, also tracking people going into the shops."

The growing experience of executives applying digitalisation makes them more aware of their growth potential and the specific risks brought by these technologies (they see an opportunity and a risk). The awareness of the DR and the development of possible solutions also work through certain risk events (outcome history) that materialise during the digital advancement of the company. In our interviews, COVID-19 and cybersecurity events were frequently mentioned examples. In these instances, executives were forced to adapt their digital and international tactics, strategies, and operations to deal with similar events in the future.

> [s331] "Post COVID, you began to have meetings as we're having now on Zoom. And decisions that used to take a long time to make now became faster [...] I think the industry has benefited immensely, immensely from the pandemic. We saw the costs of doing business come down."

> [s311] "So I think automated ways of monitoring production systems has become big. Now, that also brings up the flipside of cyberattacks, […] you saw what happened in Saudi Arabia. Some guy hacking from Iran can disrupt a refinery because everything's automated now."
>
> [s708] "I don't know if you heard, but yesterday, there was a ransomware that's shut down one of the oil production companies completely. […]. How can this happen? […] So the talent and then the education and then understanding the technology is really, really important"

2.4.2.3 DIGITALISATION AND INTERNATIONAL RISKS

Finally, from our interviewees' perspective, their firms' digitalisation journey can bring numerous advantages to the management of internationalisation and IR. Specifically, digital technologies will let them build resources that will be useful in IR prevention and mitigation, such as information, speed, knowledge, and flexibility (Damodaran, 2008). Building these resources makes executives more comfortable with internationalisation and IR decisions and changes in their organization's nature. These changes ultimately affect the decision-makers' IR propensity and perception.

> [s311] "I'd say generally over the last 20 years, is that we've pushed data to become a much bigger part of our decision making for our traders. And that's not only a way of risk mitigation […]"
>
> [s936] "Today, we are not far anymore, so we have the opportunity to be in contact and to address any specific issue with, let's say, South Africa. It can be done immediately because we have access to the people."
>
> [s600] "I have somebody in the US managing a global equity fund. If he's able to talk to my China equity analyst sitting in China and getting that local perspective and that knowledge transmitting in real time […]"
>
> [s331]"[...] the fact that digitization, right, means that your footprint in any country is not as heavy as it used to be, right? [...] the minute I have to spend money to build a physical infrastructure, then I am caught [...]. But if through digitization, I can supply what I need to that country […]"
>
> [s331] "[...]. the personal risk that comes with even just flying and going into places and all of that has reduced [...] so how does digital then affect you personally? [...] I had to do a lifestyle change on this, you find that you sit down a lot in one place, doing one meeting after another."

2.5 Discussion and conclusion

Risk is indeed a matter of perceptions and propensity. When executives deal with risky situations, their image of reality and tendency to assume risks affect their decisions. In this chapter, we have looked at two interconnected risky contexts, internationalisation and digitalisation, and their interactions through the executives' perceptions and propensity.

Our interviews have confirmed the importance of IR perception and propensity in internationalisation decision-making and the influence of individual, organizational, and problem characteristics following Sitkin and Pablo's (1992) model (see section 2.2 for a detailed description). For instance, in this risky context, drivers such as cultural distance and organizational values are *social influences* that alter executives' IR perceptions. Similarly, the executive's experience and profile influence his *risk preferences* and, therefore, the IR propensity. The changes in propensity and perception, in turn, affect the decisions (risk behaviour) that executives make in the IR context. The *outcome history* of these decisions will change, in turn, the firm's settings, as they will implement new procedures, and it will change the IR propensity of the executive and influence his future decisions. In this process, digital technology will play a key role in many ways, from its importance in communication to its use in building prevention processes and mitigation systems that will make executives more comfortable in their internationalisation efforts.

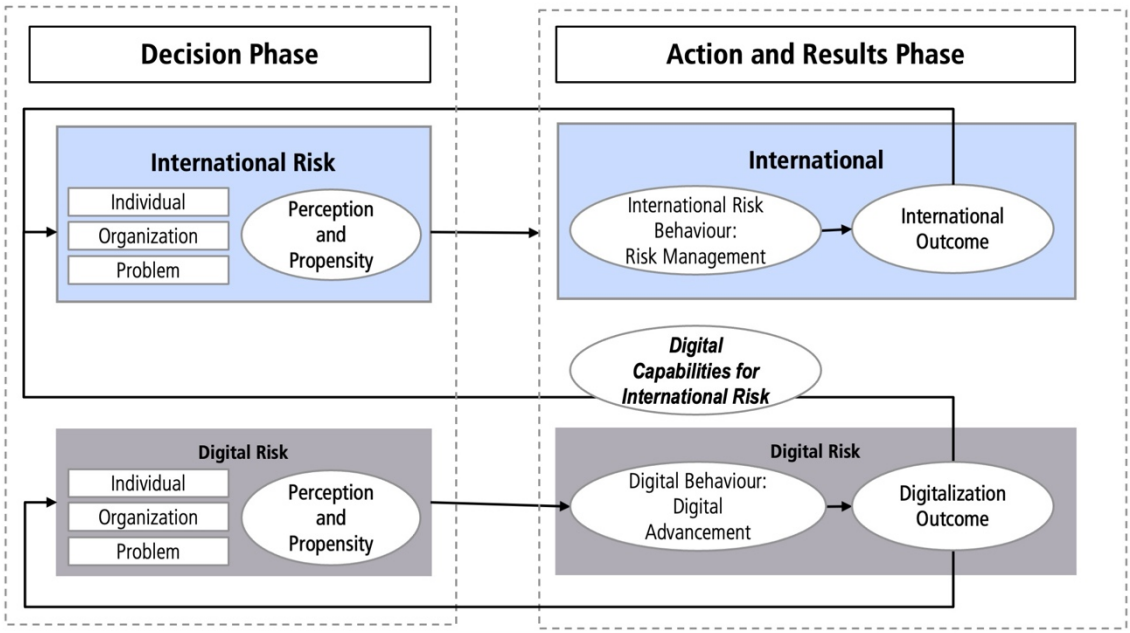
In parallel, the application of digital technology is also a risky context. Digitalisation comes with many opportunities but also with many risks and challenges. Executives' perceptions and propensity are in play again, influenced by individual, organizational, and problem characteristics. Executives will decide based on their current perception and propensity towards digital technologies. These decisions, in turn, will result in what we can call the digital advancement of the company. This advancement will result in higher value creation and increased risks and challenges that affect digital perceptions and propensity. As with IR, this works through different drivers of the model (Sitkin & Pablo, 1992). For example, as digitalisation evolves, companies complement their leadership and teams with digital profiles affecting *social influences and top management homogeneity* and, therefore, executives' DR perceptions. More exposure to digital also influences *problem-domain familiarity* and, therefore, DR perception. In addition, as the potential opportunities and the context evolve, managers' *risk preferences* and DR propensity change. Finally, if digital technologies are successful, *outcome history* will also

influence DR propensity. Specifically, the global nature of MNEs exposes them to a vast array of DR events from different countries (such as cyber-attacks or regulation changes) that influence executives' perceptions and affect their decisions.

We have found that both worlds interact. The increased exposure to digitalisation will help firms develop resources (information, speed, knowledge and flexibility) that will help them deal better with IR. This effect is developed through some drivers identified in the Sitkin and Pablo's model (Sitkin & Pablo, 1992). For example, direct access to information on foreign markets alters *problem-domain familiarity*. Building scale and new talent can change the firm's risk culture, affecting *social influences*. Both drivers finally affect executives' IR perception. Also, as the applications of digital technologies deliver their results in IR mitigation, the successful *outcome history* influences their IR propensity. Of course, during this process, managers become aware of the increased DR and their international dimension.

In Figure 2.1, we summarise relationships contained in our conceptual framework.

Figure 2.1.
Conceptual framework



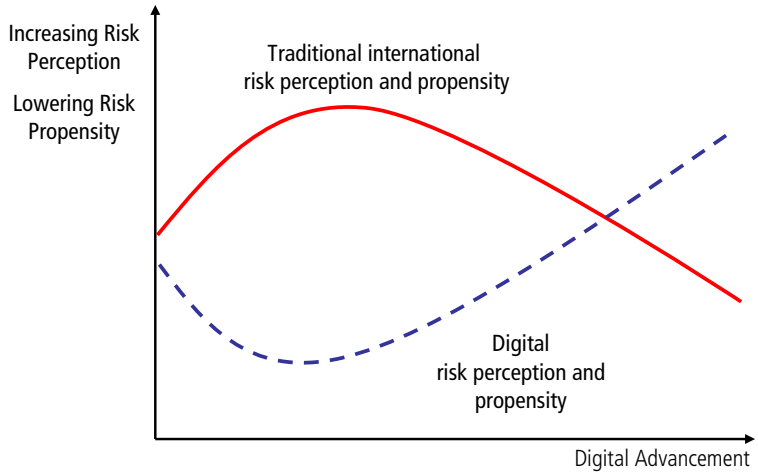
Source: Elaborated by the authors

An example of these dynamics will be the effect of data on specific types of IR. On one hand, as companies build big-data and artificial intelligence tools, the managers' perception of IR (for instance, international credit risk) lowers as they believe they have more and better information on foreign customers and their environment (a variant of the virtuality trap (Yamin & Sinkovics, 2006)). This perception will affect their underwriting decisions and behaviour in the face of potential adverse events (such as a credit default). On the other hand, building these big data and AI tools requires acquiring detailed customer information. This information must be protected in accordance with data protection laws to avoid potential reputational problems. As these effects build, managers perceive the risk inherent in these new tools differently and may adapt their data gathering and storage decisions.

A key concept in how this works is the risk event. The effects of such an event in the firm, the decisions taken and the results play a critical role in the model through *outcome history*. An example of such an event was the COVID-19 crisis; firms have been forced to apply digital technologies to their IR management and rethink their IR management strategies. The decisions managers have taken in this situation (risk behaviour) were influenced by the availability of technology. Indeed, digital technology has given executives excellent results in mitigating the pandemic impact. However, through these efforts, they also exposed their operations to certain DR, such as hacking. This process's outcomes profoundly impacted executives' IR perceptions and propensity, and changed how they looked at the internationalisation and digitalisation processes.

In summary, we found that increased exposure to digitalisation will help firms develop resources (information, speed, knowledge, and flexibility) that will help them deal better with IR. These improved resources will reduce executives' IR perception and increase their IR propensity. In this process, as managers gain more exposure to digital technologies, they become more aware of the potential DRs that could affect their companies (increasing DR perception and reducing DR propensity). This process aligns with Miller's perspective on integrated risk management, specifically the trade-off between different risk types (Miller, 1992), where improved IR is confronted with an increased DR. Figure 2.2 illustrates this interaction.

Figure 2.2.
Evolutionary Processes of Traditional International Risk and Digital Risk



Source: Elaborated by the authors

With this model, our research builds on previous literature analysing the impact of perceptions in internationalisation and digitalisation decisions. Earlier articles in this topic have examined how the perceptions of executives influence decisions, primarily regarding top-down, once-in-a-lifetime choices such as the selection of host countries (Claver et al., 2008; Ferri et al., 2021; Kraus et al., 2015) or the change in their digital approach (Ferri et al., 2021). One example is a plethora of studies analysing the propensity of SME executives to expand abroad in the presence of different resources or environmental conditions (Acedo & Florin, 2007; Claver et al., 2008; Pezderka & Sinkovics, 2011). Another example could be the role of perceptions in the development of specific distribution models, such as e-banking (Mbama et al., 2018). Our article complements these studies by focusing on the decisions and initiatives developed to prevent and handle risk events that can arise after the international and digitalisation footprints are established. Furthermore, it explores the interconnected dynamics of the evolution of internationalisation and digital advancement that arise when making these decisions. Covering these decisions will help build a holistic understanding (from the footprint to the final operational decisions and their subsequent outcomes) of how perceptions affect international risk decision-making processes, especially when incorporating digital technologies for their management. We also complement this literature by establishing the link between the executive's perception and organizational circumstances, specifically the availability of digital capabilities.

Furthermore, our study is original in applying the behavioural approach to the application of digitalisation to international risk management in large MNEs (Eduardsen & Marinova, 2020). Additionally, it is also unique as it employs a rich and diverse set of interviewees, including top management individuals from various nationalities and positions working for relevant MNEs across a wide range of industries and countries.

Besides its uniqueness, we believe this research can be helpful to both practitioners and researchers. Executives face constant challenges in the internalisation process and, especially after the risk event of COVID-19, have applied digital technologies to their IR management. This process has altered their perception and propensity to IR and, simultaneously, to DR. The understanding of these interactions can help executives be aware of possible inadequate reactions to IR or DR challenges and help them optimise their decision-making. For scholars, our framework can serve as a reference for exploring further contributions to research on digitalisation applications in the IB's various problematics, particularly when executives' perceptions and propensity are involved.

In this sense, our study is subject to certain limitations that could also open new research opportunities. First, it is a qualitative study; therefore, it has a more exploratory than probatory character. Researchers can explore the relationships described in the model in quantitative studies through surveys and experiments about IR perception and propensity. Second, it focuses mainly on MNEs, which, although rich in their risk management situations and practices, are only a limited part of the IB set of firms. New studies could focus on how SMEs or New Ventures deal with IR perceptions and digital technologies. Finally, our study generalises both IR and digital technologies. Although this has been useful for our purposes, other researchers can explore relationships in certain risk types (for example, global supply chain risk) and specific digital technologies (for example, IoT).

More importantly, our research lays the groundwork for future studies to develop more comprehensive frameworks for understanding the role of perceptions in internationalisation, particularly in the context of digital technologies. This is achieved by incorporating not only top-down strategic decisions but also subsequent operational decisions taken in the field. These frameworks can be complemented by studying both the individual and the organization levels through the microfundations approach.

As COVID-19 has taught firms, IR is constantly evolving and changing. This is a growing challenge from MNEs' executives' perspective, which can be dealt with by deploying

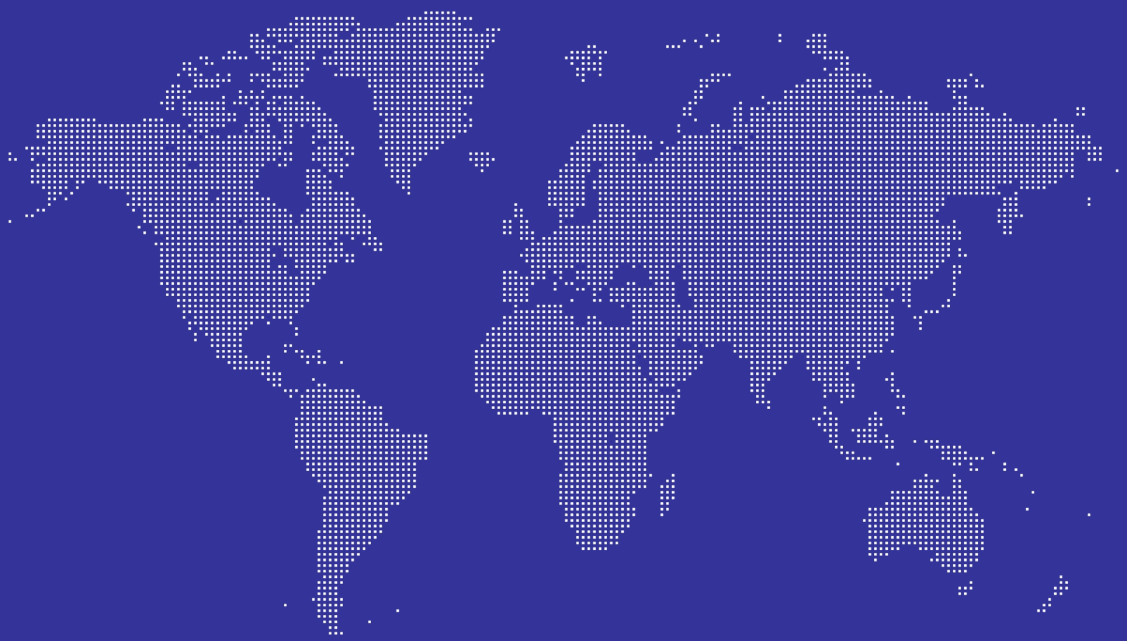
new digital technologies that can improve their IR management through improved intelligence and agility resources. However, these benefits have the side coin of the new digital risks that executives will have to deal with if they want to succeed in the new international-digital environment.

Chapter 3

THE ROLE OF DIGITALISATION IN INTERNATIONAL RISK MANAGEMENT: THE CASE OF TRADE CREDIT RISK

"Risk comes from not knowing what you're doing".

Warren Buffett.



Abstract: Firms face significant and specific risks when operating abroad. To manage these risks, they follow a two-phase process. They first develop an assessment and assume a certain risk level. Then, they must accommodate and mitigate the level of risk they have assumed. To optimise this process, multinationals use intelligence and agility resources. We argue that the firm's digital capabilities enable it to build and deploy these resources more effectively, thereby enhancing its performance in both phases. To empirically test these relationships, we have studied the risk management process in the context of international trade credit risk. We have created a unique panel based on a transactional database for a major global trade credit insurer, which includes nearly 4,000 multinational firms spanning 15 years and operating in more than 200 countries. Our analysis reveals that digital capabilities play a crucial role in enabling companies to effectively translate their international experience into a more informed assessment of international risk. However, they play a less substantial role in helping mitigate the risk assumed by the firms.

Keywords: International Risk, Risk Management, Risk Assessment, Risk Mitigation, Digitalisation, Digital Capabilities.

3.1 Introduction

The management of international risk is critical in Multinational Enterprises (MNEs) (Ghoshal, 1987). Companies operating globally are exposed to a wide variety of risks that can affect their strategy and operations (Miller, 1992). To optimise their exposure to these risks, firms develop a risk management process that consists of two phases. First, firms must correctly evaluate the risk they are assuming and decide accordingly (i.e., assessment/assumption phase); second, they apply their best efforts to minimise its harmful effects (i.e., accommodation/mitigation phase) (Eduardsen & Marinova, 2020).

In this chapter, we study the application of digitalisation in the international risk management process. Based on the resource-based view (RBV) (Barney, 1996), we argue that firms utilise intelligence (i.e., information and knowledge) resources in the assessment/assumption phase, and agility (i.e., speed and flexibility) resources in the accommodation and mitigation phase. Digital capabilities will assist firms with the process in two ways. First, they will help firms build these resources (e.g., utilising big data for credit risk assessment). They will also assist with the deployment of these resources

when needed (e.g., using videoconferencing to mitigate events like the pandemic), which will affect the results of both stages of the process (Damodaran, 2008).

To test this model, we focus on a specific risk type: International Trade Credit Risk (ITC). We use this type of risk in our analysis as it is usually found when firms engage in international activities, and it is considered an example of the application of digital technology in risk management (Gupta et al., 2014; Pridotkienė et al., 2006; Seifert et al., 2013). For this risk type, we study two main relationships, one for each phase of the risk management process. In the first relationship, we examine the role of previous international experience in assuming ITC risk and the impact of digital technologies on this relationship. In the second phase, we explore the effects of the aforementioned risk assumption on final credit risk management performance and the role of digitalisation in this relationship.

To explore these relationships, we created a panel database built from three sources. First, we refined a major international credit insurance database, which led to a total of nearly 4,000 multinationals selling to various countries over a 15-year period, resulting in a total sample of almost 310,000 entries. We then complemented the panel using World Bank public data and information from a web scraping tool. The final database includes general characteristics of the firms, their risk management data, digitalisation information, and host country characteristics (economic, political, and digital).

We run two panel regressions, controlling for both specific firm variables and host country characteristics. Based on this analysis, we conclude that the firm's digital capabilities have a significant impact on both stages of the process. For risk assessment/assumption, we demonstrate that previous experience increases the ITC risk appetite, but also that the presence of digital technologies moderates this relationship, as using improved information and knowledge resources helps to better assess the final risk. For the risk accommodation/mitigation phase, the expected relationship between the risk assumed and the final risk performance holds in our context, moderated by digital capabilities. This moderation effect is not as relevant as the first, which may suggest that speed and flexibility resources cannot rely entirely on digital tools in actual mitigation efforts, as they are less suited for this purpose.

Our study contributes to the previous literature in several ways. First and foremost, it examines the application of digital capabilities to the international risk management

process, covering one of the potential research avenues identified in the literature (Halpern & Fernández-Méndez, 2025). More specifically, it complements the literature focusing on the impact of digitalisation on firm performance by exploring the risk dimension of performance (Caputo et al., 2022; Elango et al., 2013; Luu, 2024; Neirotti et al., 2025). Second, it focuses on operational (non-strategic) risk management, theoretically exploring the mechanisms through which firms can influence their risk management processes using their digital capabilities. Third, it explores a specific type of risk (ITC risk) that has not been extensively studied in the literature (Seifert et al., 2013).

We structure this paper as follows. In Section 3.2, we examine the existing literature on international risk management and the application of digitalisation, propose a model for understanding their effects, and develop our hypothesis. Section 3.3 presents the ITC context and the methodology employed to achieve the results. In section 3.4, we describe the main results and discuss the findings. Finally, in Section 3.5, we conclude by discussing the implications of our research for both researchers and practitioners.

3.2 Literature review and hypothesis development

Companies internationalise to add value either through growth opportunities (Hashai, 2011; Requejo, 2005; Sato et al., 2020) or the diversification of regional exposure (Berrill et al., 2019; Kim, W. C. et al., 1993) . These objectives are not always met, as companies operating internationally face risk events that can hinder the expected profitability (Krapl, 2014). To prevent and handle events like these, MNEs' engage in strategic and operational risk management activities (Ghoshal, 1987).

This management of risk in an international setting has its own set of difficulties (Miller, 1992), as international expansion not only increases existing risks, such as credit risk or operational risk (Gray et al., 2011), but also has its own set of risks, such as exchange risk (Ito et al., 2016; Jacque, 1983) or political risk (De Villa, Maria A., 2023; Ellstrand et al., 2002; García-Canal & Guillén, 2008; Giambona et al., 2017).

The literature has primarily focused on strategic responses to these international risks, namely top-level preventive actions that avoid or minimise future shocks arising from international activities. The first of these is diversification. MNEs develop a portfolio of host countries to lower the risk profile of the internationalisation efforts (Kim, W. C. et al., 1993; Manuj & Mentzer, 2008). The second response involves considering specific

countries and reducing or avoiding risk in each of them. (Clarke & Liesch, 2017; Di Gregorio et al., 2009; Klein et al., 2019; Shrader et al., 2000). A third response can be to proactively transfer all or part of these risks to other actors, such as financial institutions (Brouthers & Brouthers, 1995; Hain, 2011; Miller, 1992). Ultimately, companies can select entry modes based on their prior experience with international business (Brouthers et al., 2002; Gabrielsson & Gabrielsson, 2013; García-Canal & Guillén, 2008). Firms can choose between exports, licensing/franchising, joint ventures, or establishing a wholly owned subsidiary in the host country. The higher the perceived complexity and challenges, the more conservative the chosen mode (Carlos Pinho, 2007; Demirbag et al., 2010), exporting being the lowest-risk entry mode available (Eduardsen & Marinova, 2020).

However, the focus of our article is on the less studied topic of operational (or tactical) risk management process (Chowdhry & Howe, 1999; Hoffman, 2002). This process starts when international footprint and entry modes are already established, and firms have begun their operations. We refer to this as the operational (tactical) international risk management process. In general terms, this process should encompass an initial phase of *assessment and assumption*, as well as a second phase of *accommodation and mitigation.* (Eduardsen & Marinova, 2020; Miller, 1992). The actual process used by a firm will be more or less complex, depending on the chosen entry mode and other variables, but it will maintain these two phases.

Based on Damodaran's (2008) definitions, we classify the resources that firms need to undertake this process successfully into two groups: *Intelligence* (including Information and Knowledge) and *Agility* (including Speed and Flexibility). Intelligence resources are used more frequently in the assessment/assumption stage (Al Khattab et al., 2010), while agility resources are more beneficial for the accommodation/mitigation phase (Damodaran, 2008).

MNEs can utilise digital technologies to develop the intelligence and agility resources necessary for effective international risk management and for achieving the desired value creation (Araz et al., 2020; Bubnova et al., 2018; Karduck et al., 2007).

3.2.1 Risk assessment and assumption

3.2.1.1 THE ROLE OF EXPERIENCE IN RISK ASSESSMENT AND ASSUMPTION

As companies conduct business in international markets, they encounter distinct challenges and accumulate valuable experience (Oetzel, J. & Oh, 2014; Rogers, 1997). This experience will be helpful when making decisions about the risks to be assumed. The literature has studied this process mainly from the theoretical lens of the resource-based view (Erramilli & Rao, 1993; Halpern & Fernández-Méndez, 2025; Westhead et al., 2001).

Both *information and knowledge* resources are *built* upon the company's experience in international markets (Buckley et al., 2016; Eriksson & Chetty, 2003; Parracho & Silva, 2021). When the company faces certain risk events, it adapts and builds new resources of both types (Liesch et al., 2011; Pezderka & Sinkovics, 2011). For example, experience will help companies understand the importance of structured data, and they will build information resources, such as more complete databases, accordingly (Glavas & Mathews, 2014). More importantly, with experience, companies also develop knowledge resources, such as more capable and adaptable management teams (Rogers, 1997). Once built, both types of resources will be *deployed* when analysing and assessing international risks and making decisions on the risks to be assumed. For example, when the accumulated information is used to forecast potential fraud (Pezderka & Sinkovics, 2011).

The building and deployment of information resources will help companies properly quantify and analyse the risks they face when expanding abroad (Bubnova et al., 2018; Ivanov et al., 2019). These resources can help firms gather information about the business environment, target companies, industries, and political risks, among others (De Villa, Maria A., 2023; Miller, 1992; Pezderka & Sinkovics, 2011). Information resources will help firms consider not only the business risks but also the impact of the country's characteristics on the outcome of the risk management efforts. Including country-level information (Coccia, 2007) help firms predict outcomes in international connected environments, where it is usually more complicated than in domestic ones (Oetzel et al., 2001).

Similarly, knowledge resources developed through experience also influence how companies assess international risk (Andersen, 2012). This is a critical perspective, as firms

frequently fail to conduct a detailed and information-based risk assessment, instead resorting to more unstructured approaches (Oetzel, J., 2005). Therefore, one of the key factors that will affect this assessment is the knowledge accumulated by firms and their managers with international experience (Buckley et al., 2016; Delios & Henisz, 2003; Ding et al., 2025; Wüstermann, 2016).

We can summarise by concluding that the firm's risk appetite (after a proper risk assessment) is a function of the firm's experience in the international setting (Buckley et al., 2016; Krapl, 2014; Oh & Oetzel, 2017; Sato et al., 2020; Wüstermann, 2016). This relationship is developed through the intelligence and knowledge resources that the companies build as they have more experience with international risk (Claver et al., 2008; Delios & Henisz, 2003; Gabrielsson & Gabrielsson, 2013). The more developed these resources are, the more a firm can deploy them to get a precise picture of the situation, allowing the company to assume higher risks in its internationalisation process (Pezderka & Sinkovics, 2011). The firm's recent experience is especially relevant in this process, as experiences of risk events in the recent past carry disproportionate weight in managers' decisions (Oh & Oetzel, 2016; Rogers, 1997), following the well-known anchor effect (Barbosa & Fayolle, 2007). Therefore, managers consider these resources, as well as the specific characteristics of the host country (Kraus et al., 2015), and their own experience when making risk assumption decisions (Claver et al., 2008; Delios & Henisz, 2003; García-Canal & Guillén, 2008). Based on these arguments, we formulated the first baseline hypothesis as follows:

Hypothesis 1 (baseline): The higher a firm's international experience, the higher its international risk assumption.

3.2.1.2 DIGITAL CAPABILITIES ROLE IN RISK ASSESSMENT, AND ASSUMPTION

We argue that when firms use digital capabilities, they affect this process in two ways. First, they help build information and knowledge as firms accumulate experience. Then they will also help with the deployment of these resources in the actual decision-making that leads to risk assumption (Ojala et al., 2022).

Digitalisation can help firms *build* the information resources needed to manage international risk as they gain experience (Araz et al., 2020; Brindley & Ritchie, 2003; Bubnova et al., 2018). For example, companies can use big data to gather experience in

changing consumer tastes in different countries (De la Torre & Moxon, 2001) or to gather credit information from potential partners (Araz et al., 2020). Furthermore, these tools can also be used in the *deployment* of these information resources. For example, when using AI to analyse credit and other types of export risk (Liu et al., 2022).

Firms can also utilise these technologies to *build* the knowledge required for effective risk management. For example, by systematising and keeping track of the experience about risk management that is hidden in the organisation (Baritchi, 2004; Bouncken & Barwinski, 2021). They can also help in *deploying* the previously accumulated knowledge, for example, by using these systems to avoid reliance on local managers (Petersen et al., 2002).

However, as all international risks are interconnected (Miller, 1992), we can expect that the risk reduction achieved by using these tools will introduce new types of risks. The literature has found many kinds of new challenges that come with digitalisation (Pezderka & Sinkovics, 2011), from regulatory-related risks (Ferri et al., 2021; Frynas, 2002) to intellectual property protection (Coeurderoy & Murray, 2008; Gopal & Sanders, 1998) and cybersecurity risks (Scott, 2004).

One of the most significant digital-related risks to consider in our context is that, ultimately, firms tend to rely too heavily on these digital-based intelligence gathering resources, thereby forfeiting the importance of deploying real physical resources, which can result in less-than-optimal risk management exposure decisions. This is what is called the "virtuality trap" (Yamin & Sinkovics, 2006).

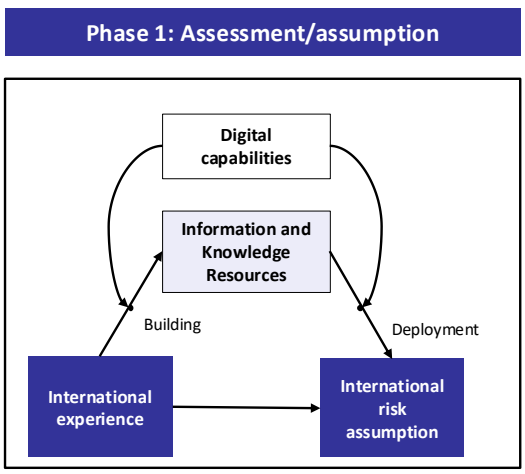


Figure 3.1. Role of digital capabilities in Phase 1

Generalising for all different types of international risk, we argue that the theoretical mechanism by which digital capabilities affect the process involves their help in building information and knowledge resources through experience, as well as in deploying these resources when assessing/assuming risk. This will help firms lower the final level of international risk assumed for the same business results, as they will select their risk based on systematised information and knowledge instead of managers' qualitative

perceptions (Brindley & Ritchie, 2003). Another effect in this relationship could be mentioned: the "virtuality trap," which works in the opposite direction (Yamin & Sinkovics, 2006). However, in general, we expect this effect to be minor, and digitalisation will improve this relationship (reducing the firm's risk exposure), in line with other research that studies the relationship between experience and internationalisation (Ding et al., 2025). Therefore, we establish that:

Hypothesis 1b: Digital capabilities decrease the positive effect that a firm's international business experience has on the assumption of risk.

3.2.2 Risk accommodation and mitigation

3.2.2.1 THE RELATIONSHIP BETWEEN THE RISK ASSUMED AND THE RISK PERFORMANCE

As previously documented, the higher the risk assumed by a firm, the more damaging potential adverse risk events can be (Lu & Zhou, 2024). The firm's resources, mainly speed and flexibility, will filter this impact and will allow it to accommodate and mitigate these risk events and retain the benefits of internationalisation (Eduardsen & Marinova, 2020).

The assumption of new risks incentivises firms to *build* and adapt these resources, tailoring them to accommodate these new expected risks and mitigate their effects (Bassino et al., 2017; Distel et al., 2019; Grøgaard et al., 2019; Mascarenhas, 1982; Shrader et al., 2000; Sreedevi & Saranga, 2017). For example, when considering political risk in a particular country, firms may choose to try to control it, for instance, by developing local political resources (De Villa, Maria A. et al., 2019; García-Canal & Guillén, 2008; Iankova & Katz, 2003; Liedong et al., 2020; Mascarenhas, 1982). Other types of risks can be prevented to some extent through a higher interaction with the local community through the selection of partners (Hashai & Adler, 2021) or by hiring local personnel (Bassino et al., 2017; Distel et al., 2019).

These resources will then be *deployed* when mitigating adverse risk events (John & Lawton, 2018; Lu & Zhou, 2024). For example, when a political risk event occurs, corporations activate the emergency procedures developed for that purpose (Adarkwah & Benito, 2023), or when a cyberattack happens, and the firm's IT measures respond to

mitigate it (Bendovschi, 2015). The results of this resource deployment will impact the firm's final risk management performance (Khan et al., 2024; Manuj & Mentzer, 2008).

In conclusion, the risk assumed when expanding internationally will have an impact on the final risk performance (Eduardsen & Marinova, 2020; Leontieva et al., 2019). This effect will be influenced by the firm's building of speed and flexibility resources and their deployment in its accommodation and mitigation efforts. Based on this literature, we propose the following baseline hypothesis:

Hypothesis 2 (baseline): The higher the international risk assumption of a firm, the lower its international risk performance.

3.2.2.2 DIGITAL CAPABILITIES ROLE IN RISK ACCOMMODATION AND MITIGATION

The application of specific digital capabilities in intelligence resources, such as big data, can play a limited role in this phase, as improved information and knowledge can facilitate more effective ongoing evaluation and mitigation of current risks (Araz et al., 2020). However, the key application of digital capabilities in this phase is its help in *building* speed and flexibility resources, and their *deployment* when needed (Karduck et al., 2007; Raisinghani & Nugent, 2004).

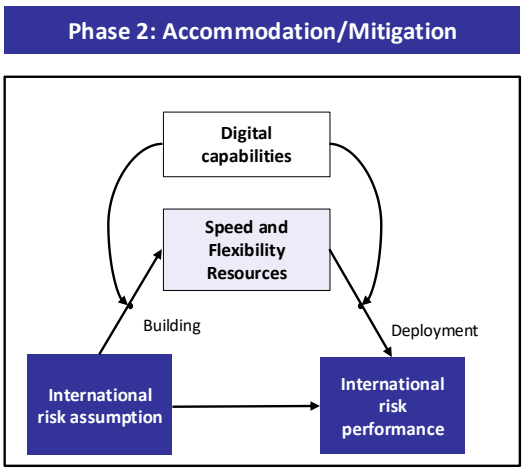


Figure 3.2. Role of digital capabilities in Phase 2

Digital capabilities can help *build* the necessary resources to cope with the new levels of risk assumed, enhancing a firm's operational flexibility, for example, by improving monitoring and adaptation systems that can respond to political crises (De Villa, Maria A., 2023) or by building more reliable inventory systems (Wresch, 2004). Digitalisation can also help *deploy* these resources, for example, by improving a corporation's reaction times when responding to risk events (Ivanov

et al., 2019; Karduck et al., 2007). One recent example of this is the use of digital technologies to reconfigure the value chain during the COVID-19 crisis (Strange, 2020).

These applications play a role in mitigating the firm's actual risk exposure and are especially relevant for international firms, given the heterogeneous, changing, and distant environments they face. It is worth noting that we do not expect digital technologies to be as powerful in this phase as they were in the previous one. This may be because mitigation relies more on a local physical presence (Petersen et al., 2002; Pezderka & Sinkovics, 2011; Yamin & Sinkovics, 2006). Its importance could increase with better digital infrastructure in the host country, as firms will have better and more timely access to information (Luo, 2021).

As a summary, we argue that the mechanism by which digital capabilities help companies lower the effect of higher assumption risk in their final risk performance (Lu & Zhou, 2024) will be by first helping in building their speed and flexibility resources, and then assisting in deploying them when facing upcoming and potential risk events (Karduck et al., 2007; Raisinghani & Nugent, 2004). This mechanism will, therefore, help firms cope better with the risks they assume, resulting in improved risk performance. Following these arguments, we hypothesise that:

Hypothesis 2b: Digital capabilities will decrease the adverse effect that risk assumption has on final risk performance.

3.3 Context of the study and methodology

3.3.1 Context of the study

In the previous section, we proposed a theoretical mechanism to understand the effect of digital capabilities in both phases of the risk management process and proposed a series of hypotheses. To empirically test these relationships, we focus on a specific type of international risk: international trade credit risk (ITC).

Credit risk can be defined as the *"probability of a transaction party's default, which may cause financial loss to the creditor."* (Ammann, 2002 p.1). ITC risk happens when it applies to an international commercial transaction, generally between two businesses (Pridotkienė et al., 2006). Our study contributes to complement the relatively scarce research currently available in the international trade credit risk management context,

which until now has focused primarily on general and local contexts (Seifert et al., 2013).

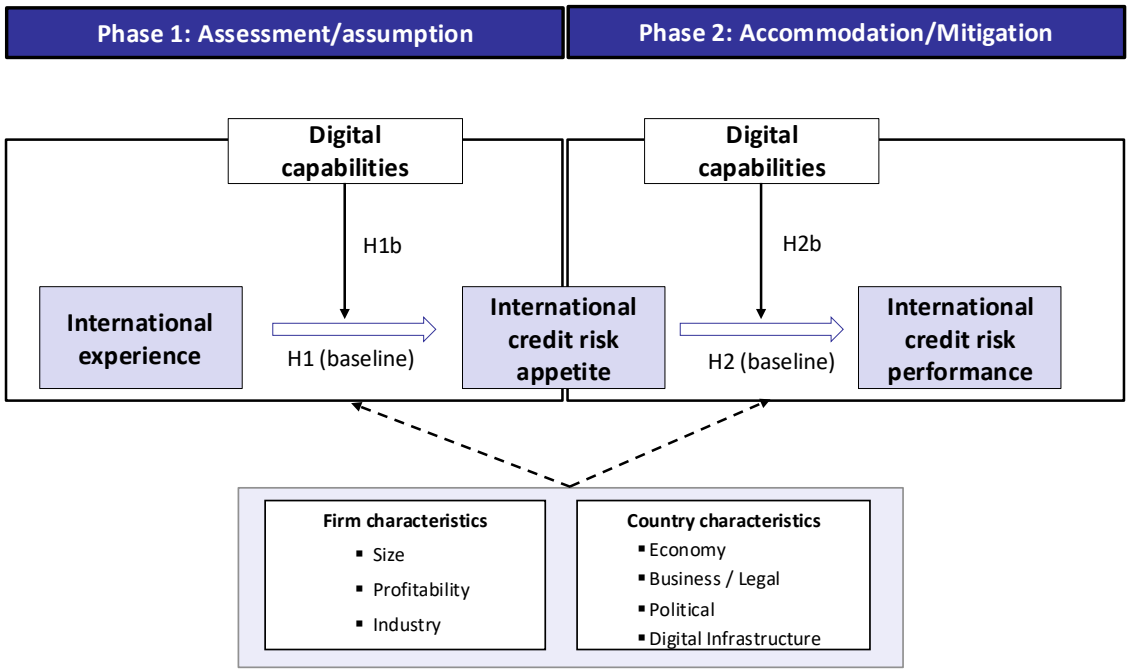
We believe that this risk type is an optimal choice to test our model, as it is present in almost every international entry mode (mainly in exporting) and has clear cases for applying digital technology in intelligence (Cui, 2015; Nahar et al., 2024) and agility (Ok et al., 2024; Xiao et al., 2022) resources. Although this risk is present in almost all entry modes, we focus our efforts on the firm's exporting activities. This helps us make a more precise analysis of the impact of digitalisation in the risk process, avoiding other factors that appear in more complex settings, like FDI (Pridotkienė et al., 2006; Simpson Jr & Kujawa, 1974).

The two main phases also appear in the ITC risk management process. The assessment/assumption stage has to do with evaluating the credit quality of the final clients (Bonfim, 2008) and considering the characteristics of the country where they are based (Ali & Daly, 2010). When the commercial relationship is already in place, firms start the risk mitigation phase by addressing potential/actual problems with payment (Sokolovska, 2017).

As we will see later, international risks are influenced by firm characteristics (such as size, profitability, and industry) and host country characteristics (including economic, legal, political, and digital factors). Likewise, ITC risk will also be affected by the selected companies (Bonfim, 2008) and countries (Ali & Daly, 2010).

In summary, we aim to demonstrate the impact of digital capabilities on the risk management process in our context, across both phases. First, the effect of digitalisation in the relationship between firm international experience and ITC risk assumption (an application for our context of hypothesis 1 and 1b), and then its impact on the relationship between ITC risk assumed and final ITC risk performance (an application for our context of hypothesis 2 and 2b). We also examine the impact of the relevant control variables on both relationships in our context. All this is summarised in Figure 3.3.

Figure 3.3.
Application of the model to the ITC context, including control variables



Source: Elaborated by the authors

3.3.2 Methodology and analysis

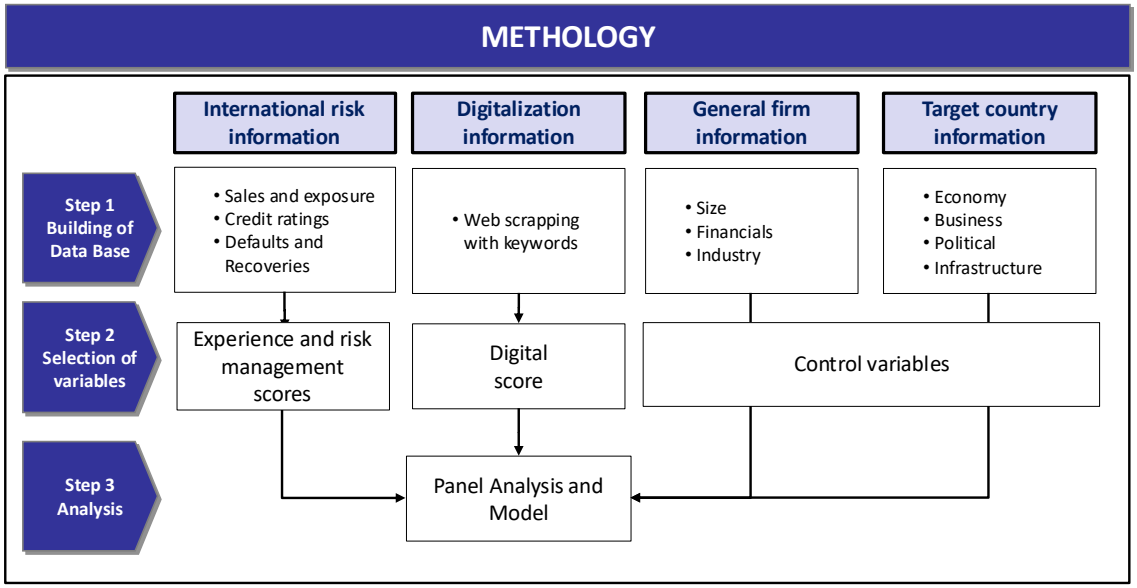
For our analysis, we designed the following methodology (see Figure 3.4).

As a first step, we gather general and financial information about the firm, including its credit risk behaviour and performance, its level of digitalisation, and the characteristics of the target countries to which it exports. We obtain this information over several years.

As a second step, we select the relevant variables to represent the concepts in our model, based on the findings of previous literature on the topic.

Finally, we conduct regression analyses on the final panel database to test our hypothesis in the ITC context.

Figure 3.4.
Methodology steps and description



Source: Elaborated by the authors

3.3.2.1 BUILDING OF THE DATABASE

To conduct our analysis, we require data on the firm's credit risk appetite and performance, as well as its level of digitalisation.

For the first set of information, we need to use actual data of companies' commercial transactions and credit management results. To gather this data, we have used the operational database of a major global trade credit insurer. Real transactional data obtained in this manner has significant advantages over surveys, as it prevents the responder's perceptions from influencing the results. However, it does not allow for the tailoring of questions as surveys do (Fricker & Schonlau, 2002).

Our starting database contains at least 59,000 clients from 107 countries, encompassing over 77 million commercial relationships across 235 different countries. Besides the number of observations, the database is significantly richer than other commercially available databases in terms of the type of data available and its granularity, as it in-

cludes information on the company's general and financial characteristics, its commercial transactions, and the credit assessment and final performance of its risk management efforts. All this information is available for each target country and year.

Our unit of analysis is the firm-country-year, and we focus on large and medium international companies. For our purposes, we select only companies with at least 250 employees (classified as medium enterprises (European Commission, 2003)) and at least 25% of export sales (Aggarwal et al., 2011; Canton et al., 2013). Our period of analysis ranges from 2007 to 2023. Among other advantages, having such a panel will enable us to rule out the effects of the economic cycle in our study, specifically covering two significant risk periods, including the 2008 global financial crisis and the 2020 COVID-19 pandemic (Gunay & Can, 2022). Finally, we also examine the distribution of the firms' sales according to the countries where they are produced, to account for the effects of host country influence in our model. We have finally obtained a comprehensive three-dimensional panel database comprising 3,912 firms across 15 years and 235 target countries, resulting in a total of 308,769 entries.

We have reviewed previous literature on credit risk management evaluation. Although it is mainly based on local credit risk, it has helped us define what types of data could be helpful for our purposes (Arora & Kumar, 2014). For each company, and on a per-year and country basis, we gathered five types of information:

- *General information:* Name, industry, and country
- *Financial information:* Sales, assets, profitability (ROE, ROS, and ROA), and total employees
- *Commercial information:* Number and value of sales made to different countries
- *Credit quality information:* Average exposure and average rating (awarded by the insurance company) of the firm's clients per country.
- *Credit performance information:* Number and value of defaults, both from domestic/export sales, and number and amount of domestic/export defaults recovered per country.

To prepare all this information for our analysis, we went through the process of understanding the contents of the raw database fields and records, developing a set of detailed SQL queries, and building an intermediate database for further processing.

However, this database does not contain information on the level of digitalisation of the firms we are studying. To complement this, we can use two main approaches. The first one is to use the industry as a proxy. For that, we can obtain a digital development score for each of the industries in our database according to the NACE codes (Mucha & Seppälä, 2021). Using this approach has the drawback of losing granularity at the individual firm level. However, the information obtained this way can be helpful later on when controlling for industry effects.

Therefore, we followed a second approach, developing a web-scraping tool that utilises specific keywords to search the Internet, taking into account the number of appearances per firm considered. Similar techniques have been used, validated and verified previously (Ashouri et al., 2024). Building on previous literature measuring the digital advancement of companies (Cagno et al., 2021; Jung & Gómez-Bengoechea, 2022; Pagoropoulos et al., 2017; Stich et al., 2020; Zaoui & Souissi, 2020) and our previous research, we have selected the relevant keywords from "The Gartner Glossary of Information Technology Acronyms and Terms" (Gartner Group, 2004). For each company, we have defined three different sets of keywords:

- *General Keywords:* Wide terms that identify the general digital level of the company. Some examples include DIGITALISATION, CYBER and PLATFORM
- *Intelligence-related keywords:* Related to the technologies that allow better information and knowledge in the firm. Some examples include BIGDATA, DATA ANALYTICS, MACHINE LEARNING and DATAWAREHOUSE
- *Agility-related keywords:* Related to the technologies that allow better speed or flexibility. Some examples include: INTERNET OF THINGS, ECOMMERCE, VIDEOCONFERENCING, and BLOCKCHAIN.

We include the results of this scraping tool in the intermediate database, matching by company name.

The last pieces of data to be obtained are the characteristics of the host countries where each firm operates. For this, we use information mainly from the World Bank's indicator databank, a source frequently used in previous literature (Brown, C. L. et al., 2015; García-Canal & Guillén, 2008). We did a pre-selection of variables from this database (See Appendix 4 for a complete list with definitions):

- *Economic development:* Indicators such as GDP per capita or Trade over GDP
- *Business development:* Indicators of the Ease of Doing Business World Bank Report
- *Political, legal, and institutional development:* Rule of law, regulatory quality, and political stability indicators
- *Digital infrastructure:* Presence of online media and ratios of internet and broadband connections per capita.

We include this information in the intermediate database, matching it by country name. This provides us with a comprehensive database that contains all the necessary information for our analysis.

3.3.2.2 SELECTION OF MAIN VARIABLES

Not all the information contained in the database will be helpful for our purposes. We need to select a set of variables that represent the concepts expressed in our framework for both phases of the ITC risk management process.

When analysing the assessment/assumption phase, we should select variables that represent the company's previous experience in international business and its level of risk appetite. For experience, we decided to use the percentage of last year's international shipments (the *Previous year's export percentage*) (Axinn, 1988; Oura et al., 2016). We use the number of shipments instead of shipments in monetary terms to avoid problems with currency conversion. Choosing only the previous years' totals over the total percentages of exports for the period is reasonably adequate. First, the number including all the years will result in a different number of years for each observation. Second, as we have seen, recent experience has a more relevant weight in risk decisions than overall experience (Oh & Oetzel, 2017; Rogers, 1997). For risk appetite, we use the insurer's average internal credit rating (a number calculated with proprietary systems and algorithms of the insurance company, valid both for public and private companies) of the clients of the selected firm for each country and year (*Average firm's client rating*) (Hilscher & Wilson, 2017). This number estimates the credit quality of clients and their estimated probability of default, ranging from 0 (highest quality) to 100 (lowest quality).

For the risk accommodation/mitigation phase, we also assess the risk assumed based on the aforementioned credit rating of the firm's clients. However, in this case, we use the previous year's ratings as the effect of the risk assumed takes time to impact actual results (the *Previous year's average firm's clients' rating*). For risk performance, we have chosen to use the default rate, as it is the most widely used measure in the literature (Peter & Peter, 2006). However, as before, we use the default rate based on the number of defaults over the total number of shipments (and not the ratio with monetary terms), to avoid currency conversion problems (*Default rate shipments*). Defined in this way, the default rate in our setting moves from 0 to 10 in most cases. It is essential to clarify that an increasing default rate means a worse risk performance (as referred to in the theoretical model).

For both phases, we need a measure for the level of digitalisation of the firms. We use the results obtained with the previously mentioned web-scraping tool (using all keywords). Previous literature has proved that this is a reasonable way to measure the digital capabilities of a firm (Ashouri et al., 2024). To compensate for the larger internet footprints of bigger companies, we divide the number of hits by the total number of employees of the firm (*Digital score*). This score typically ranges from 0 to 400. We have checked the validity of this measure by comparing it with other possible measure variables such as the industry digital score, the intangible ratio or the results of a different web scrapping tool that reads inside the companies' actual websites (the usefulness of this latter tool as our variable was limited due to the language of the websites and the limited number of webs identified). We obtained positive correlations between the selected variable and these alternative measures.

3.3.2.3 SELECTION OF CONTROL VARIABLES

Before selecting the control variables, we justify, based on previous research, that a firm's and host country characteristics affect how firms use resources and apply digital capabilities to assess risk and mitigate risk events.

Regarding the first phase (assessment/assumption), given the intangible nature of intelligence resources, the industry of the firm will affect its risk assessment and assumption (Andersen, 2012; Pan & Tse, 2000; Zhao et al., 2004). Specifically, knowledge-based and digital industries assume international risk in different ways than more traditional industries based on tangible assets, as the former do not have to consider the significant

investments of the latter (García-Canal & Guillén, 2025; Houman Andersen, 2005; Kuivalainen et al., 2012; Sanchez-Peinado & Pla-Barber, 2006).

Also, in the first phase, the size will play a role. Naturally, MNE firms tend to be less averse to risk due to their more extensive resources. (Brown et al., 2014; Hain, 2011). International SMEs will approach internationalisation more carefully than their larger counterparts (Di Gregorio et al., 2009; Gupta et al., 2014). On the other side of the spectrum (international new ventures), the reality is more mixed, with some companies focusing on exporting from the very first moment (Born Globals) (Iankova & Katz, 2003; Mcdougall, P. P. & Oviatt, 2000).

Finally, country characteristics are indeed considered during risk assessment by multinational firm managers. Specifically, the country's economic development and its institutions, as they affect various risks, including political and legal risks (Belderbos et al., 2014; Giambona et al., 2017; Mostafiz et al., 2020). These aspects can be considered in isolation or in relation to the firm's home country, with several studies looking at how the difference or "distance" between home and host countries affects the assessment and assumption of risk by firms (Brown, C. L. et al., 2015; Pan & Tse, 2000).

In the second phase (accommodation/mitigation), the nature of the industry will affect the physical assets deployed in host countries, as knowledge-based industries tend to rely less on physical presence. This will be relevant because physical presence is more critical when mitigating risk than when assessing it. (Sanchez-Peinado & Pla-Barber, 2006; Yamin & Sinkovics, 2006).

Additionally, in this phase, the size of the firm will play a role, as it affects the results of these risk accommodation and mitigation efforts. Larger firms have considerable managerial and financial resources to help them cope with adverse risk events, while SMEs and new ventures will have more difficulties (Bassino et al., 2017; Eduardsen, J. S. & Ivang, 2016; Hashai & Adler, 2021).

Finally, host country characteristics could also play a role, as the institutions and infrastructure in place can help or hinder the firm's risk mitigation efforts (Belderbos et al., 2014; Eduardsen & Marinova, 2020), and a potential political turmoil can have a disproportionate effect on the final risk management results (De Villa, María Andrea & Rajwani, 2013; Giambona et al., 2017). Besides this effect, as we mentioned, the host country's digital infrastructure can increase the impact of digitalisation in this phase.

To represent the previously mentioned firm characteristics in our context, we have selected the number of employees as a measure of size (as it avoids currency conversion problems that could appear with sales or revenues), return on assets as a measure of profitability (as it avoids considering leverage issues), and the industry's digital score (Mucha & Seppälä, 2021) to control for the level of "physicality" in the firm's sector.

For the country characteristics, we have selected GDP per capita as a measure for economic development, and the average "Ease of Doing Business" score for the country's openness to business activities (Corcoran & Gillanders, 2015), the political stability rating for political risk (Ferrari & Rolfini, 2006) and the penetration of broadband per capita for digital infrastructure (Chinn & Fairlie, 2010). For definitions of these variables, refer to Appendix 4.

3.3.2.4 MAIN ANALYSIS

We developed two separate analyses: one for the risk assessment/assumption phase and one for the risk accommodation/mitigation phase.

As previously mentioned, for both analyses, we filter our results to include only firms with more than 250 employees and at least 25% of their sales being international. Also, to specifically analyse international risk, we consider only clients, sales and defaults in countries different from where the firm has its headquarters (to consider only international operations).

For all analyses, we use the logarithm (for digital score, default rate shipments, and number of employees), and/or a mean-centred (for digital score, export percentage, and average firm's client rating) version of the variables, given the distribution of the sample and our intended goals (Welc & Esquerdo, 2018).

As previously discussed, for the first phase, we use last year's percentage of exports as the independent variable, and the average credit rating of the firm's customers is used as the dependent variable. We examine the moderating effect of the company's digitalisation, measured by the digital score, and control for all the aforementioned firm and country variables.

With these variables, we conduct a panel regression analysis on our three-dimensional panel, controlling for firm, year, and country. Using panel analysis allows us to increase

scale and efficiency, control for different types of effects, and work with lagged variables (Narver et al., 1999).

The model we use for the panel analysis is the population average (or GEE) estimator, as it fits better with our sample and intended goals (Crouchley & Davies, 1999; McGahan, 2017). Specifically, it is superior to both fixed effects and random-effects methods, as it is efficient, allows for autocorrelation, and accounts for unobserved heterogeneity (Krishnan & Kozhikode, 2015). We run this model using robust standard error estimates to account for the fact that our sample is based on real transactional data and does not perfectly match OLS assumptions. (Croux et al., 2004). Finally, we measured the size of the effect of the moderating variable, in our case, the digital score.

An identical approach is followed for the assumption/mitigation phase. However, in this case, the independent variable is last year's credit rating, and the dependent variable is the default rate as described before. We also examine the moderating effect of our digital capabilities measuring variable (the digital score), and control for the impact of all the considered firm and country variables.

3.4 Results and interpretation

Before running our regression, we look at the main descriptive statistics of our selected variables (Table 3.1).

Table 3.1.
Descriptive statistics

VARIABLES	OBS	MEAN	STD. DEV.
Export percentage	73,963	0.67	0.24
Avergare firms client rating	130,301	48.33	12.60
Digital Score (number of hits per employee)	130,301	17.81	43.92
Default rate shipments (number)	5,648	0.05	0.05
Industry digital score	130,300	0.44	0.12
Number of firm employees	130,301	1,228.78	5,762.70
Return on assets	129,471	0.04	0.14
Target country GDP per capita	123,230	36,011.54	27,299.52
Target country ease of doing business score	63,938	74.02	7.89
Target country political estability score	108,165	0.42	0.69
Target country broadband connections per 100 habitants	122,073	29.60	12.43

Note: Outliers for some variables are left out

For this analysis, we remove some outliers in different variables. In any case, these results are conditioned by our research setting (credit insurer database) and do not represent the total universe of firms.

3.4.1 Assessment and assumption phase

Considering the assessment/assumption phase, we have run our model with three specifications. The first specification accounts for all considered variables, including the moderation effect. The second specification accounts for all considered variables, excluding the moderation effect. The final third specification only includes the control variables. We obtain the following results, as shown in Table 3.2:

Table 3.2.
Results for the Assessment/assumption phase

DEPENDENT VARIABLE		Average firm's client rating								
	SPECIFICATION	1			2			3		
	VARIABLES	Coeff.	std. error	pval	Coeff.	std. error	pval	Coeff.	std. error	pval
1	Previous year export percentage (cent)	1.059*	(0.586)	0.070	0.151***	(0.042)	0.000			
2	Digital score (num of hits per employee) (log cent)	0.180***	(0.042)	0.000	1.145*	(0.596)	0.055			
3	Moderation effect of the digital score (1##2)	-0.354**	(0.151)	0.019						
4	Industry digital score	0.309	(1.519)	0.839	0.235	(1.511)	0.876	1.028	(1.005)	0.306
5	Number of firm employees (log)	0.405*	(0.215)	0.059	0.375*	(0.217)	0.083	-0.331**	(0.136)	0.015
6	Return on assets	1.502	(0.986)	0.128	1.450	(0.980)	0.139	-0.004***	(0.001)	0.001
7	Target country GDP per capita	-0.000***	(0.000)	0.000	-0.000***	(0.000)	0.000	-0.000***	(0.000)	0.000
8	Target country ease of doing business score	0.030	(0.019)	0.117	0.029	(0.019)	0.120	-0.010	(0.012)	0.403
9	Target country political estability score	0.373**	(0.175)	0.033	0.374**	(0.175)	0.032	0.211*	(0.110)	0.054
10	Target country broadband connections per 100 habitants	-0.123***	(0.012)	0.000	-0.123***	(0.012)	0.000	-0.047***	(0.009)	0.000
	Observations	24,995								
	Number of clients considered	621								
	Robust standard errors in parentheses									

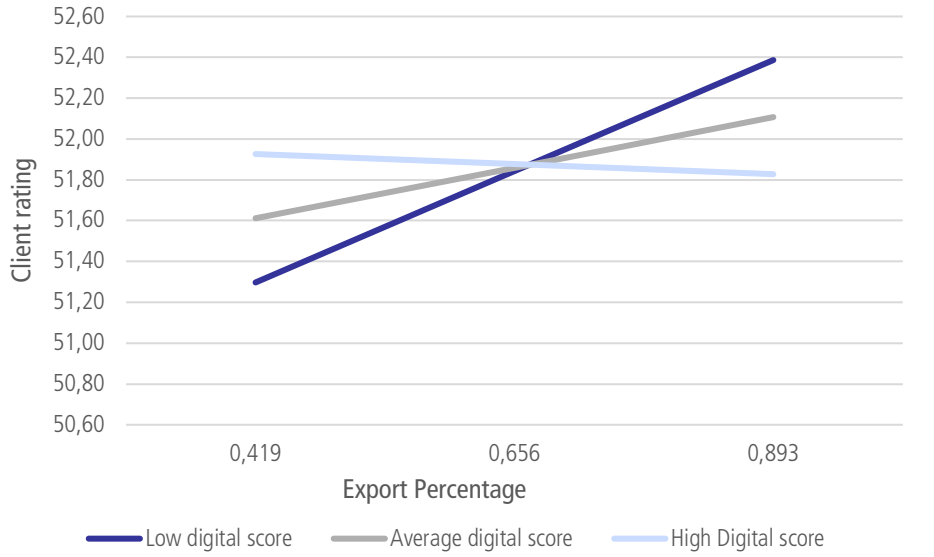
Note: *** p<0.01, ** p<0.05, * p<0.1. Export percentage and digital scored variables are centered. Source: Analysis of the database elaborated by the authors

As expected from the literature (Buckley et al., 2016; Krapl, 2014; Oh & Oetzel, 2017; Wüstermann, 2016), the higher the experience of the firm (measured by last year's export percentage), the higher the risk appetite (measured by the average client rating), as the firm most likely has built processes and systems to cope with possible adverse outcomes, increasing their managers' risk propensity (Claver et al., 2008; Gabrielsson & Gabrielsson, 2013). We verify this expected outcome for our ITC risk context. This is not the only factor that influences a firm's credit risk assumption. Other variables, both internal and external, could also apply (Schwaab et al., 2017).

This expected relationship is moderated by the firm's digital capabilities (measured by the digital score). The higher the digital score, the weaker the relationship between experience and risk assumption. This confirms the role of digitalisation in gathering client information in an international credit risk setting, helping firms select better-quality clients (Araz et al., 2020; Brindley & Ritchie, 2003), and therefore, moderating the impact of using less information-based approaches (Oetzel, J., 2005). The "virtuality trap" effect is not confirmed in our case. (Yamin & Sinkovics, 2006). If we examine the impact of digital capabilities on risk assumption in isolation, the interpretation would be that the higher the digitalisation, the higher the risk assumed (confirming the aforementioned "virtuality trap"). However, when considering the moderating effect on the relationship between experience and assumption, the role of digitalisation is clear, with a positive impact of digital technologies on risk assessment.

The moderation effect of the digital score is represented in Figure 3.5. To calculate the size of the effect, we used the results from the complete model (first specification of the model) and constructed three scenarios, maintaining all control variables constant while modifying the moderating variable by one standard deviation above and below the mean (High and Low in the graph). At low levels of digital capabilities, the moderating effect increases, and the client rating rises by 4.5 per cent with the variable measuring experience (export percentage of the previous year). At high digital capabilities scores, the impact of experience in risk assumption appears to be reversed, with client ratings decreasing by 0.4 per cent. This can be explained as follows: with high digital capabilities, firms' tendency to assume higher risk with experience is accentuated by these capabilities. This may be related to the virtuality trap and an increased confidence in the information obtained through technology.

Figure 3.5.
Moderating effect of digital score in the assessment/assumption phase



Source: Analysis of the database elaborated by the authors

Regarding firm control variables, we found no evidence that the nature of the company industry affects this relationship (measured by the industry digital score). However, as expected, size does seem to have an effect, increasing the risk appetite, as larger firms can assume more risk, being confident that they have better resources to deal with the adverse impact of higher credit risk (Liesch et al., 2011; Shrader et al., 2000). Finally, the profitability of the firm doesn't affect this relationship, confirming that this process of risk assumption is independent of other profit-seeking initiatives that the firm may be pursuing, such as growth or cost reductions (Cao et al., 2016; Vuorio et al., 2020).

Regarding country characteristics, in general, the level of development of the target country in all aspects does affect final credit quality, as firm clients from more developed countries will naturally have better ratings. Especially relevant is the country's political stability, as political risk is one of the primary considerations when analysing potential international expansion (Giambona et al., 2017). Finally, the country's level of digital advancement improves the final rating of clients, possibly because firms have more available information on them.

3.4.2 Accommodation and mitigation phase

Regarding the accommodation/mitigation phase, for the same three specifications used in the first phase, we obtain the results contained in Table 3.3.

Table 3.3.
Results for the Accommodation/mitigation phase

DEPENDENT VARIABLE		Default rate shipments (number based and log)								
SPECIFICATION		1			2			3		
VARIABLES		Coeff.	std. error	Pval	Coeff.	std. error	pval	Coeff.	std. error	pval
1	Previous year average firms client rating (cent)	0.004**	(0.002)	0.026	0.004*	(0.002)	0.056			
2	Digital score (num of hits per employee) (log cent)	0.030**	(0.014)	0.031	0.028**	(0.014)	0.045			
3	Moderation effect of the digital score (1##2)	-0.001*	(0.001)	0.051						
4	Industry digital score	0.712	(0.470)	0.130	0.719	(0.471)	0.127	0.734**	(0.358)	0.041
5	Number of firm employees (log)	0.229	(0.201)	0.255	0.204	(0.197)	0.300	0.001**	(0.001)	0.014
6	Return on assets	-0.062	(0.056)	0.272	-0.061	(0.056)	0.277	-0.079*	(0.047)	0.093
7	Target country GDP per capita	-0.000	(0.000)	0.168	-0.000	(0.000)	0.192	-0.000	(0.000)	0.112
8	Target country ease of doing business score	0.003	(0.003)	0.320	0.003	(0.003)	0.290	0.002	(0.003)	0.527
9	Target country political estability score	-0.119***	(0.042)	0.005	-0.118***	(0.042)	0.005	-0.143***	(0.035)	0.000
10	Target country broadband connections per 100 habitants	0.007**	(0.003)	0.029	0.007**	(0.003)	0.033	0.007**	(0.003)	0.012
Observations		1,829								
Number of clients considered		321								
Robust standard errors in parentheses										

Source: Analysis of the database elaborated by the authors

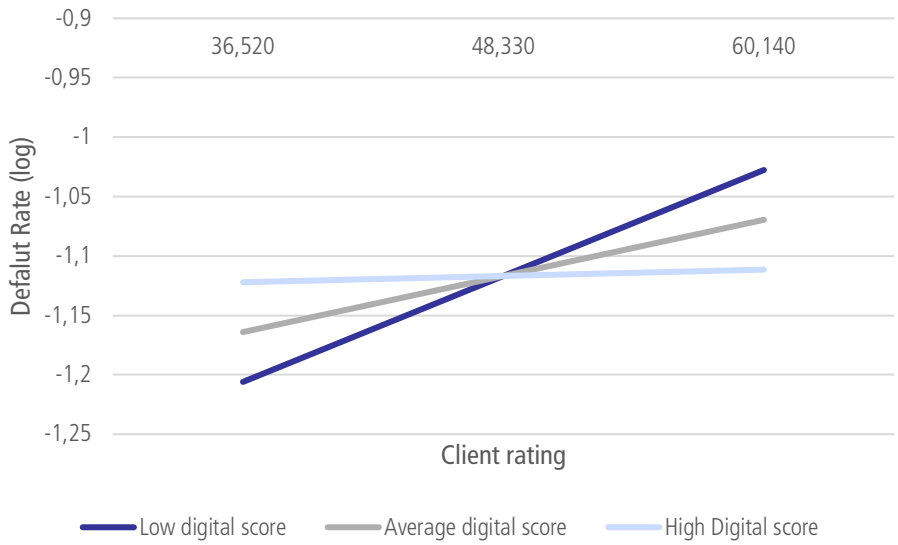
As expected (Bonfim, 2008; Pridotkienė et al., 2006), the risk assumed (measured by the rating of the clients in the previous year) has a positive effect on the final risk performance measured by the default rate: the lower the rating, the lower the default rate.

With these results, we verify this outcome for our ITC risk context. However, the strength of this relationship is relatively low, as risk outcomes can depend on other factors, both internal and external, that happen after the assumption of the risk (Al Khattab et al., 2007; Schwaab et al., 2017).

The firm's digital capabilities score moderate this effect, which reduces the final rate. The higher the digital capabilities of the firm, the easier it is for the firm to mitigate the risk assumed in the previous phase (Bubnova et al., 2018; Karduck et al., 2007; Raisinghani & Nugent, 2004). However, this effect is not too relevant, as other physical resources may have a greater impact on this relationship (Leontieva et al., 2019; Peter & Peter, 2006). For example, direct communication with debtors and legal skills are key resources to be utilised in avoiding credit defaults (Cutts & Merrill, 2008; Russell, 2005).

The moderation effect of the digital capabilities score is represented in Figure 3.6. As we did in the previous phase, we have constructed three scenarios, maintaining all control variables constant and modifying the moderating variable one standard deviation above and below the mean (High and Low in the graph). At low digital capabilities, the default rate decreases by 0.6 per cent with each rating increase, and at high digital capabilities, the relationship is almost flat.

Figure 3.6.
Moderating effect of digital score in the accommodation/mitigation phase



Source: Analysis of the database elaborated by the authors

This relationship holds for different firm characteristics, not confirming the potential effect of size in risk mitigation (it is worth mentioning that the firm's industry nature is almost significant, as the nature of the firm could impact the way this moderating effect plays).

Most countries' variables do not significantly impact this relationship. However, the country's political stability has a profound and significant impact. This is not surprising, as unexpected potential political risk events, out of the firm's control, can severely impact default rates (Balkan, 1992).

3.4.3 Summary of support and complementary analysis

In addition to the main models, we have developed a series of complementary analyses to enhance our understanding of the relationships and increase our confidence in the calculations performed.

Some of these analyses focused on measuring a firm's digital capabilities. As a first validation step, we have run several models using a composed industry digitalisation score (Mucha & Seppälä, 2021) or the intangible asset ratio (Erickson & Rothberg, 2019). We obtained similar but less solid and rich results. We also decided to use a more sophisticated scraping tool (utilising an agent) that examines the results on the actual company's webpages (Ashouri et al., 2024). Due to language and identification issues, we were unable to use this tool to develop a measure for a sufficiently large sample to conduct our analysis. However, for the reduced sample, the results obtained were similar in direction.

For the risk variables, we have run various models using alternative dependent variables. For example, we have tried using the recovery rate for each company; however, this information was not available for a large part of the sample (Grunert & Weber, 2009). Other variables we have tried to include are the amount-based variables of the default rate, which yielded inconsistent results due to differences in currency exchange rates.

For the country variables, we have run several models using all the variables available at the World Bank that the literature identifies as measuring country-level risk or digital development. We finally settled on the ones that were more often mentioned in the literature and that yielded the most consistent results (Chinn & Fairlie, 2010; Corcoran & Gillanders, 2015; Ferrari & Rolfini, 2006).

Finally, we have also developed a factorial analysis incorporating all available variables from the different databases, including risk, digital, and country information. Most of the results of this analysis and the factors were aligned with our theoretical model; however, specific aggregations of variables did not match the relationships explained in the literature, and the final alpha result for this analysis was low according to standards (Yong & Pearce, 2013).

3.5 Discussion and conclusions

In this article, we have examined the impact of digital capabilities on the international risk management process in its two primary stages: assessment/assumption and accommodation/mitigation.

In the first phase, we reflect that, in our ITC context, risk assumption is a function of the firm's previous experience with internationalisation, as managers' risk aversion is compensated with real experience (García-Canal & Guillén, 2008; Sato et al., 2020; Wüstermann, 2016). More importantly, we have found that a firm's digital capabilities moderate this relationship by impacting the information and knowledge resources that drive it. The higher the firm's digitalisation, the slower the increase in risk appetite with experience, likely due to better intelligence about the risks assumed.

In the second stage of the international risk management process, we also confirm the expected relationship between the risk assumed and the final risk performance of the firm's efforts in our setting. We have found that the digitalisation of the firm has a positive impact on moderating this relationship, helping to develop speed and agility resources to better manage the level of international risk it assumes.

Our work builds on previous literature on the impact of digitalisation on international performance. Prior research on this topic has examined this relationship, focusing on specific aspects of the firm, such as team and talent management. (Luu, 2024), on specific types of companies, such as SMEs (Caputo et al., 2022), or on specific digital concepts, such as Internet 4.0 (Neirotti et al., 2025). However, these studies have primarily examined international performance from a profitability/results perspective, leaving the variability of these results uncovered. It is reasonable to complement this view with a risk-adjusted definition of performance (Elango et al., 2013). Our study will be a first step toward an integrated and risk-based vision of the impact of digital technology on

performance, as it explores how digitalisation can reduce uncertainty in results through improved risk management.

From a theoretical perspective, previous research examining the intersection between internationalisation, risk management, and technology has been primarily based on the RBV perspective (Barney, 1996). On the technology-risk dimension, studies have examined how specific types of resources affect the firm's risk management (Damodaran, 2008; Mishra et al., 2019), highlighting the importance of IT in this process. On the technology-internationalisation dimension, the research has employed the RBV and OLI frameworks to examine the impact of technological resources on the internationalisation of firms (Coeurderoy & Murray, 2008; Jean et al., 2014). With this article, we complement these efforts by proposing a theoretical mechanism which explains how digitalisation can affect the operational international risk management process. In the first stage, we argue that digital capabilities enable firms to *"build"* information and knowledge resources based on their accumulated experience and then *"deploy"* them when assessing risk. In the second stage, we similarly argue that digital capabilities let firms *"build"* speed and flexibility resources and then *"deploy"* them when mitigating the risk assumed.

This research also contributes to previous approaches to international risk management (Eduardsen & Marinova, 2020; Miller, 1992). The literature has explored how firms manage risks from a strategic perspective, either looking at how they define their portfolio of countries (Kim, W. C. et al., 1993) or how they select their entry modes (Demirbag et al., 2010). Therefore, it makes sense to examine the processes that firms use once they have taken these strategic decisions and have to deal with risks on a day-to-day basis. Given the rapid advancement of technology, it will also be relevant to explore the role of digitalisation in improving those processes.

Finally, we also add to the previous literature on trade credit risk. Previous research on this topic has primarily focused on local environments where credit information is widely available (Seifert et al., 2013). Therefore, our study contributes by building an understanding of credit risk in a more uncertain international environment, where information is limited, and the support of digital technology can be critical.

Our results could have relevant implications for practitioners at international firms. The first implication is that the most critical stage for applying digital capabilities is assessment/assumption, building information and knowledge resources, and deploying them

in analysis and decision-making. The technologies relevant to this phase, such as big data and AI, are well-developed and continually improving. They can develop the firm's available intelligence resources, helping managers better calibrate the lowering risk perceptions that come with experience and avoid unstructured decision-making processes (Oetzel, J., 2005). The importance of digital capabilities in accommodating/mitigating the risks assumed by firms is less relevant (although still significant). This is most likely due to the importance of physical resources and the limitations of technology, particularly when there is considerable turmoil in a specific host country (Cutts & Merrill, 2008). Therefore, managers should be careful when relying on digital technology for their mitigation and recovery efforts.

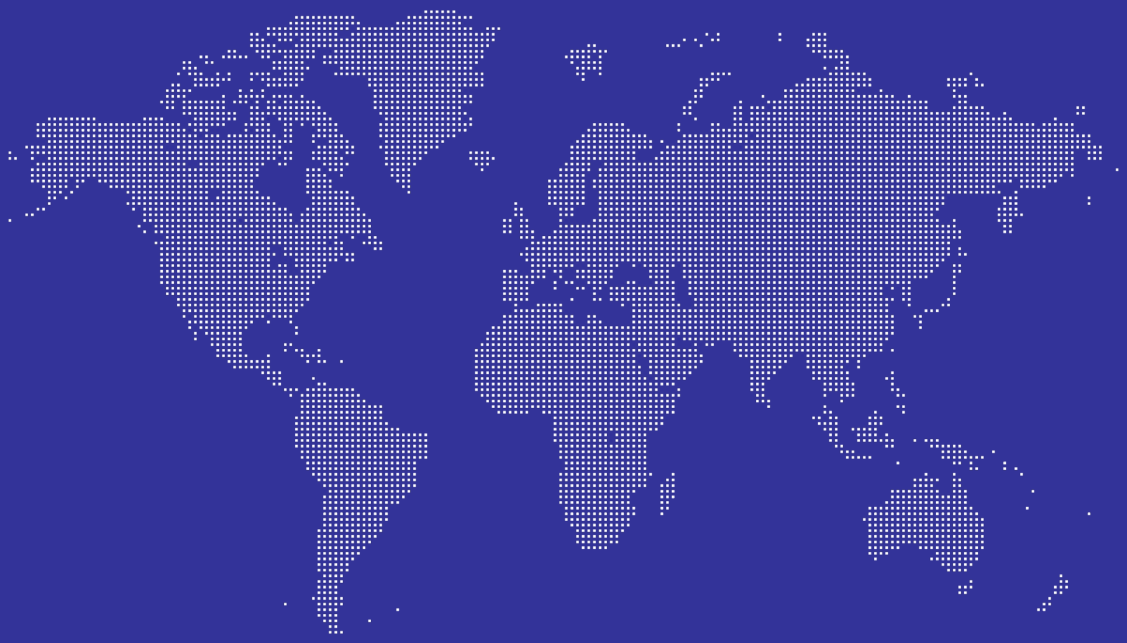
From the researchers' perspective, our approach opens up avenues for exploring new questions and mechanisms. The international risk management process is primarily a process based on human behaviour, specifically decisions made by managers. Therefore, new studies could try to explore these relations through the lens of the microfoundations approach. (Felin et al., 2015), exploring at the same time "social" (or firm) context and outcome with the individual context and actions. More specifically, they could investigate the conditions under which managers make these decisions in risky contexts based on models from previous literature. (Sitkin & Pablo, 1992). Building on this, it will also be an opportunity from the perspective of the Organisational Learning Theory (Basten & Haamann, 2018) to explore the feedback mechanism by which the outcome of our second stage (the final risk performance after mitigation efforts) builds the international experience that initiates it. In this sense, research could look further into how firms systematise this knowledge gained from experience and how digitalisation can help with this process. Finally, there is a relevant opportunity to explore the understanding of the impact of digitalisation on international performance by examining the concept of risk-adjusted performance (Elango et al., 2013). This can be achieved by studying not only how firms can utilise digital capabilities to achieve better international results, but also how they use them to manage the unavoidable risks effectively.

In addition to these theoretical approaches, due to certain limitations of our study, scholars may also develop other interesting research opportunities. First, our work focused on a single-entry mode (exporting) and a specific risk type (ITC risk). Consequently, future studies could concentrate on other meaningful contexts, such as the impact of digitalisation on political risk in an FDI setting. Second, we look at multinational firms of a specific size. Therefore, it may also be relevant to study this context in

smaller firms with fewer resources. Finally, our study examines real transaction data for a large number of firms, which limits the details available on the inner workings of the process and the relationships it entails. Furthermore, this sample is biased towards firms that are credit insurance customers, which makes them, by default, better credit risk managers. Future studies could investigate the relationship between digitalisation and international risk through in-depth surveys or qualitative methodologies in a more limited sample, thereby developing further implications for managers in different international settings and addressing these two limitations.

In today's business world, pursuing international growth is increasingly subject to challenges, from political events such as the war in Ukraine to rising trade barriers. However, firms can rely on the continuous development of digital technologies and their application in managing international risk to counter these trends. For example, in the future, intelligence-related technologies such as AI can help them better assess their clients' credit risk (Van Thiel & Van Raaij, 2019). To a lesser extent, other agility-related technologies, such as videoconferencing and blockchain, can also help address specific problems in managing international risk events, as seen during the pandemic (Guillén, 2020; Strange, 2020). With an appropriate combination of these resources, multinational firm managers can counter the new challenges in international trade, forging a new future for globalisation.

CONCLUSIONS



In this dissertation, we examined the role of digitalisation in a firm's international risk management efforts. We began with a general perspective on the intersection of digital technologies with internationalisation. From there, we focused on international risk and specifically examined the decision-making processes of managers in MNEs, as well as the impact of digitalisation on these processes. Finally, by building on these insights, we proposed a mechanism by which digitalisation affects the entire international risk management (IRM) process and tested it quantitatively in the context of International Trade Credit Risk. In the following paragraphs, we summarise the insights, contributions, and implications drawn from each of these chapters.

Chapter 1 Conclusions

The first chapter contributes to the literature of international business by exploring the interaction between digitalisation and the internationalisation of companies.

Its main contribution is the framework for Digital International Value Creation (DIVC). We propose three potential avenues for achieving this value creation, examining how international firms digitise, how digital firms internationalise, and how local firms internationalise through digitalisation.

The chapter proposes several areas where this value creation can be achieved, ranging from the more strategic to the more operational, and outlines a potential research agenda for future studies. Some of these opportunities arise by segmenting the field by type of firm or by focusing on specific strategic problems, such as strategic flexibility.

However, first and foremost, it highlights a research gap in the application of digitalisation to IRM, which it builds upon in subsequent chapters. More importantly, it discusses how researchers could address some of the opportunities uncovered. One example is the study of the potential application of technology to non-market strategies (Liedong et al., 2020). Another possible opportunity that we can add here, is the uncovering of the details underlying these value-creation processes. For example, following the approach of the Uppsala model, future studies can look at how DIVC could be achieved in different stages, with varying degrees of commitment by firms (Johanson & Vahlne, 1977).

The conclusions in this chapter have significant implications for today's practitioners in MNEs, as new adverse events, such as emerging armed conflicts and increasing trade barriers, exert pressure on their global value chains. Latest developments in technology could help them deal with these new pressures. New studies could focus on these gaps from a more "defensive" standpoint on how digital technologies can help circumvent these challenges (Karakaya & Yannopoulos, 2010).

Chapter 2 Conclusions

The second chapter examines the impact of digital technologies on IRM, starting from its foundation: decision-making in a risky context. The chapter builds on previously explored concepts of risk perception and propensity to apply them to the interaction of digitalisation and globalisation, and in the context of international risk and digital risk (Sitkin & Pablo, 1992).

Through a qualitative approach, the chapter examines the process by which the resources and context of the international firm influence the perception and propensity of MNE managers, and, consequently, their decisions. Digitalisation affects these processes by providing new resources, but also by creating new digital risks.

The chapter adds a dynamic aspect to previous literature as its findings support a feedback loop where both international and digital risk outcomes build the experience of executives, alter their perceptions and propensity, and, in turn, their decision-making. We argue that this process happens simultaneously for both global and digital risks.

The International Business research on risk is mainly focused on the strategic aspect of risk (Eduardsen & Marinova, 2020). Our conclusions shed light on the more behavioural aspects involved in the operational process of IRM, as internationalisation and digitalisation are both highly uncertain contexts where the behaviour of individuals is especially relevant (Ferri et al., 2021; Miller, 1992). Building on this, future research could draw on the literature on behavioural biases to explore these mechanisms in more depth. Following this line of enquiry, we may add that new studies could attempt to frame this problem through the theoretical lens of the Prospect Theory (Kahneman & Tversky, 2013).

Central to this reasoning is the concept of a risk event (Rogers, 1997). Today's environment presents a breadth of new international risk events, such as the Ukrainian War, and digital risk events, including AI disruption, making it more relevant than ever and impacting the behaviour and decisions of executives in MNEs.

For companies operating in this environment, our research is particularly relevant as they can leverage new technologies to avoid non-optimal perception-based decisions from their executives in their IRM efforts (Oetzel, J., 2005).

Chapter 3 Conclusions

The final chapter examines the operational IRM process and the role that digital technologies can play in it. Inspired by the previous article, this study begins by examining the impact of experience on risk decisions (particularly in risk assumption) and the role of digital capabilities in this relationship within the international trade credit insurance context. This is followed by the exploration of how these capabilities can be applied to mitigate the assumed risk.

In this chapter, we contribute to the theory by proposing a mechanism through which digital capabilities influence the resources typically involved in the IRM process. We argue that they can help both in building the resources and in deploying these resources.

Our analysis confirms that digital capabilities help firms optimise the risks they assume with higher experience and, to a lesser degree, mitigate the risks taken when adverse risk events occur.

Besides this, our research sheds some light on the discussion of the final effect of digitalisation on risk assumption. Some literature argues that technology can have a positive impact as it helps to assess risk better, but other literature warns about the virtuality trap (Yamin & Sinkovics, 2006). Our results based on the moderation effect of digital technology support the first argument.

For further research, a natural continuation of our study could be to explore the feedback mechanism between final risk outcomes and firm experience. In other words, studying how companies learn from their international risk decisions and their consequences, and the role digitalisation can play in this process. More interestingly, this can

be done using both the firm's perspective and the individual decision-maker's perspective, following the microfoundations approach (Felin et al., 2015).

Besides this, our work serves as a basis for more comprehensive research on the impact of digitalisation on international performance, examining the actions that firms can take to optimise performance from a risk-adjusted perspective rather than simply a results-based one.

Our quantitative analysis also provides valuable insights for practitioners in MNEs, as it demonstrates that technology can be highly relevant when determining the risk to be assumed, but has certain limitations in its application to risk mitigation. This can better guide IT investment decisions when considering IRM applications.

Overall conclusions

Taken as a whole, our dissertation contributes in the following ways:

- The thesis explores how digitalisation can help add value in the effort of MNEs to manage international risk.
- The main contribution of the thesis is the exploration of the more operational aspects of the IRM process and the mechanisms by which digital technologies impact the results of such a process.
- Another main conclusion that can be drawn from the dissertation is that digitalisation positively affects the resources available for the firm to carry out the operational part of IRM. Companies can leverage new technologies to deal with pressing challenges in the global environment.
- The thesis approaches this process from the firm perspective as well as from the individual perspective. We argue that this process occurs in the day-to-day decision-making of executives. Both firms' resources and executive experience have an impact on how firms approach IRM and how they use digitalisation in this context.
- Key to this process is the concept of risk events. When companies face unexpected events, they utilise technology to cope with them, while also developing

new systems and processes to mitigate future risk events. In this process, the executive's perception of risk is also altered.

- As the main conclusion, the accumulated international risk experience of the firm through risk events affects the availability of resources and alters the perceptions of managers. These perceptions influence their decisions, resulting in a certain level of risk exposure. This relationship is affected by the use of digitalisation, which helps build the resources mentioned above and systematise and rationalise managers' decisions, optimising the risk assumption process. Digitalisation also helps mitigate unexpected international risk events that could arise, thereby maximising the firm’s international risk performance.

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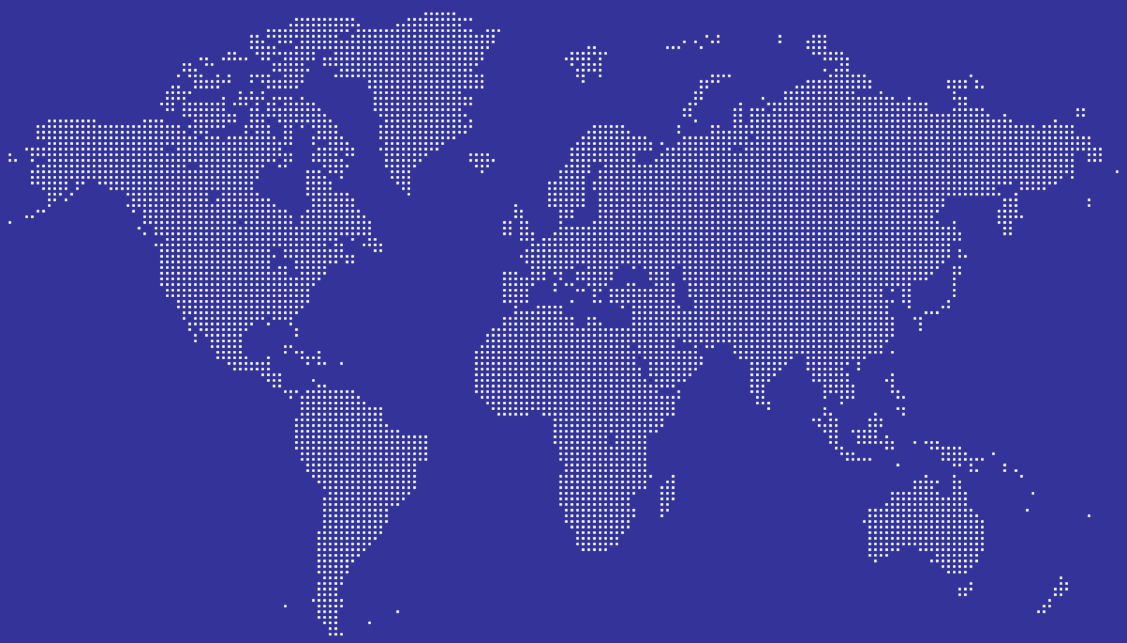

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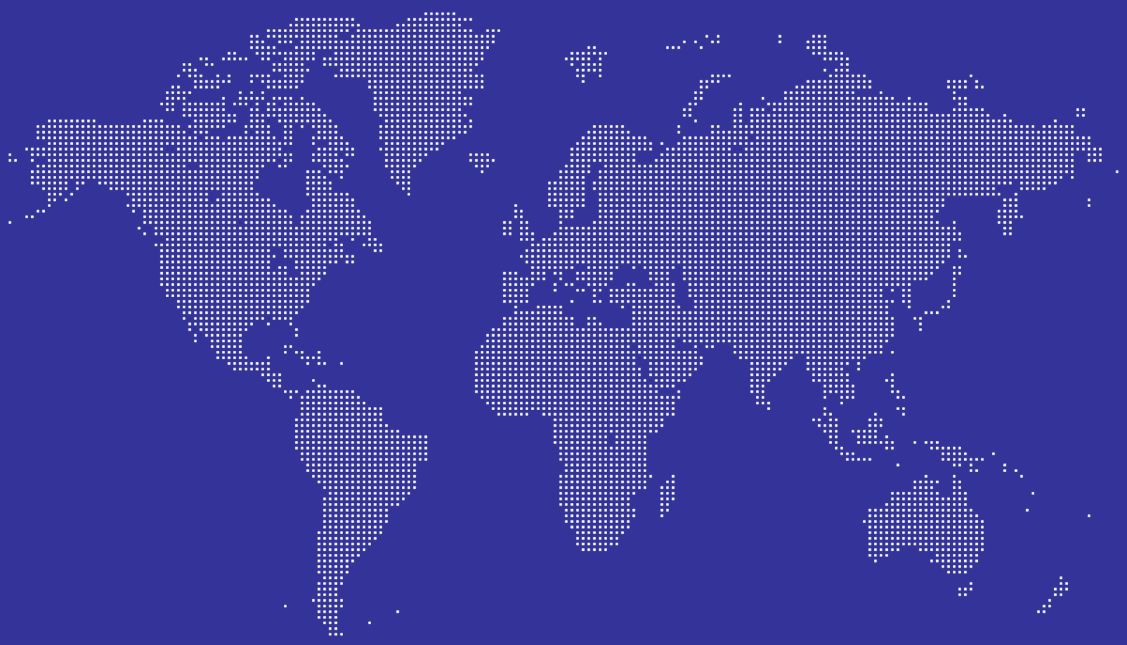
APPENDIXES



Appendix 1 (Chapter 1): Journals included in the literature search

NUM	JOURNAL	TYPE
1	ACADEMY OF MANAGEMENT ANNALS	Reputed Journal
2	ACADEMY OF MANAGEMENT JOURNAL	Reputed Journal
3	ACADEMY OF MANAGEMENT LEARNING & EDUCATION	WOS Q1 or Q2
4	ACADEMY OF MANAGEMENT PERSPECTIVES	WOS Q1 or Q2
5	ACADEMY OF MANAGEMENT REVIEW	Reputed Journal
6	ACCOUNTING ORGANIZATIONS AND SOCIETY	WOS Q1 or Q2
7	ASIA PACIFIC JOURNAL OF MANAGEMENT	WOS Q1 or Q2
8	BRITISH JOURNAL OF MANAGEMENT	WOS Q1 or Q2
9	BUSINESS ETHICS-A EUROPEAN REVIEW	WOS Q1 or Q2
10	BUSINESS HORIZONS	WOS Q1 or Q2
11	BUSINESS STRATEGY AND THE ENVIRONMENT	WOS Q1 or Q2
12	CORPORATE GOVERNANCE-AN INTERNATIONAL REVIEW	WOS Q1 or Q2
13	CREATIVITY AND INNOVATION MANAGEMENT	Reputed Journal
14	DECISION SCIENCES	Reputed Journal
15	ELECTRONIC COMMERCE RESEARCH AND APPLICATIONS	WOS Q1 or Q2
16	ENTREPRENEURSHIP AND REGIONAL DEVELOPMENT	Reputed Journal
17	ENTREPRENEURSHIP: THEORY AND PRACTICE	Reputed Journal
18	EUROPEAN JOURNAL OF INTERNATIONAL MANAGEMENT	Reputed Journal
19	EUROPEAN MANAGEMENT JOURNAL	WOS Q1 or Q2
20	GENDER WORK AND ORGANIZATION	WOS Q1 or Q2
21	GLOBAL STRATEGY JOURNAL	WOS Q1 or Q2
22	HARVARD BUSINESS REVIEW	WOS Q1 or Q2
23	INDUSTRIAL MANAGEMENT AND DATA SYSTEMS	Reputed Journal
24	INDUSTRIAL MARKETING MANAGEMENT	WOS Q1 or Q2
25	INDUSTRY AND INNOVATION	WOS Q1 or Q2
26	INFORMATION & MANAGEMENT	WOS Q1 or Q2
27	INFORMATION AND ORGANIZATION	WOS Q1 or Q2
28	INFORMATION SYSTEMS RESEARCH	WOS Q1 or Q2
29	INTERNATIONAL BUSINESS REVIEW	WOS Q1 or Q2
30	INTERNATIONAL ENTREPRENEURSHIP AND MANAGEMENT JOURNAL	WOS Q1 or Q2
31	INTERNATIONAL JOURNAL OF ACCOUNTING INFORMATION SYSTEMS	WOS Q1 or Q2
32	INTERNATIONAL JOURNAL OF CONTEMPORARY HOSPITALITY MANAGEMENT	WOS Q1 or Q2
33	INTERNATIONAL JOURNAL OF ELECTRONIC COMMERCE	WOS Q1 or Q2
34	INTERNATIONAL JOURNAL OF ENTREPRENEURIAL BEHAVIOR & RESEARCH	WOS Q1 or Q2
35	INTERNATIONAL JOURNAL OF FORECASTING	WOS Q1 or Q2
36	INTERNATIONAL JOURNAL OF HUMAN RESOURCE MANAGEMENT	WOS Q1 or Q2

NUM	JOURNAL	TYPE
37	INTERNATIONAL JOURNAL OF MANAGEMENT REVIEWS	Reputed Journal
38	INTERNATIONAL JOURNAL OF OPERATIONS & PRODUCTION MANAGEMENT	WOS Q1 or Q2
39	INTERNATIONAL JOURNAL OF PROJECT MANAGEMENT	Reputed Journal
40	INTERNATIONAL JOURNAL OF RETAIL & DISTRIBUTION MANAGEMENT	WOS Q1 or Q2
41	INTERNATIONAL MARKETING REVIEW	WOS Q1 or Q2
42	INTERNATIONAL SMALL BUSINESS JOURNAL-RESEARCHING ENTREPRENEURSHIP	WOS Q1 or Q2
43	INTERNET RESEARCH	WOS Q1 or Q2
44	JOURNAL OF ADVERTISING	WOS Q1 or Q2
45	JOURNAL OF BUSINESS ETHICS	WOS Q1 or Q2
46	JOURNAL OF BUSINESS RESEARCH	WOS Q1 or Q2
47	JOURNAL OF BUSINESS VENTURING	WOS Q1 or Q2
48	JOURNAL OF CONSUMER RESEARCH	Reputed Journal
49	JOURNAL OF DESTINATION MARKETING & MANAGEMENT	WOS Q1 or Q2
50	JOURNAL OF ECONOMICS AND MANAGEMENT STRATEGY	Reputed Journal
51	JOURNAL OF ENVIRONMENTAL ECONOMICS AND MANAGEMENT	WOS Q1 or Q2
52	JOURNAL OF FAMILY BUSINESS STRATEGY	Reputed Journal
53	JOURNAL OF FINANCIAL ECONOMICS	WOS Q1 or Q2
54	JOURNAL OF HOSPITALITY AND TOURISM MANAGEMENT	WOS Q1 or Q2
55	JOURNAL OF HUMAN RESOURCES	Reputed Journal
56	JOURNAL OF INFORMATION TECHNOLOGY	WOS Q1 or Q2
57	JOURNAL OF INTELLECTUAL CAPITAL	WOS Q1 or Q2
58	JOURNAL OF INTERACTIVE MARKETING	Reputed Journal
59	JOURNAL OF INTERNATIONAL BUSINESS STUDIES	WOS Q1 or Q2
60	JOURNAL OF INTERNATIONAL MANAGEMENT	WOS Q1 or Q2
61	JOURNAL OF INTERNATIONAL MARKETING	WOS Q1 or Q2
62	JOURNAL OF KNOWLEDGE MANAGEMENT	WOS Q1 or Q2
63	JOURNAL OF MANAGEMENT	WOS Q1 or Q2
64	JOURNAL OF MANAGEMENT INFORMATION SYSTEMS	WOS Q1 or Q2
65	JOURNAL OF MANAGEMENT INQUIRY	Reputed Journal
66	JOURNAL OF MANAGEMENT STUDIES	WOS Q1 or Q2
67	JOURNAL OF MANUFACTURING TECHNOLOGY MANAGEMENT	WOS Q1 or Q2
68	JOURNAL OF MARKETING	Reputed Journal
69	JOURNAL OF MARKETING RESEARCH	Reputed Journal
70	JOURNAL OF NURSING MANAGEMENT	WOS Q1 or Q2
71	JOURNAL OF OPERATIONS MANAGEMENT	WOS Q1 or Q2
72	JOURNAL OF PRODUCT INNOVATION MANAGEMENT	WOS Q1 or Q2
73	JOURNAL OF PURCHASING AND SUPPLY MANAGEMENT	WOS Q1 or Q2
74	JOURNAL OF QUALITY TECHNOLOGY	Reputed Journal
75	JOURNAL OF SERVICE MANAGEMENT	Reputed Journal

NUM	JOURNAL	TYPE
76	JOURNAL OF SERVICES MARKETING	WOS Q1 or Q2
77	JOURNAL OF SMALL BUSINESS MANAGEMENT	WOS Q1 or Q2
78	JOURNAL OF STRATEGIC INFORMATION SYSTEMS	WOS Q1 or Q2
79	JOURNAL OF SUPPLY CHAIN MANAGEMENT	Reputed Journal
80	JOURNAL OF WORLD BUSINESS	WOS Q1 or Q2
81	KNOWLEDGE-BASED SYSTEMS	Reputed Journal
82	LONG RANGE PLANNING	WOS Q1 or Q2
83	MANAGEMENT INTERNATIONAL REVIEW	WOS Q1 or Q2
84	MANAGEMENT SCIENCE	WOS Q1 or Q2
85	MARKETING SCIENCE	Reputed Journal
86	MIS QUARTERLY	WOS Q1 or Q2
87	MIT SLOAN MANAGEMENT REVIEW	Reputed Journal
88	MULTINATIONAL BUSINESS REVIEW	Reputed Journal
89	OMEGA-INTERNATIONAL JOURNAL OF MANAGEMENT SCIENCE	WOS Q1 or Q2
90	OPERATIONS RESEARCH	WOS Q1 or Q2
91	ORGANIZATION	Reputed Journal
92	ORGANIZATION SCIENCE	Reputed Journal
93	R & D MANAGEMENT	WOS Q1 or Q2
94	RESEARCH POLICY	WOS Q1 or Q2
95	SERVICE BUSINESS	WOS Q1 or Q2
96	SMALL BUSINESS ECONOMICS	WOS Q1 or Q2
97	STRATEGIC ENTREPRENEURSHIP JOURNAL	WOS Q1 or Q2
98	STRATEGIC MANAGEMENT JOURNAL	WOS Q1 or Q2
99	STRATEGIC ORGANIZATION	Reputed Journal
100	TECHNOLOGICAL FORECASTING AND SOCIAL CHANGE	WOS Q1 or Q2
101	TECHNOVATION	WOS Q1 or Q2
102	TOURISM MANAGEMENT	WOS Q1 or Q2

Appendix 2 (Chapter 1): Articles included in the literature review

N.	AUTOR/S	YEAR	TITLE	JOURNAL	CONTRIBUTION TO OUR RESEARCH
1	Adamovic, Mladen	2018	An employee-focused human resource management perspective for the management of global virtual teams	INTERNATIONAL JOURNAL OF HUMAN RESOURCE MANAGEMENT	Problems related on the management of technology based virtual global teams
2	Ammirato, Salvatore; Sofo, Francesco; Felicetti, Alberto Michele; Helander, Nina; Aramo-Immonen, Heli	2020	A new typology to characterize Italian digital entrepreneurs	INTERNATIONAL JOURNAL OF ENTREPRE-NEURIAL BEHAVIOR & RESEARCH	Classification of digital new ventures and their international growth
3	Andersen, PH	2005	Export intermediation and the internet: an activity-unbundling approach	INTERNATIONAL MARKETING REVIEW	Alternatives for internet enabled export intermediation
4	Andersson, Martin; Xiao, Jing	2016	Acquisitions of start-ups by incumbent businesses A market selection process of "high-quality" entrants?	RESEARCH POLICY	Technology building through Mergers and Acquisitions
5	Ashton, David; Brown, Phillip; Lauder, Hugh	2010	Skill webs and international human resource management: lessons from a study of the global skill strategies of transnational companies	INTERNATIONAL JOURNAL OF HUMAN RESOURCE MANAGEMENT	Use of webs to manage the global skill resources of an MNE
6	Autio, Erkko	2017	Strategic Entrepreneurial Internationalization: A Normative Framework	STRATEGIC ENTREPRENEURSHIP JOURNAL	What advantages new ventures can use in their internationalisation
7	Banalieva, Elitsa R.; Dhanaraj, Charles	2019	Internalization theory for the digital economy	JOURNAL OF INTERNATIONAL BUSINESS STUDIES	Theoretical framework to study the internationalisation process off digital platforms based on OLI framework and networks
8	Banker, Rajiv D.; Mitra, Sabyasachi	2007	Procurement models in the agricultural supply chain: A case study of online coffee auctions in India	ELECTRONIC COMMERCE RESEARCH AND APPLICATIONS	A sample study of how internet enables globalization for micro-providers
9	Barrett, M; Cooper, DJ; Jamal, K	2005	Globalization and the coordinating of work in multinational audits	ACCOUNTING ORGANIZATIONS AND SOCIETY	Global auditing helped by technology in MNEs
10	Benmamoun, Mamoun; Alhor, Hadi; Ascencio, Christine; Sim, Woojong	2020	Social enterprises in electronic markets: web localization or standardization	ELECTRONIC MARKETS	Use of electronic media by Non Government Organizations. Localization of content
11	Benmamoun, Mamoun; Singh, Nitish; Lehnert, Kevin; Lee, Sang Bong	2019	Internationalization of e-commerce corporations (ECCs) Advanced vs emerging markets ECCs	MULTINATIONAL BUSINESS REVIEW	Factors influencing digital corporations form emerging markets when going international
12	Berthon, Pierre; Pitt, Leyland; Berthon, Jean-Paul; Campbell, Colin; Thwaites, Des	2008	E-Relationships for e-Readiness: Culture and corruption in international e-B2B	INDUSTRIAL MARKETING MANAGEMENT	Effects of culture and corruption impact in B2B e-business relationships
13	Bouncken, Ricarda; Barwinski, Roman	2021	Shared digital identity and rich knowledge ties in global 3D printing-A drizzle in the clouds?	GLOBAL STRATEGY JOURNAL	A sample of a technology (3-D printing) that bring knowledge leakage risks

N.	AUTOR/S	YEAR	TITLE	JOURNAL	CONTRIBUTION TO OUR RESEARCH
14	Brouthers, Keith D.; Geisser, Kim Dung; Rothlauf, Franz	2016	Explaining the internationalization of ibusiness firms	JOURNAL OF INTERNATIONAL BUSINESS STUDIES	The process of internationalisation of digital platforms (ibusiness firms)
15	Bruton, Garry D.; Lau, Chung-Ming; Obloj, Krzysztof	2014	Institutions, resources and firm strategies: a comparative analysis of entrepreneurial firms in three transitional economies	EUROPEAN JOURNAL OF INTERNATIONAL MANAGEMENT	Impact of institutions in technology based new ventures strategies and internationalisation
16	Cahen, Fernanda; Borini, Felipe Mendes	2020	International Digital Competence	JOURNAL OF INTERNATIONAL MANAGEMENT	Capabilities that enable an internationalisation process in digital firms
17	Cano-Kollmann, Marcelo; Hannigan, T. J.; Mudambi, Ram	2018	Global Innovation Networks - Organizations and People	JOURNAL OF INTERNATIONAL MANAGEMENT	The role of digital technologies in innovation through global networks
18	Carayannis, EG; Popescu, D	2005	Profiling a methodology for economic growth and convergence: learning from the EU e-procurement experience for central and eastern European countries	TECHNOVATION	Institutional efforts to promote SME internationalisation through new technologies
19	Cassetta, Ernesto; Monarca, Umberto; Dileo, Ivano; Di Berardino, Claudio; Pini, Marco	2019	The relationship between digital technologies and internationalisation. Evidence from Italian SMEs	INDUSTRY AND INNOVATION	internationalisation of SME enabled by e-business and impact on the organization
20	Chen, Chun-Liang	2020	Cross-disciplinary innovations by Taiwanese manufacturing SMEs in the context of Industry 4.0	JOURNAL OF MANUFACTURING TECHNOLOGY MANAGEMENT	Industry 4.0 impact in innovation in manufacturing SMEs
21	Coeurderoy, Regis; Cowling, Marc; Licht, Georg; Murray, Gordon	2012	Young firm internationalization and survival: Empirical tests on a panel of 'adolescent' new technology-based firms in Germany and the UK	INTERNATIONAL SMALL BUSINESS JOURNAL-RESEARCHING ENTREPRENEURSHIP	internationalisation and survival in technology new ventures
22	Coeurderoy, Rgis; Murray, Gordon	2008	Regulatory environments and the location decision: evidence from the early foreign market entries of new-technology-based firms	JOURNAL OF INTERNATIONAL BUSINESS STUDIES	Technology firms country choice decisions based on intellectual capital protection
23	Colombo, Massimo G.; Grilli, Luca; Murtinu, Samuele; Piscitello, Lucia; Piva, Evila	2009	EFFECTS OF INTERNATIONAL R&D ALLIANCES ON PERFORMANCE OF HIGH-TECH START-UPS: A LONGITUDINAL ANALYSIS	STRATEGIC ENTREPRENEURSHIP JOURNAL	Impact of types of R&D alliances in New Technology Ventures performance
24	Coviello, Nicole; Kano, Liena; Liesch, Peter W.	2017	Adapting the Uppsala model to a modern world: Macro-context and microfoundations	JOURNAL OF INTERNATIONAL BUSINESS STUDIES	Review of the Uppsala internationalisation model in the new digital era
25	Del Giudice, M.; Scuotto, V.; Garcia-Perez, A.; Petruzzelli, A. Messeni	2019	Shifting Wealth II in Chinese economy. The effect of the horizontal technology spillover for SMEs for international growth	TECHNOLOGICAL FORECASTING AND SOCIAL CHANGE	Impact of digital technology diffusion in emerging market SME internationalisation performance
26	Dunn, D; Yamashita, K	2003	Microcapitalism and the megacorporation	HARVARD BUSINESS REVIEW	Access to untapped customers and partners by an MNE using digital technology

N.	AUTOR/S	YEAR	TITLE	JOURNAL	CONTRIBUTION TO OUR RESEARCH
27	Efrat, Kalanit; Shoham, Aviv	2011	Environmental characteristics and technological capabilities' interaction in high-technology born global firms	EUROPEAN JOURNAL OF INTERNATIONAL MANAGEMENT	Role of target market environment in Born-globals
28	Egan, ML; Bendick, M; Miller, JJ	2002	US firms' evaluation of employee credentials in international business	INTERNATIONAL JOURNAL OF HUMAN RESOURCE MANAGEMENT	International professionals and the use of technology
29	Eid, Riyad; Elbeltagi, Ibrahim; Zairi, Mohamed	2006	Making business-to-business international Internet marketing effective: A study of critical factors using a case-study approach	JOURNAL OF INTERNATIONAL MARKETING	Success factors in international Internet Marketing for B2B enterprises
30	Foltean, Florin Sabin	2019	Bridging marketing theory - practice gap to enhance firm performance: Introduction to the special issue	JOURNAL OF BUSINESS RESEARCH	Impact of technology in international marketing and firm performance
31	Forsans, Nicolas; Balasubramanyam, V. N.	2010	Acquisitions versus licensing agreements as vehicles for technology transfer	EUROPEAN JOURNAL OF INTERNATIONAL MANAGEMENT	M&A vs. licensing strategies as a knowledge acquiring mechanism
32	Garavan, Thomas N.; O'Brien, Fergal	2013	The use of Manager Self-Service (MSS) HR portals in MNCs: the influence of attitudinal, normative, behavioural and national cultural factors	EUROPEAN JOURNAL OF INTERNATIONAL MANAGEMENT	Portals as a HR management tool in MNEs, and he influence of the environment
33	Gassmann, O; von Zedtwitz, M	2003	Trends and determinants of managing virtual R&D teams	R & D MANAGEMENT	Virtual technology based team organization for R&D projects
34	Gong, Jing; Hong, Yili; Zentner, Alejandro	2018	Role of Monetary Incentives in the Digital and Physical Inter-Border Labor Flows	JOURNAL OF MANAGEMENT INFORMATION SYSTEMS	Platform use for talent outsourcing and technologies as a tool for micro-providers
35	Gopal, RD; Sanders, GL	1998	International software piracy: Analysis of key issues and impacts	INFORMATION SYSTEMS RESEARCH	Intellectual-Protection problems in an international setting. The role of government protection and local alliances
36	Granstrand, O	1998	Towards a theory of the technology-based firm	RESEARCH POLICY	Theoretical approach to new technologies diversification and business growth including internationalisation
37	Gronroos, Christian	2016	Internationalization strategies for services: a retrospective	JOURNAL OF SERVICES MARKETING	Impact of digitalization in the different modes internationalisation of service companies
38	Hagsten, Eva; Kotnik, Patricia	2017	ICT as facilitator of internationalisation in small- and medium-sized firms	SMALL BUSINESS ECONOMICS	Technology enabled internationalisation of SMEs and impact on export intensity
39	Hannibal, Martin; Knight, Gary	2018	Additive manufacturing and the global factory: Disruptive technologies and the location of international business	INTERNATIONAL BUSINESS REVIEW	Disruption in the value chain due to 3-d printing and localization of production
40	Hennart, Jean-Francois	2019	Digitalized service multinationals and international business theory	JOURNAL OF INTERNATIONAL BUSINESS STUDIES	Theoretical counterpoint to other articles addressing the need to update OLI with the advent of digital service multinationals

N.	AUTOR/S	YEAR	TITLE	JOURNAL	CONTRIBUTION TO OUR RESEARCH
41	Ho, DCK; Au, KF; Newton, E	2003	The process and consequences of supply chain virtualization	INDUSTRIAL MANAGEMENT & DATA SYSTEMS	Impact of the virtualization of the supply chain in the buyer seller relationship and SME internationalisation
42	Hughes, Mathew; Martin, Silvia L.; Morgan, Robert E.; Robson, Matthew J.	2010	Realizing Product-Market Advantage in High-Technology International New Ventures: The Mediating Role of Ambidextrous Innovation	JOURNAL OF INTERNATIONAL MARKETING	Innovation in new technology ventures. Marketing differentiation and cost advantages
43	Jean, Ruey Jer Bryan	2014	What makes export manufacturers pursue functional upgrading in an emerging market? A study of Chinese technology new ventures	INTERNATIONAL BUSINESS REVIEW	Upgrading in New Technology Ventures exporting
44	Jean, Ruey-Jer Bryan; Kim, Daekwan; Cavusgil, Erin	2020	Antecedents and outcomes of digital platform risk for international new ventures' internationalization	JOURNAL OF WORLD BUSINESS	Risk of internationalisation through platforms for International New Ventures. Main drivers
45	Jean, Ruey-Jer Bryan; Sinkovics, Rudolf R.; Kim, Daekwan	2014	The impact of technological, organizational and environmental characteristics on electronic collaboration and relationship performance in international customer-supplier relationships	INFORMATION & MANAGEMENT	E-collaboration impact in partner and suppliers relationships
46	Jean, Ruey-Jer Bryan; Tan, Danchi	2019	The Effect of Institutional Capabilities on E-Business Firms' International Performance	MANAGEMENT INTERNATIONAL REVIEW	Institutional environment effect in e-business strategies and their performance
47	Kanter, Rosabeth Moss	2008	Transforming giants	HARVARD BUSINESS REVIEW	Technology impact on MNEs agility and their impact in host countries
48	Katsikeas, Constantine; Leonidou, Leonidas; Zeriti, Athina	2020	Revisiting international marketing strategy in a digital era Opportunities, challenges, and research directions	INTERNATIONAL MARKETING REVIEW	Impact of digital technology in market selection and entry
49	Khanagha, Saeed; Zadeh, Mohammad Taghi Ramezan; Mihalache, Oli R.; Volberda, Henk W.	2018	Embracing Bewilderment: Responding to Technological Disruption in Heterogeneous Market Environments	JOURNAL OF MANAGEMENT STUDIES	Impact of disruptive technologies in diverse environments and incumbent MNE reaction
50	Kim, Daekwan; Jean, Ruey-Jer Bryan; Sinkovics, Rudolf R.	2018	Drivers of Virtual Interfirm Integration and Its Impact on Performance in International Customer-Supplier Relationships	MANAGEMENT INTERNATIONAL REVIEW	Alternative integration and governance of firms relationships leveraging in new technologies. Impact of environmental factors
51	Kromidha, Endrit; Robson, Paul J. A.	2020	The role of digital presence and investment network signals on the internationalisation of small firms	INTERNATIONAL SMALL BUSINESS JOURNAL-RESEARCHING ENTREPRENEURSHIP	Social media and investments as drivers of SME internationalisation
52	Lal, K	2002	E-business and manufacturing sector: a study of small and medium-sized enterprises in India	RESEARCH POLICY	Role of ebusiness in emerging market SME internationalisation. Impact of technology infrastructure

N.	AUTOR/S	YEAR	TITLE	JOURNAL	CONTRIBUTION TO OUR RESEARCH
53	Leek, S; Turnbull, PW; Naude, P	2003	How is information technology affecting business relationships? Results from a UK survey	INDUSTRIAL MARKETING MANAGEMENT	Impact of e-commerce in B2B. Difference between buyers and sellers
54	Lehdonvirta, Vili; Kassi, Otto; Hjorth, Isis; Barnard, Helena; Graham, Mark	2019	The Global Platform Economy: A New Offshoring Institution Enabling Emerging-Economy Microproviders	JOURNAL OF MANAGEMENT	Micro-providers access to the global economy through platforms. Role of signalling
55	Levina, Olga; Vilnai-Yavetz, Iris	2015	E-visibility maturity model: A tool for assessment and comparison of individual firms and sets of firms in e-business	ELECTRONIC COMMERCE RESEARCH AND APPLICATIONS	Visibility in the internet in globalized firms. Model for assessment
56	Li, Jiatao; Chen, Liang; Yi, Jingtao; Mao, Jiye; Liao, Jianwen	2019	Ecosystem-specific advantages in international digital commerce	JOURNAL OF INTERNATIONAL BUSINESS STUDIES	Competitive advantage of networks (ecosystems) centred in digital platforms in international commerce
57	Li, Wei	2010	Virtual knowledge sharing in a cross-cultural context	JOURNAL OF KNOWLEDGE MANAGEMENT	Factors that impact virtual knowledge sharing. Cultural environment impact
58	Loane, Sharon; Bell, Jim; McNaughton, Rod	2006	Employing information communication technologies to enhance qualitative international marketing enquiry	INTERNATIONAL MARKETING REVIEW	The use of ICT in international marketing research.
59	Lofsten, H; Lindelof, P	2003	Determinants for an entrepreneurial milieu: Science Parks and business policy in growing firms	TECHNOVATION	Institutional promotion of internationalisation of New Technology Based Firms. Characteristics and impact on performance
60	Macchion, Laura; Moretto, Antonella Maria; Caniato, Federico; Caridi, Maria; Danese, Pamela; Vinelli, Andrea	2017	International e-commerce for fashion products: what is the relationship with performance?	INTERNATIONAL JOURNAL OF RETAIL & DISTRIBUTION MANAGEMENT	Impact of e-commerce in international firm performance and importance of brand awareness
61	Mariussen, Anastasia; Ndlovu, Tabani	2012	Internet-enabled value co-creation in SME internationalisation: current practices from the UK food and drink industry	EUROPEAN JOURNAL OF INTERNATIONAL MANAGEMENT	Impact of technology in co-creation with customers in SMEs internationalisation
62	McDougall, PP; Oviatt, BM	1996	New venture internationalization, strategic change, and performance: A follow-up study	JOURNAL OF BUSINESS VENTURING	Strategic and performance differences between International New Ventures and local ones
63	Monaghan, Sinead; Tippmann, Esther; Coviello, Nicole	2020	Born digitals: Thoughts on their internationalization and a research agenda	JOURNAL OF INTERNATIONAL BUSINESS STUDIES	Impact of different technologies advantages in the internationalisation process of born-global firms
64	Morgan, LO; Nie, W; Young, ST	2004	Operational factors as determinants of expatriate and repatriate success	INTERNATIONAL JOURNAL OF OPERATIONS & PRODUCTION MANAGEMENT	International talent management influenced by technology adoption
65	Morgan-Thomas, A; Bridgewater, S	2004	Internet and exporting: determinants of success in virtual export channels	INTERNATIONAL MARKETING REVIEW	Drivers that impact success in the commercialization through

N.	AUTOR/S	YEAR	TITLE	JOURNAL	CONTRIBUTION TO OUR RESEARCH
					virtual channels. Importance of technology management
66	Morgan-Thomas, Anna	2009	Online activities and export performance of the smaller firm: a capability perspective	EUROPEAN JOURNAL OF INTERNATIONAL MANAGEMENT	Impact of online in SME export activities. Capabilities and importance of offline exporting
67	Murphy, Jamie; Scharl, Arno	2007	An investigation of global versus local online branding	INTERNATIONAL MARKETING REVIEW	Importance of online branding. Impact of the cultural environment
68	Nambisan, Satish; Zahra, Shaker A.; Luo, Yadong	2019	Global platforms and ecosystems: Implications for international business theories	JOURNAL OF INTERNATIONAL BUSINESS STUDIES	Impact on international business theory of the existence of digital platforms. Application in knowledge, relationship and value creation
69	Ojala, Arto; Evers, Natasha; Rialp, Alex	2018	Extending the international new venture phenomenon to digital platform providers: A longitudinal case study	JOURNAL OF WORLD BUSINESS	Digital platforms internationalisation process
70	Oyna, Stine; Almor, Tamar; Elango, B.; Tarba, Shlomo Y.	2018	Maturing born globals and their acquisitive behaviour	INTERNATIONAL BUSINESS REVIEW	Technology building of Born-globals through Mergers and Acquisitions
71	Park, S; Bae, ZT	2004	New venture strategies in a developing country: Identifying a typology and examining growth patterns through case studies	JOURNAL OF BUSINESS VENTURING	Technology strategy impact in the internationalisation of new businesses. Environment characteristics and competition
72	Pauleen, DJ; Yoong, P	2001	Relationship building and the use of ICT in boundary-crossing virtual teams: a facilitator's perspective	JOURNAL OF INFORMATION TECHNOLOGY	Impact of distance variables (including cultural) in virtual team relations
73	Pezderka, Noemi; Sinkovics, Rudolf R.	2011	A conceptualization of e-risk perceptions and implications for small firm active online internationalization	INTERNATIONAL BUSINESS REVIEW	e-risk framework for International Business. Application for SMEs
74	Piscitello, L; Sgobbi, F	2004	Globalisation, E-business and SMEs: Evidence from the Italian District of Prato	SMALL BUSINESS ECONOMICS	Manufacturing SMES internationalisation and the impact of e-business in an Industrial Cluster
75	Pittaway, L; Robertson, M; Munir, K; Denyer, D; Neely, A	2004	Networking and innovation: a systematic review of the evidence	INTERNATIONAL JOURNAL OF MANAGEMENT REVIEWS	Literature review on Innovation networks allowed by technology
76	Prahalad, CK; Hammond, A	2002	Serving the world's poor, profitably	HARVARD BUSINESS REVIEW	Use of technology to access poor segments on host countries
77	Ray, Sangeeta; Ray, Pradeep Kanta	2011	Product innovation for the people's car in an emerging economy	TECHNOVATION	Collaboration for suppliers in innovation and technology. Implications for MNEs
78	Raymond, Louis; Bergeron, Francois; Croteau, Anne-Marie; St-Pierre, Josee	2015	Developing Absorptive Capacity through e-Business: The Case of International SMEs	JOURNAL OF SMALL BUSINESS MANAGEMENT	Agility and information assimilation of SMEs through e-business adoption. Impact on internationalisation performance
79	Reuber, A. Rebecca; Fischer, Eileen	2011	International entrepreneurship in internet-enabled markets	JOURNAL OF BUSINESS VENTURING	Literature review on the impact of the internet in new ventures internationalisation. Brand,

N.	AUTOR/S	YEAR	TITLE	JOURNAL	CONTRIBUTION TO OUR RESEARCH
					reputation and capabilities as resources.
80	Shaheer, Noman Ahmed; Li, Sali	2020	The CAGE around cyberspace? How digital innovations internationalize in a virtual world	JOURNAL OF BUSINESS VENTURING	Impact of CAGE distance in internationalisation speed of new digital innovations
81	Sheth, Jagdish N.	2020	Borderless Media: Rethinking International Marketing	JOURNAL OF INTERNATIONAL MARKETING	The use of social media in marketing dimensions
82	Sigfusson, Thor; Chetty, Sylvie	2013	Building international entrepreneurial virtual networks in cyberspace	JOURNAL OF WORLD BUSINESS	Usage of social networks by international digital entrepreneurs
83	Singh, N; Kundu, S	2002	Explaining the growth of e-commerce corporations (ECCs): An extension and application of the eclectic paradigm	JOURNAL OF INTERNATIONAL BUSINESS STUDIES	Theoretical framework for studying digital platforms internationalisation based on the eclectic paradigm
84	Sinkovics, Rudolf R.; Sinkovics, Noemi	2020	The Internet and international marketing - from trigger TECHNOLOGY to platforms and new markets	INTERNATIONAL MARKETING REVIEW	Internet contribution to marketing. Impact of latest technological trends
85	Strange, Roger; Zucchella, Antonella	2017	Industry 4.0, global value chains and international business	MULTINATIONAL BUSINESS REVIEW	Impact of new digital technologies (including most recent ones) in manufacturing and global value chains
86	Symeonidou, Noni; Bruneel, Johan; Autio, Erkko	2017	Commercialization strategy and internationalization outcomes in technology-based new ventures	JOURNAL OF BUSINESS VENTURING	Impact of tangible vs. intangible offering in new venture internationalisation
87	Tallon, Paul P.; Queiroz, Magno; Coltman, Timothy; Sharma, Rajeev	2019	Information technology and the search for organizational agility: A systematic review with future research possibilities	JOURNAL OF STRATEGIC INFORMATION SYSTEMS	Literature review on the relationship of It and organizational ability
88	Tan, Justin; Tan, Anna E.	2012	Business Under Threat, Technology Under Attack, Ethics Under Fire: The Experience of Google in China	JOURNAL OF BUSINESS ETHICS	RSC issues in digital platforms internationalisation. Impact of the environment
89	Tran, Yen; Yonatany, Moshe; Mahnke, Volker	2016	Crowdsourced translation for rapid internationalization in cyberspace: A learning perspective	INTERNATIONAL BUSINESS REVIEW	Reconfiguration of firm boundaries in an specific activity and impact on the internationalisation of a digital platform
90	Vadana, Ioan-Iustin; Torkkeli, Lasse; Kuivalainen, Olli; Saarenketo, Sami	2019	Digitalization of companies in international entrepreneurship and marketing	INTERNATIONAL MARKETING REVIEW	Literature review and classification of entrepreneurial firms according to their digital and international marketing characteristics
91	van Geffen, Casper; Ruel, Huub; Bondarouk, Tanya	2013	E-HRM in MNCs: what can be learned from a review of the IS literature?	EUROPEAN JOURNAL OF INTERNATIONAL MANAGEMENT	Literature review of Electronic Human resources in MNEs from an IT perspective
92	Vendrell-Herrero, Ferran; Gomes, Emanuel; Collinson, Simon; Parry, Glenn; Bustinza, Oscar F.	2018	Selling digital services abroad: How do extrinsic attributes influence foreign consumers' purchase intentions?	INTERNATIONAL BUSINESS REVIEW	Cultural digital services internationalisation from a home country perspective

N.	AUTOR/S	YEAR	TITLE	JOURNAL	CONTRIBUTION TO OUR RESEARCH
93	Walker, Helen; Harland, Christine	2008	E-procurement in the United Nations: influences, issues and impact	INTERNATIONAL JOURNAL OF OPERATIONS & PRODUCTION MANAGEMENT	Use of technology platforms to facilitate supplier interaction of public institutions
94	Wang, Fatima	2020	Digital marketing capabilities in international firms: a relational perspective	INTERNATIONAL MARKETING REVIEW	Relationship of firm size with the impact of digital in performance
95	Watson, George F.; Weaven, Scott; Perkins, Helen; Sardana, Deepak; Palmatier, Robert W.	2018	International Market Entry Strategies: Relational, Digital, and Hybrid Approaches	JOURNAL OF INTERNATIONAL MARKETING	Taxonomy an literature review of the impact of digital technologies in International Market Entry
96	Yamin, Mohammad; Sinkovics, Rudolf R.	2006	Online internationalisation, psychic distance reduction and the virtuality trap	INTERNATIONAL BUSINESS REVIEW	Effects of physic distance in online internationalisation. Concept of the Virtuality Trap
97	Zakaria, Norhayati; Yusof, Shafiz Affendi Mohd	2020	Crossing Cultural Boundaries Using the Internet: Toward Building a Model of Swift Trust Formation in Global Virtual Teams	JOURNAL OF INTERNATIONAL MANAGEMENT	Aspects of the management of Global Virtual Teams through the Internet
98	Zeng, Jing; Glaister, Keith W.	2016	Competitive Dynamics between Multinational Enterprises and Local Internet Platform Companies in the Virtual Market in China	BRITISH JOURNAL OF MANAGEMENT	Differences between global and local platforms in agility and institutional relationships
99	Zeng, Jing; Khan, Zaheer; De Silva, Muthu	2019	The emergence of multi-sided platform MNEs: Internalization theory and networks	INTERNATIONAL BUSINESS REVIEW	Digital platform internationalisation framework. Including value creation and knowledge networks.
100	Zhu, K; Kraemer, KL	2005	Post-adoption variations in usage and value of e-business by organizations: Cross-country evidence from the retail industry	INFORMATION SYSTEMS RESEARCH	E-business usage and value creation. Back-office and front-office differences
101	Zhu, K; Kraemer, KL; Xu, S; Dedrick, J	2004	Information technology payoff in e-business environments: An international perspective on value creation of e-business in the financial services industry	JOURNAL OF MANAGEMENT INFORMATION SYSTEMS	Factors that influence e-business success in a non-tangible industry
102	Zhu, Kevin; Kraemer, Kenneth L.; Xu, Sean	2006	The process of innovation assimilation by firms in different countries: A technology diffusion perspective on e-business	MANAGEMENT SCIENCE	e-business adoption by firms in an international setting. Environmental setting and firm size impact

Appendix 3 (Chapter 2): Initial Interview Guide

Introduction

1. The goal of this interview is to understand how you perceive the role of new technologies in the mitigation and/or management of the risk as-sumed in your international activities
2. We are interested in new technologies like AI, blockchain…
   - What is the most relevant technology for you and your company?
3. We are interested in any international risk
   - Examples: operational or credit risk
4. We pretend to do this interview in four main parts:
   - We will try to understand the actual context of your company, internationally, technologically and strategically.
   - At the same time, your context and/or position in your company
   - Then we will discuss your perception of the international risk your company faces and the main tools for its management (assessment, prevention and mitigation)
   - We will discuss your perception of the future of digital technology and how they are affecting your company/context
   - Finally, we will ask you how both contexts affect the decisions you take regarding risk management with digital technology. How these deci-sions affect your final behaviour, your company's actions and its per-formance
5. In the interview, we will try to see the problem from three perspectives
   - Your company
   - You and your near environment
   - The problem being faced

Introductory questions

1. Can you tell us a little bit about your company?
   - Size, product, industry
2. What is your role?
   - How are you involved or have you been involved in the international business dimension of your company?
3. What do you think makes your company different from other competitors?
   - Competitive advantage
4. Which ones are especially useful in the international environment?
5. …and in the digital revolution?

International Risk Discussion

1. How do you perceive the risk that your company assume when interna-tionalising?
   - Think about examples of the most relevant international risks for your company
     - For example: possible disruption of the supply chain
   - Please differentiate between FDI and exporting
2. How do your company manage them?
   - Assessment
   - Prevention
   - Mitigation
3. How do these uncertainties affect you, your immediate environment and your company?
   - Company/Country/Department
   - Your employees
   - Impact on you as a person, leader and decision maker
4. How do you perceive them?
5. How do risk events affect you?
6. What are you concerned about?
7. Are there any other issues regarding international risk that you want to mention?

Digitalisation Discussion

1. How do you see the present and future of digital technologies?
   - How do you use the most relevant technologies for your company?
     - For example: Big Data
   - What threats does technology bring?
     - For example: Change in business model
   - How do you use the most relevant technologies for your company?
     - For example: Big Data
   - What new risks does technology bring?
     - For example: Security
2. How are they affecting your company?
   - Projects in place
   - Strategies
3. How do these changes affect you, your immediate environment and your company?
   - Company/Country/Department
   - For example: Easier tasks, cost reductions…
   - Impact on people
   - Impact on you as a person, leader and decision maker
4. Are there any other issues regarding digitalisation that you want to mention?

Decisions / Application Discussion

1. Are these technologies applied to the management of international risks in your company?

2. When you make decisions about international risk management, what considerations do you take into account?
   - Performance of the company
   - Environment
   - Individual

3. When you make decisions about applying technology, what considerations do you take into account?
   - Performance of the company
   - Environment
   - Individual

4. How do these decisions affect the outcome of your company regarding risk management?
   - Implementation considerations

5. What do you think about the use of technologies in risk management?
   - For assessment
   - For prevention
   - For mitigation

6. Do you use them? How?

7. Give us your personal opinions and perceptions about the advantages and disadvantages of the use of technologies in international risk management and their effect on:
   - Performance of the company
   - Environment
   - Individual

8. Are there any other issues on this intersection that you want to mention?

Important note: Actual interviews were adapted depending on the results of previous interviews and on the actual responses given during the interview.

Appendix 4 (Chapter 3): List of host country pre-selected variables, sources and definitions

INDICATOR	SOURCE	DEFINITION
Rule of Law	World Bank World Development Indicators Database	The Rule of Law captures perceptions of the extent to which agents have confidence in and abide by the rules of society, particularly in the quality of contract enforcement, property rights, the police, and the courts, as well as the likelihood of crime and violence. Estimate gives the country's score on the aggregate indicator, in units of a standard normal distribution, i.e. ranging from approximately -2.5 to 2.5.
GDP per Capita	World Bank World Development Indicators Database	GDP per capita is gross domestic product divided by midyear population. GDP is the sum of gross value added by all resident producers in the economy plus any product taxes and minus any subsidies not included in the value of the products. It is calculated without making deductions for depreciation of fabricated assets or for depletion and degradation of natural resources. Data are in current U.S. dollars.
GDP	World Bank World Development Indicators Database	GDP at purchaser's prices is the sum of gross value added by all resident producers in the economy plus any product taxes and minus any subsidies not included in the value of the products. It is calculated without making deductions for depreciation of fabricated assets or for depletion and degradation of natural resources. Data are in current U.S. dollars. Dollar figures for GDP are converted from domestic currencies using single year official exchange rates. For a few countries where the official exchange rate does not reflect the rate effectively applied to actual foreign exchange transactions, an alternative conversion factor is used.
Risk Premium	World Bank World Development Indicators Database	Risk premium on lending is the interest rate charged by banks on loans to private sector customers minus the "risk free" treasury bill interest rate at which short-term government securities are issued or traded in the market. In some countries this spread may be negative, indicating that the market considers its best corporate clients to be lower risk than the government. The terms and conditions attached to lending rates differ by country, however, limiting their comparability.
High tech exports	World Bank World Development Indicators Database	High-technology exports are products with high R&D intensity, such as in aerospace, computers, pharmaceuticals, scientific instruments, and electrical machinery.
Technicians in RD	World Bank World Development Indicators Database	The number of technicians participated in Research & Development (R&D), expressed as per million. Technicians and equivalent staff are people who perform scientific and technical tasks involving the application of concepts and operational methods, normally under the supervision of researchers. R&D covers basic research, applied research, and experimental development.
Logistics performance	World Bank World Development Indicators Database	Respondents evaluate countries on six core dimensions on a scale from 1 (worst) to 5 (best). The eight countries are chosen based on the most important export and import markets of the respondent's country, random selection, and, for landlocked countries, neighboring countries that connect them with international markets. Respondents evaluated the quality of trade and transport related infrastructure (e.g. ports, railroads, roads, information technology), on a rating ranging from 1 (very low) to 5 (very high). Scores are averaged across all respondents.
Trade over GDP	World Bank World Development Indicators Database	Trade is the sum of exports and imports of goods and services measured as a share of gross domestic product.
Exports over GDP	World Bank World Development Indicators Database	Exports of goods and services represent the value of all goods and other market services provided to the rest of the world. They include the value of merchandise, freight, insurance, transport, travel, royalties, license fees, and other services, such as communication, construction, financial, information, business, personal, and government services. They exclude compensation of employees and investment income (formerly called factor services) and transfer payments.
Imports over GDP	World Bank World Development Indicators Database	Imports of goods and services represent the value of all goods and other market services received from the rest of the world. They include the value of merchandise, freight, insurance, transport, travel, royalties, license fees, and other services, such as communication, construction, financial, information, business, personal, and government services. They exclude compensation of employees and investment income (formerly called factor services) and transfer payments.
Control of Corruption	World Bank World Development	Control of Corruption captures perceptions of the extent to which public power is exercised for private gain, including both petty and grand forms of corruption, as well as "capture" of the state

INDICATOR	SOURCE	DEFINITION
	Indicators Database	by elites and private interests. Estimate gives the country's score on the aggregate indicator, in units of a standard normal distribution, i.e. ranging from approximately -2.5 to 2.5.
Political estability	World Bank World Development Indicators Database	Political Stability and Absence of Violence/Terrorism measures perceptions of the likelihood of political instability and/or politically-motivated violence, including terrorism. Estimate gives the country's score on the aggregate indicator, in units of a standard normal distribution, i.e. ranging from approximately -2.5 to 2.5.
Regulatory quality	World Bank World Development Indicators Database	Regulatory Quality captures perceptions of the ability of the government to formulate and implement sound policies and regulations that permit and promote private sector development. Estimate gives the country's score on the aggregate indicator, in units of a standard normal distribution, i.e. ranging from approximately -2.5 to 2.5.
CPIA Business regulatory rating	World Bank World Development Indicators Database	Business regulatory environment assesses the extent to which the legal, regulatory, and policy environments help or hinder private businesses in investing, creating jobs, and becoming more productive.
Ease of doing business	World Bank World Development Indicators Database	The ease of doing business score is the simple average of the scores for each of the Doing Business topics: starting a business, dealing with construction permits, getting electricity, registering property, getting credit, protecting minority investors, paying taxes, trading across borders, enforcing contracts and resolving insolvency. The score is computed based on the methodology in the DB17-20 studies for topics that underwent methodology updates.
Individuals using the Internet %	World Bank World Development Indicators Database	Internet users are individuals who have used the Internet (from any location) in the last 3 months. The Internet can be used via a computer, mobile phone, personal digital assistant, games machine, digital TV etc.
Fixed broadband subscriptions per 100 people	World Bank World Development Indicators Database	Fixed broadband subscriptions refers to fixed subscriptions to high-speed access to the public Internet (a TCP/IP connection), at downstream speeds equal to, or greater than, 256 kbit/s. This includes cable modem, DSL, fiber-to-the-home/building, other fixed (wired)-broadband subscriptions, satellite broadband and terrestrial fixed wireless broadband. This total is measured irrespective of the method of payment. It excludes subscriptions that have access to data communications (including the Internet) via mobile-cellular networks. It should include fixed WiMAX and any other fixed wireless technologies. It includes both residential subscriptions and subscriptions for organizations.
CPIA transparency rating	World Bank World Development Indicators Database	Transparency, accountability, and corruption in the public sector assess the extent to which the executive can be held accountable for its use of funds and for the results of its actions by the electorate and by the legislature and judiciary, and the extent to which public employees within the executive are required to account for administrative decisions, use of resources, and results obtained. The three main dimensions assessed here are the accountability of the executive to oversight institutions and of public employees for their performance, access of civil society to information on public affairs, and state capture by narrow vested interests.
Internet legal regulation content	V-Dem Digital Society Project	What type of content is covered in the legal framework to regulate Internet (0-4)
Privacy protection by law exists	V-Dem Digital Society Project	Does a legal framework to protect Internet users' privacy and their data exist (0-1)
Privacy protection by law content	V-Dem Digital Society Project	What does the legal framework to protect Internet users' privacy and their data stipulate (0-4)
Government capacity to regulate online content	V-Dem Digital Society Project	Does the government have sufficient staff and resources to regulate Internet content in accordance with existing law (0-4)
Online media existence	V-Dem Digital Society Project	Do people consume domestic online media (0-3)
Dealing with construction permits	World Bank Ease of Doing Business Indicators Database	The score for dealing with construction permits is the simple average of the scores for each of the component indicators: the procedures, time, cost to deal with construction permits, as well as the building quality control index that evaluate the quality of building regulations, the strength of quality control and safety mechanisms, liability and insurance regimes and professional certification requirements.

INDICATOR	SOURCE	DEFINITION
Enforcing contracts	World Bank Ease of Doing Business Indicators Database	The score for enforcing contracts is the simple average of the scores for each of the component indicators: the time and cost for resolving a commercial dispute through a local first-instance court, as well as the quality of judicial processes that promotes quality and efficiency in the court system.
Getting credit	World Bank Ease of Doing Business Indicators Database	The score for getting credit benchmarks economies with respect to the regulatory best practice on the indicator set. The score is indicated on a scale from 0 to 100, where 0 represents the worst regulatory performance and 100 the best regulatory performance.
Getting electricity	World Bank Ease of Doing Business Indicators Database	The score for getting electricity is the simple average of the scores for each of the component indicators: the procedures, time, cost for a business to obtain a permanent electricity connection and supply for a standardized warehouse, as well as the reliability of supply and transparency of tariffs index.
Global: Ease of doing business score	World Bank Ease of Doing Business Indicators Database	The ease of doing business score is the simple average of the scores for each of the Doing Business topics: starting a business, dealing with construction permits, getting electricity, registering property, getting credit, protecting minority investors, paying taxes, trading across borders, enforcing contracts and resolving insolvency. The score is computed based on the methodology in the DB15 studies for topics that underwent methodology updates.
Paying taxes	World Bank Ease of Doing Business Indicators Database	The score for paying taxes is the simple average of the scores for each of the component indicators, the payments, time and total tax and contribution rate for a company to comply with tax laws in an economy, as well as the postfiling procedures to request and process a VAT refund claim and to comply with and complete a corporate income tax correction.
Protecting minority investors	World Bank Ease of Doing Business Indicators Database	The score for protecting minority investors benchmarks economies with respect to the regulatory best practice on the indicator set. The score is indicated on a scale from 0 to 100, where 0 represents the worst regulatory performance and 100 the best regulatory performance.
Registering property	World Bank Ease of Doing Business Indicators Database	The score for registering property is the simple average of the scores for each of the component indicators: the procedures, time, cost to transfer property between two local companies, as well as the quality of land administration index that evaluates the reliability of infrastructure, transparency of information, geographic coverage, land dispute resolution and equal access to property rights.
Resolving insolvency - Score	World Bank Ease of Doing Business Indicators Database	The score for resolving insolvency is the simple average of the scores for each of the component indicators: the recovery rate of insolvency proceedings involving domestic entities, as well as the strength of the legal framework applicable to judicial liquidation and reorganization proceedings.
Resolving insolvency: Cost (% of estate)	World Bank Ease of Doing Business Indicators Database	The cost to resolve insolvency is the cost of the proceedings is recorded as a percentage of the value of the debtor's estate, including court fees and government levies, fees of insolvency administrators, auctioneers, assessors and lawyers, and all other fees and costs.
Resolving insolvency: Recovery rate	World Bank Ease of Doing Business Indicators Database	The recovery rate is recorded as cents on the dollar recovered by secured creditors through judicial reorganization, liquidation or debt enforcement (foreclosure or receivership) proceedings. The calculation takes into account the outcome: whether the business emerges from the proceedings as a going concern or the assets are sold piecemeal.
Resolving insolvency: Time (years)	World Bank Ease of Doing Business Indicators Database	The time to resolve insolvency captures the time for creditors to recover their credit and is recorded in calendar years. Potential delay tactics by the parties, such as the filing of dilatory appeals or requests for extension, are taken into consideration.
Starting a business	World Bank Ease of Doing Business Indicators Database	The score for starting a business is the simple average of the scores for each of the component indicators: the procedures, time and cost for an entrepreneur to start and formally operate a business, as well as the paid-in minimum capital requirement.
Trading across borders	World Bank Ease of Doing Business Indicators Database	Doing Business measures the time and cost associated with three sets of procedures of exporting and importing goods —documentary compliance, border compliance and domestic transport— within the overall process of exporting or importing a shipment of goods. The score for trading across borders is the simple average of the scores for the time and cost for documentary compliance and border compliance to export and import.