Universidad Rey Juan Carlos

DOCTORAL THESIS

ANALYSIS OF THE IMPACT OF DIGITAL PLATFORMS ON UNIVERSITY WORKERS AND STUDENTS:

THE INFLUENCE OF TECHNOSTRESS AND THE IMPACT ON THE LEGITIMACY AND RELATIONSHIP QUALITY OF THEIR ORGANIZATION

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Eternally grateful,

María Fernández Fernández

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La digitalización y el uso de plataformas digitales se han convertido hoy en día en uno de los elementos más importantes que cambian significativamente la forma en que las personas viven, trabajan y se comunican (Cataldo et al., 2023). En este nuevo paradigma, el conocimiento y la tecnología están indudablemente entrelazados, formando una realidad que evoluciona a una velocidad sin precedentes. La digitalización, entendida como la transformación digital de los datos, ha revolucionado la forma en que las personas utilizan, comparten y procesan la información. En este contexto, las plataformas digitales han surgido como herramientas habilitadoras para esta revolución, actuando como intermediarios necesarios entre las personas, las organizaciones y el vasto mundo digital que se extiende ante las personas (Zhang et al., 2023).

Actualmente, las plataformas digitales se encuentran en prácticamente todas partes y cubren una amplia gama de usos y aplicaciones. Desde redes sociales que conectan a amigos y familiares a través de distancias geográficas hasta soluciones empresariales que optimizan la gestión de recursos y procesos. Estas plataformas impregnan casi todos los aspectos de la vida diaria y empresarial (Strand & Robertson, 2020). Asimismo, facilitan la comunicación instantánea, brindan acceso a una cantidad aparentemente ilimitada de información y ofrecen oportunidades sin precedentes para la colaboración y la innovación.

Sin embargo, la creciente dependencia de estas plataformas digitales no está exenta de desafíos y dilemas. Estos retos abarcan aspectos cruciales que involucran tanto a los usuarios como a las organizaciones que las gestionan. En lo que respecta a los usuarios, el uso constante de plataformas digitales puede generar una serie de problemas que afectan a su bienestar. La omnipresencia de estas plataformas en la vida cotidiana contribuye a niveles crecientes de ansiedad y estrés (Siddiqui et al., 2023).

Esta sensación de estrés relacionada con la utilización de las plataformas digitales y las Tecnologías de la Información y Comunicación se conoce como tecnoestrés (Fernández-Fernández et al., 2023), un término en auge y constante crecimiento en la actualidad (Duggal et al., 2023). La necesidad de mantenerse constantemente conectado, responder a mensajes y permancer al tanto de las actualizaciones generar una presión persistente y puede afectar a la calidad de la relación de los usuarios con su organización (Bencsik & Csinger, 2021).

En este sentido, la exposición a una avalancha interminable de información y la tendencia a compararse con otros en línea lleva a una disminución de la satisfacción personal (Cataldo et al., 2023). El rendimiento en tareas importantes también puede verse comprometido debido a la distracción causada por las notificaciones y la multitarea inducida por estas plataformas. Además, la necesidad de estar constantemente conectado y disponible a través de dispositivos electrónicos también provoca una sensación de agobio y ansiedad (Fernández-Fernández et al., 2023).

En el entorno universitario, tanto los estudiantes como los profesores están experimentando las consecuencias de este cambio, donde también se enfrentan a desafíos importantes cuando utilizan la tecnología para mejorar la calidad de la educación. Uno de estos desafíos es la presión tecnológica por adaptarse a herramientas digitales y

actualizaciones constantes (Bencsik & Csinger, 2021). La calidad de la relación entre la universidad y su comunidad de estudiantes y profesores se convierte en un factor vital para hacer frente a estos retos tecnológicos (Gaube et al., 2021; Orhan & MacIlvaine, 2020). La calidad de estas relaciones mejora cuando las organizaciones utilizan la tecnología de manera efectiva y fomentan una comunicación colaborativa ágil, pero ¿cómo afecta esto a la legitimidad de la universidad?

La legitimidad de una institución académica depende en gran medida de su capacidad para responder a las necesidades y expectativas de sus miembros (Essen et al., 2023). Si la calidad de la relación entre la universidad, los estudiantes y el personal docente es positiva, la institución se posiciona como un lugar que promueve el bienestar y el desarrollo de sus integrantes. Esto, a su vez, aumenta su legitimidad como institución ya que se preocupa por su comunidad y se gana la confianza y el apoyo de sus seguidores (Zhang et al., 2023).

En cuanto al nivel tecnológico, la gestión de plataformas digitales plantea sus propios desafíos. La legitimidad de una organización puede verse amenazada si se descubre que ha manejado de manera poco ética los datos de los usuarios o ha permitido la proliferación de contenido dañino en su plataforma (Essen et al., 2023). Las decisiones tomadas en la administración de la plataforma, como la censura de contenido o la gestión de comentarios, pueden afectar negativamente al compromiso y la confianza de los grupos de interés hacia su institución. La satisfacción de los miembros también puede verse afectada si sienten que la plataforma no se adapta a sus necesidades o valores (Cataldo et al., 2023).

En resumen, si bien las plataformas digitales ofrecen indiscutiblemente una serie de beneficios, es de suma importancia que las organizaciones reconozcan y aborden estos desafíos de la mejor manera posible. La gestión adecuada de las plataformas digitales es esencial para minimizar los impactos negativos en los usuarios y para preservar la calidad de la relación de los grupos de interés dentro de la institución (Giovanis et al., 2021; Wong & Sohal, 2006).

Una vez contextualizado el área de investigación del campo de estudio, se procede a explorar la estructura de la investigación de esta Tesis Doctoral, una práctica esencial que explica las razones por las cuales se ha realizado esta investigación. De esta manera, esta introducción marca el comienzo de un viaje hacia el mundo de la digitalización y las plataformas digitales, explorando su impacto en sus usuarios y en la propia organización, así como los desafíos y oportunidades que crean. A medida que continua este viaje, se va descubriendo cómo estos elementos definitorios de la era digital continúan dando forma al presente y al futuro de maneras que aún se desconocen.

La presente Tesis Doctoral está organizada de manera estructurada para poder presentar de forma clara la investigación llevada a cabo sobre el campo de estudio anteriormente mencionado. Esta estructura, compuesta por cinco capítulos, ha sido diseñada para proporcionar una progresión lógica a lo largo del texto, permitiendo a los lectores comprender de manera integral los aspectos fundamentales del estudio. A continuación, se presenta un resumen de la organización de esta tesis, destacando el propósito y el contenido de cada capítulo, para facilitar la comprensión de su alcance y contribuciones.

El primer capítulo de esta Tesis Doctoral desempeña un papel fundamental al establecer una sólida base para el resto del estudio. Su propósito principal es proporcionar una introducción exhaustiva que permita contextualizar adecuadamente el tema central del trabajo. En esta sección inicial, se explora y discute en profundidad la importancia intrínseca del tema que se aborda a lo largo de toda la investigación. Esta importancia se sustenta en la creciente relevancia de las plataformas digitales en la vidas laboral y académica de los usuarios, ya que ha transformado radicalmente la manera en que interactúan con las organizaciones y entornos educativos.

El segundo capítulo se enfoca en la elaboración de un análisis bibliométrico sobre el tema del tecnoestrés. En esta sección, se realiza un examen minucioso de la literatura existente relacionada con el tecnoestrés, utilizando herramientas y métodos bibliométricos para identificar y analizar tendencias, patrones y contribuciones en el ámbito de estudio del tecnoestrés. En él, se emplea la herramienta CiteSpace para realizar un análisis bibliométrico exhaustivo de la literatura académica relacionada con el tecnoestrés. Este análisis abarca el período desde la concepción inicial del concepto de tecnoestrés en 1982 hasta diciembre de 2022. Se utiliza CiteSpace puesto que es un software adecuado para identificar patrones y tendencias clave del estudio del tecnoestrés durante un amplio intervalo de tiempo.

En el tercer capítulo de la tesis, desarrolla un análisis detallado de la conexión entre el uso de plataformas digitales, el tecnoestrés y tres variables clave: la satisfacción, el rendimiento y la ansiedad de los trabajadores alumnos y de la universidad. Para alcanzar estos objetivos, se emplea un cuestionario diseñado específicamente para medir estas variables, y se aplica un enfoque estadístico basado en PLS (Partial Least Squares) de modelos estructurales.

El cuestionario se emplea como instrumento fundamental para recoger datos cuantitativos de los participantes, permitiendo evaluar su nivel de tecnoestrés, satisfacción, ansiedad y rendimiento en el entorno digital. La muestra, de 451 encuestados, es representativa de la población estudiada, y, por lo tanto, se analiza de manera conjunta: alumnos y trabajadores de las universidades madrileñas. El diseño y validación del cuestionario se describen en detalle en este apartado, incluyendo las medidas de fiabilidad y validez que son necesarias para garantizar la fortaleza y veracidad de los datos recopilados.

En el cuarto capítulo de esta Tesis Doctoral, se realiza un análisis exhaustivo de dos aspectos cruciales en la gestión online a través del uso de plataformas digitales: la legitimidad y variables como el compromiso, la satisfacción y la confianza. Estos dos componentes se exploran junto con tres dimensiones cruciales: la satisfacción, el compromiso y la confianza de los usuarios. Este capítulo examina cómo los usuarios perciben la legitimidad de las actividades desarrolladas en entornos digitales, cómo se relaciona con la variable satisfacción y así como su influencia el compromiso con la organización o institución. Para llevar a cabo este análisis, se utiliza, de nuevo, el software Partial Least Squares en una muestra de 830 encuestados.

En el último capítulo de esta Tesis Doctoral, se presentan las conclusiones clave obtenidas a lo largo del estudio realizado en los capítulos anteriores. Además de resumir los hallazgos más importantes, este capítulo ofrece una visión general de las implicaciones prácticas y teóricas, las limitaciones y las futuras líneas de investigación.

Gracias a esta Tesis Doctoral, se consolidan los hallazgos y las perspectivas clave obtenidas a lo largo de esta investigación exhaustiva sobre el impacto de las plataformas digitales en los trabajadores estudiantes de la universidad: la influencia del tecnoestrés y la repercusión en la legitimidad y en la calidad de la relación de su organización.

En el capítulo dos de esta Tesis Doctoral, mediante el análisis bibliométrico del tecnoestrés, esta investigación ha conseguido describir la estructura intelectual del dominio del conocimiento del tecnoestrés e identificar las tendencias de la investigación, lo que permite definir la evolución de este campo de estudio. Esto incluye trazar la trayectoria de la investigación sobre tecnoestrés en las dos primeras décadas del siglo XXI e identificar los estudios publicados más destacados.

Las conclusiones del capítulo tres de esta Tesis ofrecen información valiosa que debe considerarse al implementar el uso de plataformas digitales en las actividades organizacionales. Se puede inferir que el tecnoestrés afecta de manera significativa a los usuarios universitarios, y esto se refleja en varios aspectos de su trabajo. Se puede inferir que el tecnoestrés afecta de manera significativa a los usuarios universitarios, y esto se refleja en varios aspectos de su trabajo. Asimismo, se constata que el tecnoestrés incide directa y positivamente en la ansiedad experimentada por los teletrabajadores

Por último, los resultados de esta investigación del capítulo cuatro confirman la influencia de la legitimidad de una institución en los constructos de calidad de las relaciones. En el contexto de la educación superior y el uso de plataformas digitales, se observa que la legitimidad ejerce un impacto positivo y directo en la satisfacción, la confianza y el compromiso de los estudiantes y profesores.

Se puede concluir, por tanto, que esta Tesis Doctoral cumple de manera efectiva con los objetivos de investigación que se plantearon previamente. A lo largo del camino, se ha logrado obtener respuestas fundamentales a las preguntas y objetivos que se delinearon al comienzo del estudio. Los hallazgos y análisis presentados en cada capítulo respaldan de manera concluyente la consecución de nuestros propósitos y contribuyen al avance del conocimiento en el campo de las plataformas digitales, y su impacto en las distintas variables como con el tecnoestrés, la satisfacción, el compromiso, la ansiedad, el rendimiento, la confianza y la legitimidad en entornos laborales y académicos.

CHAPTER 1. INTRODUCTION

1.1. CONTEXT AND RELEVANCE OF THE RESEARCH

Digitization and the use of digital platforms have become today one of the most important elements that significantly change the way people live, work and communicate (Cataldo et al., 2023). In this new paradigm, knowledge and technology are undoubtedly intertwined, forming a reality that is evolving at unprecedented speed. Digitization, understood as the digital transformation of data, has revolutionized the way people use, share and process information. In this context, digital platforms have emerged as enabling tools for this revolution, acting as necessary intermediaries between people, organizations and the vast digital world that extends before people (Zhang et al., 2023).

Today, digital platforms are virtually ubiquitous and cover a wide range of uses and applications. From social networks that connect friends and family across geographic distances to business solutions that optimize the management of resources and processes. These platforms permeate almost every aspect of daily and business life (Strand & Robertson, 2020). They also facilitate instant communication, provide access to a seemingly limitless amount of information and offer unprecedented opportunities for collaboration and innovation.

However, the growing reliance on these digital platforms is not without its challenges and dilemmas. These challenges encompass crucial aspects involving both the users and the organizations that manage them. As far as users are concerned, the constant use of digital platforms can generate a number of problems that affect their well-being. The omnipresence of these platforms in everyday life contributes to increasing levels of anxiety and stres (Siddiqui et al., 2023).

This feeling of stress related to the use of digital platforms and Information and Communication Technologies is known as technostress (Fernández-Fernández et al., 2023), un término en auge y constante crecimiento en la actualidad (Duggal et al., 2023). The need to stay constantly connected, respond to messages and stay abreast of updates generates a persistent pressure and can affect the quality of the users' relationship with their organization (Bencsik & Csinger, 2021).

In this sense, exposure to an endless avalanche of information and the tendency to compare oneself with others online leads to a decrease in personal satisfaction (Cataldo et al., 2023). Performance on important tasks can also be compromised due to the distraction caused by notifications and multitasking induced by these platforms. In addition, the need to be constantly connected and available through electronic devices also causes a sense of overwhelm and anxiety (Fernández-Fernández et al., 2023).

In the university environment, both students and teachers are experiencing the consequences of this change, where they also face significant challenges when using technology to improve the quality of education. One of these challenges is the technological pressure to adapt to digital tools and constant updates (Bencsik & Csinger, 2021). The quality of the relationship between the university and its community of students and faculty becomes a vital factor in meeting these technological challenges (Gaube et al., 2021; Orhan & MacIlvaine, 2020). The quality of these relationships improves when organizations use technology effectively and foster agile collaborative communication, but how does this affect the legitimacy of the university?

The legitimacy of an academic institution depends largely on its ability to respond to the needs and expectations of its members (Essen et al., 2023). If the quality of the relationship between the university, students, and faculty is positive, the institution is positioned as a place that promotes the well-being and development of its constituents. This, in turn, increases its legitimacy as an institution as it cares about its community and earns the trust and support of its supporters (Zhang et al., 2023).

At the technological level, digital platform management poses its own challenges. An organization's legitimacy can be threatened if it is found to have unethically handled user data or allowed the proliferation of harmful content on its platform (Essen et al., 2023). Decisions made in platform management, such as content censorship or comment management, can negatively affect stakeholder engagement and trust towards your institution. Member satisfaction may also be affected if they feel that the platform does not suit their needs or values (Cataldo et al., 2023).

In summary, while digital platforms undeniably offer a number of benefits, it is of utmost importance that organizations recognize and address these challenges in the best possible way. Proper management of digital platforms is essential to minimize negative impacts on users and to preserve the quality of the stakeholder relationship within the institution (Giovanis et al., 2021; Wong & Sohal, 2006).

Once the research area of the field of study has been contextualized, we proceed to explore the relevance of this Doctoral Thesis research, an essential practice that explains the reasons why this research has been conducted. Thus, this introduction marks the beginning of a journey into the world of digitization and digital platforms, exploring their impact on their users and the organization itself, as well as the challenges and opportunities they create. As this journey continues, it uncovers how these defining elements of the digital age continue to shape the present and future in ways yet unknown.

The increasing reliance on digital technology in everyday life, both in the workplace and in academia, has generated significant interest in understanding how digital platforms affect people's emotional and psychological health. For this reason, the need to conduct a bibliometric analysis of technostress is becoming increasingly pressing, as this methodology allows tracking and quantifying the evolution of technostress research, identifying emerging trends, influential researchers and critical areas of study.

Moreover, given that technostress is a complex and multidimensional phenomenon, a bibliometric analysis helps to consolidate and systematize existing knowledge, providing a solid foundation for future research and contributing to the advancement of the field (González-López et al., 2021; Zhao et al., 2022).

Given the considerable relevance of the concept of technostress, an equally significant interest arises in investigating how this variable relates to other factors that impact the quality of users' interactions with their respective organizations (Christ-Brendemühl & Schaarschmidt, 2020; Park & Cho, 2016). Although research has been conducted exploring the connection between technostress and variables such as satisfaction, anxiety, or performance, to date no study has been identified that encompasses all of these variables in a comprehensive measurement scale (Cataldo et al., 2023; Fernández-Fernández et al., 2023; Suh & Lee, 2017; Tarafdar et al., 2010).

Furthermore, it is important to note that most studies have focused on analyzing the impact of technostress in the work environment, while there is a notable lack of information on how students experience technostress (Suh & Lee, 2017; Tarafdar et al., 2010). This gap in research opens the door to a deeper exploration of how technostress influences various dimensions of users' lives and, in turn, underscores the need to address this issue from a broader and more inclusive perspective.

Regarding the organization's legitimacy, this study is essential to assess whether the actions related to digital platforms follow the organization's principles and ethics. A careful analysis facilitates the identification of areas in which the management of digital platforms could be in confrontation with the organization's core values, and thus avoid damaging its legitimacy (Clark, 2023; Corazza et al., 2023; Zhang et al., 2023).

Likewise, although there are studies that relate the quality of relationships between users and legitimacy (Del-Castillo-Feito et al., 2020), it is interesting to see how it affects today's technological world. A detailed analysis reveals how online management with the use of digital platforms affects variables such as satisfaction, trust and engagement. In addition, this can serve to instruct organizations on how to optimize relationships with their members through more effective management of digital platforms, which enhances their legitimacy (Miotto et al., 2020; Zapp et al., 2021).

In summary, the study of the impact of digital platforms on users and organizations plays a key role in ensuring that these platforms are used effectively and ethically (Gerekan et al., 2023; Giovanis et al., 2021) In addition, it allows organizations to identify areas for improvement and take measures to mitigate negative effects, thus promoting stronger and healthier relationships with their users, and preserving their legitimacy in a constantly evolving digital environment (Duggal et al., 2023; Kroll & Stieglitz, 2021; Orhan & MacIlvaine, 2020).

For all of the above, it is absolutely essential to conduct a thorough study on how the use of digital platforms, technological pressure, relationship quality and legitimacy are closely related in the university context. This Doctoral Thesis therefore analyzes the impact of digital platforms on university student workers, the influence of technostress, and the impact of digital platforms on legitimacy and the quality of relationships between users and their organization.

1.2. RESEARCH OBJECTIVES

Once the field of study has been contextualized and the relevance of the research of this Doctoral Thesis has been determined, the basic and specific objectives of this study are described.

The **second chapter** of the Doctoral Thesis consists of a bibliometric analysis of technostress. The main objective is to provide a systematic and quantitative view of the concept of technostress that has been conducted so far. To begin with, the bibliometric analysis allows the identification of trends that have marked the development and growth of the term technostress over time. This includes the detection of periods of increased research activity, as well as changes in the approaches and perspectives that have been adopted at different times.

Likewise, the bibliometric analysis recognizes and identifies the most influential authors and sources in the field of technostress. This makes it possible to recognize the most prominent researchers in this field and the reference publications that have contributed significantly to the accumulated knowledge.

In addition, the analysis identifies the main lines of research and existing gaps in the field of study, i.e., less explored areas or aspects insufficiently addressed in the literature on technostress. These gaps represent opportunities to contribute new knowledge or original approaches to the field of study of technostress.

In summary, the bibliometric analysis in this first chapter of the Doctoral Dissertation aims essentially to provide a solid and reliable basis for research on technostress. This provides insight into the current state of the literature in this field and how the study integrates and contributes to this existing body of knowledge.

The **third chapter** of this Doctoral Thesis delves into a quantitative analysis using PLS software that has as its main objective to explore the impact of the phenomenon of technostress on various variables such as satisfaction, performance and anxiety of workers and students through the use of digital platforms in their organizations.

In this chapter, the relationship between the use of these digital platforms and the feeling of technostress among users is examined in detail, understanding how technostress influences the anxiety of workers and students. One of the central questions is whether exposure to technostress as a result of the use of these digital platforms is related to higher levels of anxiety in individuals.

Also, it is studied whether performance can be affected by the perceived technostress of workers and students in their daily activities. This includes both performance in the world of work and in other spheres of daily life, where the constant presence of these technologies can have a significant impact.

Finally, this chapter analyzes the relationship between workers' and students' satisfaction with digital platforms and, possibly, with the organization or entity that manages them. This chapter uncovers how technostress may influence worker satisfaction and whether this may affect their relationship with the organization in which they work. Additionally, it considers the possible existence of moderating factors that may mitigate the impact of technostress and the use of digital platforms on variables related to workers' emotional disturbances.

The **fourth chapter** of this Doctoral Thesis performs a detailed analysis that explores how the concept of legitimacy with the use of digital platforms exerts a significant influence on variables such as satisfaction, commitment and trust among the parties involved. This analysis focuses on these three essential components that shape the quality of the relationship of workers and students with their organization.

The objective of this chapter is to analyze the impact of workers' and students' commitment to their online organization in terms of their perceived legitimacy. It explores whether perceived legitimacy is related to higher worker and student engagement. In addition, we study how the perceived legitimacy of the organization influences the degree of trust placed by workers. Finally, we investigate how the perception of legitimacy impacts the level of satisfaction with the use of digital platforms by workers.

As mentioned above, this Doctoral Thesis focuses on the analysis of three fundamental aspects in the context of digital platforms: technostress, legitimacy, and its impact on the quality of relationships between users and organizations. Having established the main and general objectives of this research that encompass the deep understanding of these topics, the specific objectives are presented. The latter, when broken down from the general objectives, become a fundamental piece to achieve these general objectives in a precise and well-founded manner.

The specific objectives of this chapter are designed to achieve a thorough understanding of the existing research on digital platforms and their impact on the quality of relationships. The following are the specific objectives of this research:

The specific objectives of this chapter are designed to achieve a thorough understanding of the existing research on digital platforms and their impact on the quality of relationships. The following are the specific objectives of this research:

- Identify trends in technostress on digital platforms, including periods of increased research activity.
- Determine the most influential sources and prominent authors in the study of technostress.
- To discover the most recurrent lines of research in the literature related to technostress on digital platforms.
- Identify gaps in existing research on technostress in this context.
- To contextualize the current existing research on technostress on digital platforms.
- What are the determinants of technostress in the context of digital platforms?
- Could perceived technostress from the use of digital platforms affect worker and student satisfaction?
- Could perceived technostress from the use of digital platforms affect workers' and students' performance?
- How does technostress influence the anxiety experienced by users when using digital platforms?
- What moderating factors influence technostress and its effects on users?
- How can technostress be mitigated and promote healthier use of digital platforms?
- Propose recommendations and strategies to mitigate technostress and optimize the quality of working relationships in the digital environment.
- How does the use of digital platforms influence university legitimacy?
- How does the use of digital platforms affect the quality of the relationship between workers and the university?
- How does the perception of legitimacy with the organization in the online environment impact the quality of the relationship between workers and students?
- What influence does the perception of legitimacy have on workers' and students' satisfaction with the online management of the institution?

- To what extent does the perception of legitimacy affect workers' and students' commitment to the online entity?
- How does legitimacy relate to the trust placed by users in the online entity?

These specific objectives guide the research in a precise manner and contribute to gain a more detailed understanding of the topics addressed in the Doctoral Thesis. In addition, they provide a solid vision of the field of study, allowing to advance towards the achievement of the general objectives with a deeper knowledge and supported by empirical evidence.

1.3. STRUCTURE OF THE DOCTORAL THESIS

This Doctoral Thesis is organized in a structured manner in order to clearly present the research carried out on the aforementioned field of study. This structure, composed of five chapters, has been designed to provide a logical progression throughout the text, allowing readers to comprehensively understand the fundamental aspects of the study. The following is a summary of the organization of this thesis, highlighting the purpose and content of each chapter, to facilitate understanding of its scope and contributions.

The **first chapter** of this dissertation plays a fundamental role in establishing a solid foundation for the rest of the study. Its main purpose is to provide a comprehensive introduction to adequately contextualize the central topic of the work. In this initial section, the intrinsic importance of the topic addressed throughout the research is explored and discussed in depth. This importance is supported by the growing relevance of digital platforms in the working and academic lives of users, as it has radically transformed the way they interact with organizations and educational environments.

This section also clearly and concisely defines the study objectives that guide and shape the study. These objectives represent the fundamental pillars of the approach and allow addressing crucial questions related to the impact of digital platforms on university workers and students.

Finally, the first chapter also serves as a map that guides readers along the way this Doctoral Dissertation. In it, the structure of the Doctoral Dissertation is shown from a broad viewpoint, highlighting the sequence and relationship between the different chapters and sections. This provides readers with a clear roadmap for understanding how each aspect of the topic of study is addressed and how each part contributes to the overall research.

The **second chapter** focuses on the development of a bibliometric analysis on the topic of technostress. In this section, a thorough review of the existing literature related to technostress is conducted using bibliometric tools and methods to identify and analyze trends, patterns, and contributions in the field of technostress study. It employs the CiteSpace tool to conduct a comprehensive bibliometric analysis of the academic literature related to technostress. This analysis covers the period from the initial conception of the concept of technostress in 1982 to December 2022. CiteSpace is used since it is suitable software for identifying key patterns and trends in the study of technostress over a broad time interval.

This bibliometric analysis provides a panoramic perspective of existing research on technostress and favors the discovery of possible areas and lines of research where the study can contribute significantly to the field. In addition, it allows the research to be solidly grounded in the theoretical and empirical base previously established by the academic community.

In the **third chapter** of the thesis, it develops a detailed analysis of the connection between the use of digital platforms, technostress and three key variables: satisfaction, performance and anxiety of student and university workers. To achieve these objectives, a questionnaire specifically designed to measure these variables is used, and a statistical approach based on PLS (Partial Least Squares) structural models is applied.

The questionnaire is used as a fundamental instrument to collect quantitative data from the participants, allowing to assess their level of technostress, satisfaction, anxiety and performance in the digital environment. The sample of 451 respondents is representative of the population studied, and is therefore analyzed jointly: students and employees of Madrid universities. The design and validation of the questionnaire are described in detail in this section, including the reliability and validity measures that are necessary to guarantee the strength and veracity of the data collected.

This chapter plays a pivotal role in the Doctoral Thesis by providing an in-depth understanding of how technostress impacts the experience of students and university workers, and how this translates into levels of satisfaction, anxiety and performance. The findings and conclusions derived from the study serve as a basis for enriching the existing body of knowledge on the topic, and may have significant practical implications for dealing with technostress in university and work settings.

In the **fourth chapter** of this Doctoral Thesis, a comprehensive analysis of two crucial aspects of online management through the use of digital platforms is conducted: legitimacy and variables such as engagement, satisfaction and trust. These two components are explored along with three crucial dimensions: user satisfaction, engagement and trust.

This chapter examines how users perceive the legitimacy of activities carried out in digital environments, how it relates to the satisfaction variable and how it influences commitment to the organization or institution. The aspects that affect legitimacy are explored, and their impact on the quality of the relationship of the corresponding organizations is analyzed.

To carry out this analysis, we again use Partial Least Squares (PLS) software, a statistical approach that is particularly suitable for analyzing complex models with multiple independent and dependent variables. PLS allows to explore and quantify the connections between perceived legitimacy, satisfaction, commitment and trust in the context of online management through the use of digital platforms.

The sample of this research gathers a total of 830 respondents from the population of Madrid, which confirms the representativeness of the sample and is analyzed jointly from students and workers of Madrid universities. The data collected in this study, including survey results and statistical analysis based on PLS, contribute significantly to the understanding of how online management through the use of digital platforms affects perceived legitimacy and the quality of relationships between users and their respective organizations or institutions. The findings of this analysis are fundamental to provide practical recommendations that can improve online management and strengthen the relationship between the parties involved in the digital environment.

In the **last chapter** of this Doctoral Thesis, the key conclusions obtained throughout the study conducted in the previous chapters are presented. In addition to summarizing the most important findings, this chapter provides an overview of practical and theoretical implications, limitations and future lines of research.

First, it highlights the most relevant related results of the influence of variables such as technostress on satisfaction, engagement, trust, legitimacy and the quality of users' relationship with their respective organizations or institutions through the use of digital platforms. Specific research contributions to advance the understanding of these phenomena are highlighted.

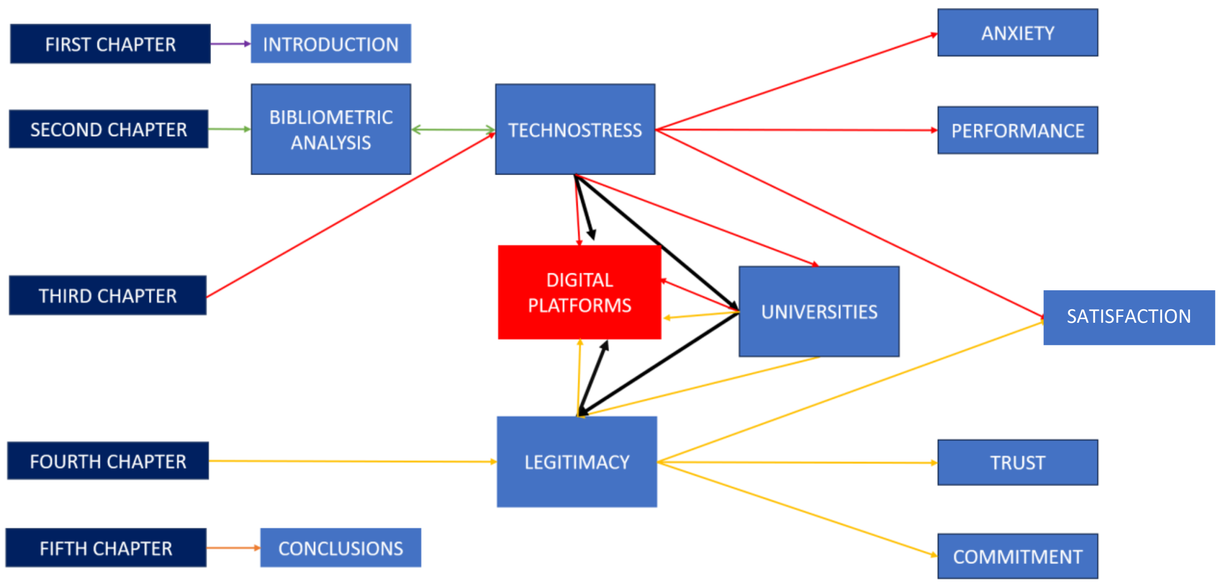
Secondly, practical and theoretical implications are discussed as a result of the Doctoral Thesis study. On the one hand, concrete recommendations are provided for organizations, academic institutions and other stakeholders wishing to improve online management and the relationship with their users. It highlights effective practices and strategies based on the findings of the dissertation. Furthermore, it discusses how the findings contribute to the advancement of theory in the field of technostress, online management, and digital relationships. This analysis helps to enrich and nuance the existing literature on the field of study, providing a solid foundation for future research and contributing to the evolution of theory in the field.

Finally, possible future research directions arising from the findings and limitations identified in the research are discussed. Limitations are examined by recognizing areas where the study may have had methodological, sample, or scope challenges or barriers. Also, areas that require further exploration are noted, and research questions are suggested that could expand and enrich the scope of research on digital platforms, technostress, legitimacy, and relationship quality in organizations.

Therefore, the concluding chapter provides a solid and reflective closure to the dissertation, summarizing the research journey, highlighting its importance, and pointing the direction for future research in the field of technostress and management through the use of digital platforms.

The following is a structural diagram of the dissertation designed to facilitate understanding of the layout and organization of the path taken by the research.

Figure 1.1. Diagram of the structure of the Doctoral Thesis



Source: Own elaboration

After having established the theoretical foundations, methodology and structure of the Doctoral Thesis in the introductory chapter, the core of the Doctoral Thesis follows. These chapters follow a logical and coherent structure, allowing a deep and progressive understanding of the methodology used, the results obtained and the conclusions of the research individually. Overall, this dissertation seeks to shed light on the complex interaction between digital technology and human relationships in work and academic environments, providing practical and theoretical perspectives that contribute to the advancement of understanding in this crucial field.

CHAPTER 2: NEW TRENDS IN TECHNOSTRESS: A BIBLIOMETRIC ANALYSIS WITH CITESPACE

2.1. INTRODUCTION

Today, technology has advanced by leaps and bounds and has infiltrated all areas of our lives, from work to personal relationships (Atanasoff & Venable, 2017). With the increasing dependence on technology in our daily lives, both in the work and personal spheres, the ability to handle technological tools has become an essential skill (Salazar-Concha et al., 2021).

However, while technology can be a useful tool, it can also cause stress and anxiety when it is not used effectively or is overly relied upon (Salo et al., 2019). This feeling of stress connected to the usage of technology is called technostress (Ayyagari et al., 2011). Technostress is a phenomenon that has become increasingly common in the digital age in which we live.

The use of technology can be overwhelming and stressful, especially when it is not fully understood or mastered. In addition, the need to be constantly connected and available through electronic devices can lead to a sense of overwhelm and anxiety (Yossef et al., 2020).

It is important for individuals to recognize the symptoms of technostress and take steps to address it. This may include learning to unplug and setting limits on technology use, seeking help from technology experts to improve skills and understanding of the tools, and practicing stress management techniques to reduce anxiety and stress (Lee et al., 2016).

Given that the use of technology is becoming more and more frequent in our society and in various areas of life, technostress has become a very important problem today. For this reason, the study of technostress is booming, and it is important to continue research to better understand its causes and consequences, and thus be able to develop strategies and tools to help prevent and mitigate its negative effects (Nastjuk et al., 2023). The purpose, therefore, of this research is to discover how the lines of research on the phenomenon of technostress have evolved, to discover today's trends, future lines of research, and the most important authors and articles, in order to address the problem effectively in future research.

To carry out the research, we will perform a bibliometric analysis and use CiteSpace software (Zhao et al., 2023) to measure the evolution of the concept. This program is especially useful for bibliometric network analysis, as it allows visualizing and analyzing the relationships between authors, institutions, keywords, topics and citations. This helps to identify patterns and trends in research and to understand the structure of academic networks (Chen & Song, 2019).

The results of the analysis show us twelve lines of research or clusters that represent the topics that have been dealt with during these forty years: work overload (#1), social networks (#2), inhibitors (3#), neuroscience (4#), teaching (5#), creators of technostress (6#), organizational behavior (7#), organizational culture (8#), excess technology (9#), new methodologies (10#), personal factors (11#), and stress potential (12#). Among these, cluster #1 stands out as the most recurrent and the most current line of research.

The twelve distinct clusters collectively include 617 references that have been cited together, originating from the pool of 23,534 references cited within the sample. The findings derived from the bibliometric analysis indicate that the network structure we've discerned is meticulously calibrated and characterized by exceptional quality, both from an external perspective (evidenced by a modularity score of 0.77) and an internal standpoint (as reflected by a silhouette score of 0.833) (Chen & Song, 2019; Delgado-Alemany et al., 2022).

In addition, the bibliometric analysis enables us to distinguish three fundamental articles that serve as turning points between different lines of research (Ayyagari et al., 2011; Hair et al., 2018; Tarafdar et al., 2010), and found 46 references with a high degree of cocitation. In terms of trends today we find mainly work overload to be the principal line of research, social networks, teaching and new methodologies.

The structure of this research work will begin with a bibliographic study of the literature on the concept of technostress developed from the bibliometric study mentioned above. This will be followed by a description of the methodology used, the research design and the analysis of the results obtained. Later, the results will be discussed, and the implications, limitations and future lines of research will be discussed.

2.2. THEORETICAL FRAMEWORK

In recent times, workers are frequently facing circumstances wherein technology, meant to aid them, instead presents difficulties. These predicaments encompass diverse aspects: physical, social, and organizational," assert Atanasoff and Venable (2017) and Li and Wang (2020). Technology has the potential to impose restrictions and barriers that adversely impact individuals' physical and mental well-being, their capacity to engage with others, and their work efficiency. Furthermore, as highlighted by Salo et al. (2019), this scenario can give rise to challenges concerning concentration, sleep, or interpersonal connections.

An additional outcome is the potential negative impact on the willingness of remote workers to sustain the utilization of ICTs," emphasize Fuglseth and Sørebø (2014) and Joo et al. (2016), "alongside a potential decline in organizational commitment and employee job performance," as noted by Foroughi et al. (2022). With the increasing prevalence of technology in our daily lives, it is commonplace to encounter emotions such as anxiety, frustration, irritation, and similar symptoms. It is during these instances that the concept of technostress emerges, as discussed by Ayyagari et al. (2011).

Despite the existence of various proposed definitions for techno-stress, as put forth by Al-Fudail and Mellar (2008), Ayyagari et al. (2011), Ragu-Nathan et al. (2008), Salazar-Concha et al. (2021), and Salo et al. (2019, 2022), in most cases, “these encompass psychological, physical, or behavioral stress responses as a result of technostress. In earlier iterations, definitions of technostress were more broad in scope, and researchers often employed identical terminology to describe various facets of technostress (Nimrod, 2018; Yossef et al., 2020). Initially, technostress was examined as a condition, but subsequent research has regarded it more as a difficulty in adapting to the changes brought about by ICTs.

The concept of "technostress" was initially introduced in scholarly works by Brod (1984) and characterized as the experience of stress perceived by individuals when they struggle to beneficially adjust to new technologies (Tarafdar et al., 2014, 2019, 2020). Various definitions concur that technostress represents a distinct form of stress associated with the use of ICTs, primarily stemming from the rapid pace of technological changes and the sense of being overwhelmed by them (Sahin & Çoklar, 2009; Salazar-Concha et al., 2021).

While the aforementioned definitions are commonly utilized in scholarly discourse, they portray technostress as solely negative, which fails to align with the character of stress itself, since stress is neither positive nor negative in nature (Salazar-Concha et al., 2021). The authors propose technostress as "the condition of mental or physiological arousal resulting from the use of information and communication technology for work purposes, usually caused by factors such as increased workload, increased speed, and invasion of personal time".

Drawing upon the transactional theory of stress, technostress can have both harmful and beneficial outcomes. In this regard, Tarafdar et al. (2019, 2020) assume that stress represents an imbalance between the situation and the demands of the individual and the ability to respond to them. There are several definitions of the term, and it can be viewed either positively or negatively from the perspective of researchers.

Diverse individuals exhibit varying responses to internal and external disruptions, thus giving rise to two distinct concepts: techno-eustress and techno-distress, as elucidated by Tarafdar et al. (2019). Techno-eustress denotes a positive form of stress that engenders fulfilment, enhances energy, and avoids disorders. This class or variant of technostress arises from the emergence of new challenges and threats that foster the growth of skills (Tarafdar, 2019). Consequently, when ICT is employed appropriately, it promotes human growth and enables the attainment of novel objectives (Salazar-Concha et al., 2021).

The favourable outcomes include heightened efficiency (e.g., reduced time and effort through faster work or error avoidance) and enhanced effectiveness (e.g., improved service quality). However, it is crucial to consider the risk of technostress caused by overload. When workers become overwhelmed, their health inevitably suffers due to stress. While technology-induced stress may contribute to personal growth, excessive reliance on it is likely to deteriorate one's well-being, making it advisable to exercise moderation (Nimrod, 2018).

Conversely, techno-distress refers to the adverse impact stemming from the utilization of ICTs, resulting from the appearance of challenges or obstacles (Tarafdar et al., 2019). Frequently, ICTs surpass users' capabilities, leading them to perceive technology as a source of threat rather than benefit. Some researchers have emphasized that workers perceive ICTs as overwhelming, placing pressures on them that surpass their own capacities (Ragu-Nathan et al., 2008). Moreover, they anticipate negative consequences if they fail to effectively manage these technologies. This form of technostress is extensively studied by scholars and serves as the foundation for numerous definitions within the field.

In order to gauge technostress, existing literature supports the employment of two measures: technostress creators and technostress inhibitors (Tarafdar et al., 2011). Technostress creators encompass the factors that incite or provoke stress associated with ICT usage. In their comprehensive study on technostress, Tarafdar et al. (2007) identified five dimensions of technostress: work overload, invasiveness, complexity, insecurity, and uncertainty (Li & Wang, 2020; Srivastava et al., 2013).

Regarding technostress inhibitors, they are defined as resources that have the potential to mitigate the adverse consequences triggered by technostress while enhancing the productivity and performance of remote workers (Fuglseth & Sørebø, 2014; Ragu-Nathan et al., 2008). Among these, three technostress inhibitors have been conceptualized: fostering literacy, providing technical support, and encouraging active participation (Li & Wang, 2020; Pullins et al., 2015; Tarafdar et al., 2020).

Despite extensive research on these concepts, researchers investigating technostress have yet to identify (Fuglseth & Sørebø, 2014; Ragu-Nathan et al., 2008) comprehensive understanding of how specific technostress inhibitors can effectively mitigate technostress creators, what kind of technostress inhibitors are most effective in achieving this goal, and how certain technostress creators and inhibitors impact individuals' job performance (Li & Wang, 2020).

2.2.1. Previous bibliometric analysis

In the present era, considering the significance and continuous development of the concept, researchers have initiated investigations into its origins and embarked on analyzing potential causes and consequences. The majority of technostress studies predominantly rely on quantitative surveys coupled with structural model analysis and specialized software to assess the impact of variables. Nonetheless, research employing bibliometric analysis and specific software to identify key research domains, influential authors and journals, as well as thematic trends, has also been discovered.

However, owing to the dynamic nature of this subject, studies swiftly become outdated, necessitating constant review and updates due to the novelty associated with the concept. Bibliometric analyses have revealed substantial growth in technostress research over recent decades. Noteworthy increases have been observed in the number of scientific publications, authors, and journals dedicated to this field (Chen & Song, 2019; González-López et al., 2021; Grummeck-Braamt et al., 2021; Nastjuk et al., 2023; Salazar-Concha et al., 2021). According to bibliometric analyses, the most significant research areas in the study of technostress encompass technology management, organizational psychology, ergonomics, computer science, and occupational health (Grummeck-Braamt et al., 2021; Nastjuk et al., 2023; Salazar-Concha et al., 2021).

Within the literature, three distinct studies involving bibliometric analyses of technostress have been encountered. The first study, conducted by Cuervo Carabel et al. (2018), encompasses a total of 58 articles extracted from the Web of Science database spanning the years 1997 to 2017. Although this analysis employs a database to examine the concept, it does not utilize any specific software. Consequently, the study does not establish network connections or allow for the analysis of future research directions, nodes, or emerging trends; rather, it serves as a literature review.

On the other hand, the article authored by Salazar-Concha et al. (2021) investigates a total of 246 papers discovered between 1982 and 2017, utilizing the SciMat program to evaluate and analyze co-occurring words associated with the concept. The findings reveal an evolving research field that is still in an immature state. The study identifies fifteen key subject areas with limited interconnections. The analysis highlights that "Computer Science," "Business, Management and Accounting," "Social Sciences," and "Medicine" are the most significant topics within the field. Researchers' focus has predominantly revolved around investigating the stress induced by the use of ICTs, which adversely impacts human health and generates stress and psychosocial risks among workers.

On the contrary, the research conducted by Grummeck-Braamt et al. (2021) delves into the concept of technostress utilizing more sophisticated software, employing various techniques such as co-citation, co-word, and spectroscopy analysis. However, their evaluation encompasses a set of 252 articles published until 2019, indicating a relatively small database. Their findings indicate that technostress is a rapidly expanding field that traces its historical roots back to biology, psychology, and quantitative methods. The primary areas of research emphasize health technologies, mobile phones, electric mobility, social networks, and education. They propose future research avenues in the realm of technostress, such as the context of usage and research methodology. It is important to note that this study solely considers articles from Scopus and does not encompass articles published from 2019 onwards.

Taking into account the aforementioned factors, the present study aims to comprehensively analyze the term "technostress" from its inception to the present day, covering the period from 1982 to 2022 using the Web of Science Collection database. The software utilized for this analysis will be CiteSpace, enabling the examination of co-citations among a total of 666 articles. Through the examination of co-citations, the study will identify the significance of a document within a thematic network based on the frequency of its citation alongside other documents, thereby facilitating the identification of central documents within the knowledge network.

2.3. METHODOLOGY

A bibliometric investigation was conducted as part of this study. Bibliometric analyses pertaining to technostress encompass quantitative analytical techniques employed to examine scientific output concerning this subject matter. Such analyses enable the identification of research expansion within the field of technostress, key research domains, influential authors and journals, as well as thematic trends in scholarly inquiry (Delgado-Alemany et al., 2022). Given the continuous evolution and growth of this research area, conducting a comprehensive bibliometric analysis is deemed crucial for this study.

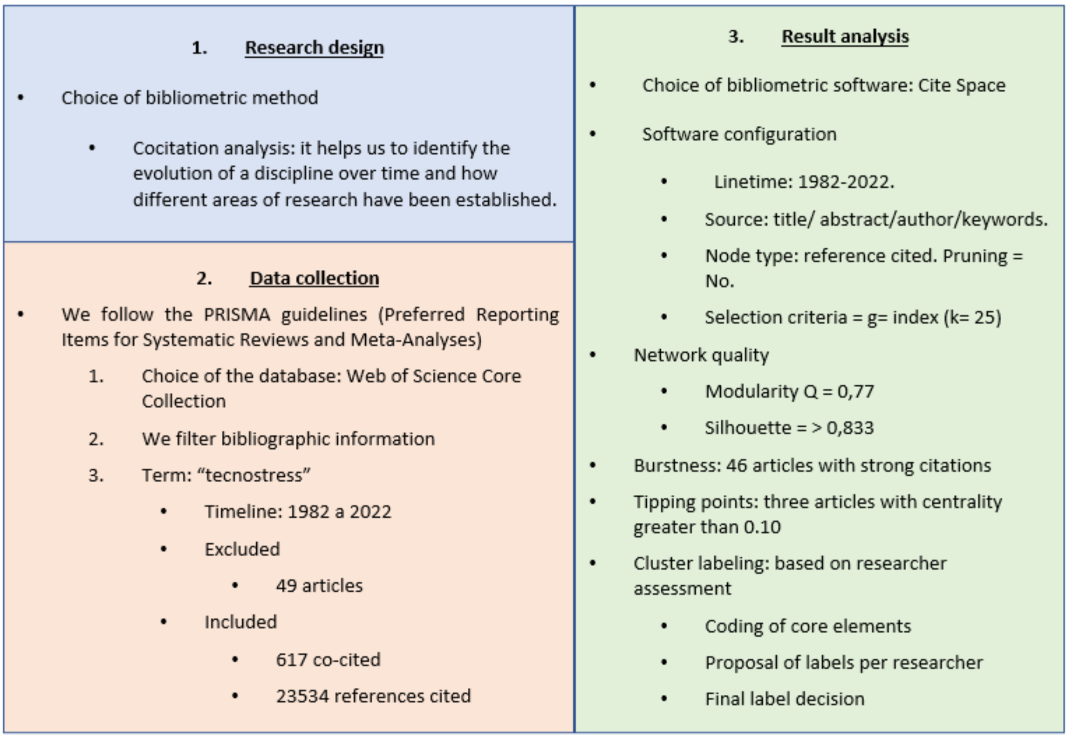
2.3.1. Bibliometric analysis

Multiple varieties of bibliometric analysis programs exist, each differing in their characteristics and objectives. The utilization of bibliometric analysis, combined with scientific mapping, enables the evaluation of publication effectiveness and the investigation of the arrangement and evolution within scientific domains (Gutiérrez-Salcedo et al., 2018).

The selection of bibliometric analysis software typically depends on the specific research goals and the attributes of the available data (Zupic & Čater, 2015). It is crucial to choose a tool that aligns with the user's requirements and the research questions to be addressed.

Figure 2.1. the process followed in the bibliometric analysis. This procedure is an adaptation of the scientific mapping procedure incorporating bibliometric techniques as suggested by Zupic & Čater (2015).

Figure 2.1. Framework of the Study.



Source: Own elaboration

2.3.2. Study methodology

The bibliometric technique utilized in this study involves co-citation analysis, which is a widely employed approach in bibliometric research within the social sciences (Zupic & Čater, 2015) nd is particularly well-suited for the objectives of this investigation. Co-citation, as defined, pertains to the frequency with which two articles, denoted as "A" and "B," are jointly referenced by a third article labeled as "C" (Delgado-Alemany et al., 2022). Consequently, when two documents are cited together in a publication, they accrue a co-citation.

Co-citation operates as a fluid technique, where the robustness of the link between published articles is ascertained by the degree of congruence in their cited sources. The fundamental principle behind this method is that when two articles are cited jointly, they are more likely to have common theories, suppositions, ideas, or techniques. Furthermore, their potential impact within their domain of knowledge is also amplified (Delgado-Alemany et al., 2022).

Moreover, unlike the citation counting method that provides insights into the relative impact of an article, co-citation analysis provides insights into networking and has the capability to identify transformations in paradigms and intellectual trends over an extended timeframe (Zupic & Čater, 2015).

Co-citation enables us to identify the association between documents based on how frequently they are cited together, facilitating the identification of thematically related document clusters. It also assists in tracing the evolution of a field over time and the establishment of various research areas. This helps reveal trends and emerging domains within a discipline, which is valuable for future research planning in the realm of technostress. Lastly, co-citation enables the identification of an author's or journal's influence within a thematic network, aiding in the recognition of key experts in a specific research area (Moral-Munoz et al., 2019).

2.3.3. Information Gathering

To perform this bibliometric examination, we adhered to the guidelines outlined in the *Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA)* framework during this stage (Delgado-Alemany et al., 2022; Hallinger et al., 2020). The initial set of documents was identified through the Web of Science Core Collection (WoS) database, not only because it is widely utilized in the realm of social sciences (Díez-Martín et al., 2021) but also due to its capability to retrieve the references of the chosen articles, which is essential for the subsequent co-citation analysis.

In constructing the database, we deliberately selected articles featuring the term "technostress*" in their title, abstract, or keywords. The subsequent stage entailed an assessment to ensure the appropriateness of the chosen papers. We conducted a thorough review to identify and remove duplicate articles, eliminate irrelevant ones, and refine our database, leading to the removal of 49 articles The reasons for exclusion included the presence of duplicate articles, unreadable content, and articles that were unrelated to the research topic. This process ensured a bibliometric analysis using articles that are of high quality, relevance, and accessibility, thereby ensuring the accuracy and reliability of the study. Consequently, the sample magnitude was reduced to 617 articles encompassing a total of 23,534 cited references.

2.3.4. Review of results

The analysis phase involved the following sequential procedures: selecting bibliometric software, configuring the software, assessing network quality, identifying burst patterns, determining inflection points, and labeling clusters.

2.3.4.1. Choosing bibliometric software

Numerous software applications have been developed for carrying out bibliometric analysis, including SciMAT, CiteSpace, and VOSviewer. Each one of these optionsprograms possesses its unique advantages and constraints (Moral-Munoz et al., 2019). In our case, we opted for the CiteSpace software as it aligned most effectively with our needs and research objectives, specifically for performing co-citation analysis.

CiteSpace is a Java-based software dedicated to scientific detection and visualization, facilitating the exploration of significant transformations happening in a particular research area (Hou et al., 2018). Additionally, it facilitates the presentation of scientific metrics and visual representation of data. For researchers at large, it offers a visual depiction of trending subjects, influential scholars, and leading research institutions in similar research fields. Moreover, it highlights the abrupt emergence of fresh research topics during specific time intervals (Moral-Munoz et al., 2019; Zhou et al., 2020).

CiteSpace stands out among other bibliometric analysis software programs, presenting numerous benefits. Particularly notable is its aptitude for conducting bibliometric network analysis, enabling the visualization and examination of associations among authors, institutions, keywords, topics, and citations. This capability assists in the identification of research patterns and trends, as well as in comprehending the composition of scholarly networks (Moral-Munoz et al., 2019). Moreover, CiteSpace incorporates interactive visualization tools that enhance the intuitive and effective exploration of data and findings by users. These visualizations can be personalized and adjusted to present various types of information (Delgado-Alemany et al., 2022).

CiteSpace encompasses sophisticated functionalities that empower users to conduct efficient and effective analysis of extensive datasets. As an illustration, this software provides the capability to filter and arrange publications based on various criteria, such as publication date or citation count. Furthermore, CiteSpace seamlessly integrates with diverse bibliometric and data analysis tools like Scopus, Web of Science, and Google Scholar. This integration permits users to import and analyze data from multiple sources, facilitating a comprehensive examination of information (Delgado-Alemany et al., 2022; Grummeck-Braamt et al., 2021; Hallinger et al., 2020).

Significantly, CiteSpace remains an ever-evolving program, continuously undergoing updates and enhancements to align with the latest advancements and trends in bibliometric analysis. This characteristic renders it an invaluable tool for researchers seeking to engage in bibliometric analysis, particularly those interested in network analysis and interactive data visualization. CiteSpace boasts several strengths that set it apart from other programs, such as the ability to establish temporal divisions to examine the evolution of research fields and the capability to identify papers that have garnered substantial citations within specific timeframes (Delgado-Alemany et al., 2022; Díez-Martín et al., 2021). For these reasons, CiteSpace was chosen as the software to develop our technostress network.

2.3.4.2. Software settings

The goal of configuring various software parameters is to establish a coherent and high-quality network. For this purpose, we have employed the following configuration settings: (1) Time period spanning from 1989 to 2022, with each segment lasting one year; (2) Term source derived from the title, abstract, and author keywords; (3) Node type set as cited reference; (4) Pruning option disabled; (5) Selection criterion based on the g-index, with k=25.

Pruning involves the systematic elimination of excessive links from the network diagram. In our case, we did not utilize the pruning process since the network diagram contained an insufficient number of links to impede visualization.

The selection of the g-index as our node selection criterion offers advantages over other criteria such as the h-index. The g-index represents the largest number that matches the average citation count of the g most cited publications. This index addresses certain limitations associated with the h-index, providing improved visualization of links and nodes (Chen & Song, 2019). Figure 2.2 illustrates the software structure and configuration described above.

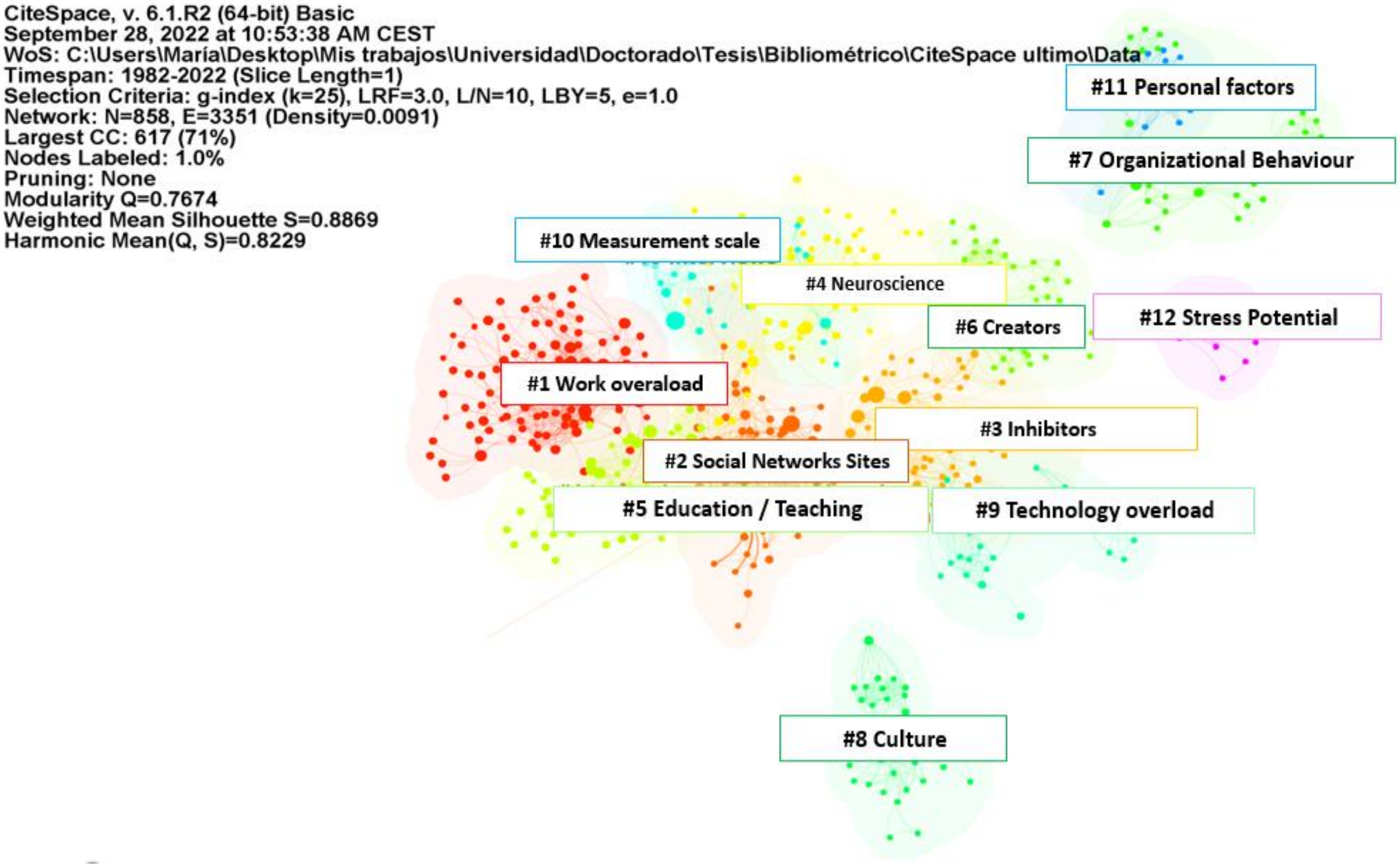
2.3.4.3. Network quality

CiteSpace employs Q modularity as a metric to evaluate the quality of networks. The modularity of a network gauges its capacity for decomposition into distinct components or modules (Chen & Song, 2019). The modularity value, Q, falls within the range of 0 to 1. A low modularity value indicates a network with weak cohesion and ambiguous boundaries, whereas a high modularity value indicates a well-organized network (Zhao et al., 2023).

The technostress research field exhibits a division into distinct clusters that display reasonable interconnections (Q Modularity of 0.77). Each cluster consists of multiple nodes, where each node represents a document. Evaluating the quality of cluster configuration, the silhouette value gauges the similarity of a node to other nodes within its own cluster (cohesion) as opposed to nodes in other clusters (separation). Previous studies suggest that a cluster characterized by internal homogeneity and external differentiation should possess a silhouette value greater than 0.7 but less than 1 (Chen & Song, 2019; Delgado-Alemany et al., 2022; Zhao et al., 2023). As far as our research concept is concerned, the modularity value indicates its appropriateness within the network structure.

In Figure 2. Clusters, shown below, we can see the structure and configuration of the software discussed above, as well as the connection of the twelve clusters of the bibliometric analysis that will follow.

Figure 2.2. Clusters or lines of research



Source extracted from bibliometric analysis with CiteSpace

To ensure the network's quality, CiteSpace exclusively selects clusters that exhibit a silhouette value surpassing 0.833. Consequently, the network is divided into twelve clusters, namely work overload (#1), social networks (#2), inhibitors (#3), neuroscience (#4), teaching (#5), technostress creators (#6), organizational behavior (#7), organizational culture (#8), technology overload (#9), new methodologies (#10), personal factors (#11), and stress potential (#12). These twelve groups encompass a total of 617 co-cited references out of the 23,534 references cited in the sample. The analysis and the ensuing discourse of the findings are primarily rooted in these 617 documents that are co-cited. The values mentioned above signify that the network structure identified demonstrates a robust congruence both externally (as evidenced by modularity) and internally (as indicated by silhouette), affirming its high quality (Chen & Song, 2019; Delgado-Alemany et al., 2022).

2.3.4.4. Burstness

It suggests an active or emerging research domain when a cluster is composed of nodes that have accumulated a notable volume of citations during specific time intervals (Chen & Song, 2019). In other words, it signifies an area of study that has attracted significant interest from scholars within a relatively short timeframe. Citation spiking, also known as 'burstiness,' involves an algorithm used to detect fluctuations in a variable concerning others within the same group over a given period (Chen & Song, 2019).

CiteSpace utilizes Kleinberg’s (2003) burst detection algorithm, which functions independently of any predetermined citation threshold to pinpoint bursts. Instead, it dynamically assesses whether an article qualifies as a burst, taking into consideration various factors, including not only the quantity of citations but also the timeframe within which they occur. This means that an article may amass a substantial number of citations but not be categorized as a burst if those citations are dispersed throughout the article's lifespan rather than concentrated within a specific time window. The burst detection algorithm employed by CiteSpace is widely adopted within the field of computer science for identifying burst terms (Delgado-Alemany et al., 2022; Kleinberg, 2003; Tattershall et al., 2020).

This research detects publications characterized by bursts related to the term "technostress," and these are presented in the *Annex 1. The 46 references with the strongest citations* in the Annexes section.

2.3.4.5. Inflection points

Clusters comprise publications united by shared thematic structures, forming a coherent line of research. Each publication is visually represented as a point or node, and these nodes function as connectors for various thematic structures, functioning as pivotal intellectual junctures (Chen & Song, 2019; Delgado-Alemany et al., 2022). Inflection points are of particular importance as they enable the linkage of other nodes, thereby fostering continued research and the advancement of knowledge within the domain.

Intermediation centrality serves as a valuable tool for identifying significant inflection points within a knowledge domain. This parametric assesses the significance of a network node in facilitating the information exchange. Intermediation centrality quantifies how frequently a node serves as a bridge between the shortest paths connecting two other nodes. Consequently, nodes with elevated centrality assume a pivotal role in interconnecting multiple groups or research directions (Chen & Song, 2019). Based on network theory, nodes exhibiting a betweenness centrality surpassing 0.10 are typically regarded as having significant centrality and are frequently situated along routes that link various research directions (Zhao et al., 2023).

In this CiteSpace analysis, three publications with intermediate centrality higher than 0.10 have been identified (Ayyagari et al., 2011; Hair et al., 2018; Tarafdar et al., 2010) as shown in Table 2.1. These publications play a key role in facilitating connections between different research areas within the analyzed network.

Table 2.1. Inflection point articles. Centrality.

Centrality	*Cluster*	*Title*	*Author*	*Year*
0,11	6	Impact of Technostress on End-User Satisfaction and Performance	Tarafdar M	2010
0,10	6	Technostress: Technological antecedents and implications	Ayyagari R	2011
0,11	10	Advance issues in partial least squares structural equation modeling	Hair J	2018

Source: Own elaboration

2.3.4.6. Clusters labelling

Cluster labels in bibliometric analysis are not predetermined classifications but instead arise from researchers' assessments of the content they examine. This poses a noteworthy constraint in bibliometric analysis, as discerning between conclusions based on empirical evidence and those influenced by researchers' conjectures and heuristics can be a complex task (Zupic & Čater, 2015).

In order to address potential limitations and refine the description and categorization of each cluster, we carried out an autonomous coding process involving the content of the 103 co-cited papers. This process adhered to the methodology elucidated by Vogel et al. (2021 and encompassed critical facets of each document, including its source, publication year, publication type, title, abstract, and DOI. Furthermore, we conducted coding for the primary research category, content attributes and bibliometric metrics.

Utilizing this information, each researcher independently devised a label for each group and provided a narrative justification, typically encompassing the group's overall objectives or primary research question. Subsequently, we compiled all the proposed labels and addressed any discrepancies through resolution discussions. This comprehensive procedure enabled us to concisely summarize the essence of each research group (Vogel et al., 2021; Zhao et al., 2023).

2.4. RESULTS

Within the results section of this study, we offer an insight into our findings during the coding process. In essence, the bibliometric co-citation analysis relies on a predefined set of parameters that enable us to recognize outcomes and gauge their quality. The Silhouette value, for instance, aids in the identification of documents pertaining to a specific group, thereby assessing the level of cohesion versus separation. Simultaneously, Modularity Q quantifies the collective cohesiveness of the entire network. Furthermore, the analysis of citation bursts aids in the identification of current or past research trends. Intermediation centrality, on the other hand, delves into an examination of the pivotal nodes (documents) that have facilitated the transmission of knowledge from one node to another (Kleinberg, 2003; Tattershall et al., 2020; Vogel et al., 2021; Zhao et al., 2023).

The findings of this present study are structured into three subcategories. Initially, we delineate the distribution of the most noteworthy publications on technostress, encompassing subject areas and publication titles. Subsequently, we expound on the primary research directions and their evolving patterns. Lastly, we present a visualization of the knowledge network within the technostress domain and detail its developmental trajectory.

2.4.1. Main research lines

The primary research directions in the field of technostress are displayed in Table 2.2.and Figure 2.2 above. This knowledge domain is made up of twelve main lines of research that include 617 documents out of the total of 23435 references cited.

Table 2.2. Cluster labeling

CLUSTER	***LABEL***
1	**Work overload**
2	**Social Network Sites**
3	**Inhibitors**
4	**Neuroscience**
5	**Education / Teaching**
6	**Creators**
7	**Organizational Behaviour**
8	**Culture**
9	**Technology overload**
10	**Mesurement Scale**
11	**Personal Factors**
12	**Stress potential**

Source: Own elaboration

In addition, Annex 1 provides insights into the research patterns from 1989 to 2022 and highlights the most significant co-cited articles in the field. Over the study period, we've identified 46 articles marked by citation bursts, all of which are detailed in Annex 1 within the Appendices section. Among these, three articles are categorized under group #1 and were published between 2016 and 2017. Additionally, there are eleven more burst articles located in cluster #2, published during 2015-2016. In cluster #3, we find another eleven burst articles spanning the years 2011 to 2015. From cluster #4 we find 7 articles from 2013 to 2015. From cluster #5 we collect 7 published between 2011 and 2016. From cluster #6 we have 3 articles from 2007 to 2008. As for cluster #9# we have a single article published in 2012. In the end, cluster 10 includes three articles that experienced a sudden surge in publications, spanning the years 2013 to 2019.

The first research on technostress began in the late twentieth century, with the first article being published in 1982. Given the novelty of the term, until the beginning of the 21st century there were no clearly defined lines of research, when technostress began to be related to the company's organizational culture (cluster 8#). Shortly afterwards, it began to be related to organizational behavior (cluster 7#) and to the personal factors of each individual (cluster 11#). None of these three clusters, has burst articles, which implies that there is no significant increase in the number of citations of the cluster's articles in that period of time. This may be because it is composed of articles which are not highly cited in general, meaning that there is no great potential for a significant increase in citations.

Subsequent research, with a broader comprehension of the construct, began to examine the creators of technostress (cluster #6) and its possible inhibitors (cluster 3#). In this investigation, the scale for measuring technostress with its five dimensions emerged: overload, uncertainty, invasiveness, complexity and insecurity, stands out (Ragu-Nathan et al., 2008; Tarafdar et al., 2007; K. Wang et al., 2008). In addition, possible inhibitors and countermeasures are discussed (Barley et al., 2011; Fuglseth & Sørebø, 2014; Hung et al., 2015; Lee et al., 2014; Pullins et al., 2015; Sellberg & Susi, 2014; Shu et al., 2011; Tarafdar et al., 2015; Turel et al., 2011; Turel & Serenko, 2012).

With the adventf technology, the emergence and consolidation of the use of cell phones, research began on the connection to technology (cluster 9#) (Oulasvirta et al., 2012) and their possible biological effects on workers (cluster 4#) (D'Arcy et al., 2014; Galluch et al., 2015; Riedl, 2013; Tarafdar et al., 2014). Related to the use of technology, the new line of research appears from 2014, in which researchers focus on finding out its relationship with social networks (cluster 2#) (Bright et al., 2015; Brooks, 2015; Lee et al., 2016; Maier et al., 2015; Ravindran et al., 2014; Soror et al., 2015; Turel, 2015, 2016; S. Zhang et al., 2016; Zheng & Lee, 2016).

Finally, the newest research and where the most co-cited articles have been found is within the field of research related to work overload (cluster 1#). This cluster has the highest number of referenced articles (113). This indicates that the majority of technostress research has focused on investigating work overload as an influential factor in technostress. From the literature, it is important to note that one risk that can cause technostress is overload. Work overload is, moreover, one of the five dimensions of technostress, so it is linked to technostress. Nevertheless, it is also related to technostress, since an overloaded worker can also have a greater personal development because of the stress caused by the use of technology; although this will probably worsen his health, so it is advisable not to abuse it (Nimrod, 2018).

This line of research is the most emerging one, started to succeed between 2019 and 2020, and is today research trend in the field of technostress, generating three burst articles (Alam, 2016; Fischer & Riedl, 2017; Stadin et al., 2016). These three articles discuss the importance of analyzing the term techno-stress and explore the factors that produce stress, tension and the use of technologies as a consequence of this work overload.

2.4.2. Connections between lines of research. Inflection points

Figure 2.2, and Table 2.1, discussed above, depict the research network related to technostress and its associated connections. Within the bibliometric analysis, three specific publications emerged as critical inflection points, demonstrating a substantial degree of centrality (>0.10). These publications serve as primary intellectual conduits linking various aspects of research within this domain. This indicates that a considerable number of investigators turn to these publications as foundational resources. Among these, the work Tarafdar et al., (2010) analyzes in detail the factors that generate technostress (cluster 6#) and possible mitigators, besides relating it to satisfaction and performance variables. This study marks the first step in the measurement of technostress as a measurement scale along with 5 dimensions: overload, uncertainty, invasiveness, complexity and insecurity. This justifies its importance and its consideration as a turning point in our network.

Moreover, the article by Ayyagari et al., (2011) also belonging to cluster 6#, makes a compilation of the background of technostress, relates the five dimensions to other variables such as usefulness, anonymity, reliability and how that ultimately has negative consequences on users. Additionally, it details the practical and theoretical implications of the concept. Finally, the article by Hair et al., (2018) is highlighted as a turning point, although it does not emphasize a thematic or line of research but rather, a model of methodological analysis, where the importance of structural model analysis with PLS software is stated.

2.5. DISCUSSION

Through the application of bibliometric analysis, this study delineates the intellectual landscape of the technostress knowledge domain while pinpointing areas that remain unexplored. In this pursuit, we identify the primary research directions within the field and the knowledge sources that constitute them. Additionally, we uncover trends in research, enabling us to characterize the evolution of this research domain. This encompasses retracing the trajectory of technostress research throughout the first two decades of the 21st century and singling out the most influential published studies.

In contrast to prior assessments, which included qualitative and quantitative approaches involving questionnaires and statistical logit methods to scrutinize influential variables, our findings complement prior qualitative reviews in various ways. Most notably, this work sheds light on the core research directions, with a recent emphasis on work overload. This distinguishes it from other bibliometric studies on technostress (Cuervo Carabel et al., 2018; Grummeck-Braamt et al., 2021; Salazar-Concha et al., 2021) in that research we can observe how studies published in 2016 and 2017 have been gaining importance in these last 6 years, until they have become burst articles (Alam, 2016; Fischer & Riedl, 2017; Stadin et al., 2016).

Secondly, unlike previous research, the bibliometric analysis enables us to identify articles that not only stand out in terms of their significance and the number of co-citations, but that are still trending today. Among the trending topics are work overload (Alam, 2016; Fischer & Riedl, 2017; Stadin et al., 2016), as mentioned above; social networks (Lee et al., 2016; S. Zhang et al., 2016), teaching (Joo et al., 2016) and the scales of measurement of technostress (Tarafdar et al., 2019).

As discussed, the findings reveal a progressive advancement in the research domain, indicating that technostress research is currently in its early stage, primarily focused on exploring the origins and alleviators of technostress, while also endeavouring to examine its impact on various variables.. Nonetheless, once a fundamental knowledge foundation is established, the research domain may transition into fresh debates and discussions.

Lastly, we also illustrate the pathways and linkages through which the dissemination of technostress research has taken place, pinpointing the studies that have played a paramount role in propagating this domain of knowledge. The literacy coincides in considering the articles of (Ayyagari et al., 2011; Ragu-Nathan et al., 2008) to be two of the pivotal articles to connect the different research áreas (Grummeck-Braamt et al., 2021; Salazar-Concha et al., 2021). Previous research, however, has not considered the structural equations article by (Hair et al., 2018), considered a turning point, as it is the methodology most commonly used in research on technostress. These three articles represent the cornerstone of the technostress domain and constitute the bridge that connects different lines of research. Therefore, scholars wishing to investigate technostress should analyze these papers in depth.

2.6. CONCLUSIONS

2.6.1. Implications

This bibliometric study of technostress may have several important implications for research and practice. On the one hand, this research identifies the most relevant research areas in the technostress research, which may be useful to guide future research and focus research efforts on the most relevant areas.

In addition, it uncovers the most influential authors involved the concept including Ayyagari, Maier, Tarafdar (Ayyagari et al., 2011; Maier et al., 2014, 2015; Tarafdar et al., 2020), and thematic research trends, which may be useful to identify the most important areas and to guide future research. Notable trending themes include work overload (Alam, 2016; Fischer & Riedl, 2017; Stadin et al., 2016), as discussed above; social networks (Lee et al., 2016; S. Zhang et al., 2016), teaching (Joo et al., 2016) and technostress measurement scales (Tarafdar et al., 2019).

In addition, the papers are organized into thematic categories. This knowledge serves as a cornerstone for comprehending the domain, offering a launching point for pioneering advancements. It can prove invaluable for emerging researchers seeking to make strides within specific research realms or even for pioneering entirely novel avenues of investigation. Access to these interconnections can greatly expedite researchers' grasp of the research landscape, particularly during the preliminary stages of conceptual framework development, ultimately conserving substantial time and effort.

Ultimately, this bibliometric study of technostress can have important implications for research and practice, including the recognition of relevant research areas, authors, thematic trends, and research gaps.

2.6.2. Future lines of research

This study has identified several trends in the study of technostress that are evolving and developing in current research. With the emergence of new technologies such as artificial intelligence, augmented reality, and robotics, it may be interesting to explore how these technologies may contribute to technostress and how strategies can be developed to manage it. Moreover, with the increase in remote work because of to the COVID-19 pandemic, researchers could analyze how the use of technology in remote work may contribute to technostress and how strategies can be developed to handle it.

Furthermore, this study also enables us to analyze gaps and areas where research is scarce or non-existent, which can be useful in identifying areas of research where more effort is needed. Most research focuses on studying how technostress affects workers. In fact, although a teaching or teaching issue has been uncovered, they are concerned with how technostress affects teachers (workers). However, hardly any research has been done on how it affects students, a potentially interesting research topic.

Lastly, it would also be interesting to investigate how cultural factors may influence the experience of technostress and how it could be combated, as it has been observed that the perception of technostress may vary across cultures..

2.6.3. Limitations

This bibliometric analysis of technostress with CiteSpace provides a useful overview of trends and patterns in research, nevertheless, it is essential to keep in mind some potential limitations.

It is important to note that CiteSpace can only analyze bibliographic databases that are available in its system, so it is not possible to analyze future important publications on the topic that are later than December 2022 or do not appear in the Web of Science database. Moreover, CiteSpace analyzes bibliometric data (author, publication, keywords, etc.), although it does not conduct an exhaustive analysis of the full text of the documents. This means that it cannot fully capture the content of research articles. Bibliometric analysis can provide information on the quantity of research conducted on technostress, but it cannot provide a complete insight into the background in which the research was conducted. Additionally, the bibliometric study analyzes co-cited references; therefore, it will not take into account articles not trending or as highly cited within the time of the analysis.

Finally, the cluster names are not predetermined categories, instead, they are derived from the researchers' assessments of the content within the analyzed research. his represents a key constraint in bibliometric analysis, as distinguishing between findings grounded in empirical evidence and those rooted in researchers' conjecture and heuristics can be challenging.

2.7. ANNEXES

Annex 2.1. Top 46 References with the Strongest Citation Bursts

CLÚSTER	*REFERENCES*	*STRENGTH*	*1982-2022*
6	Tarafdar M, 2007, J MANAGE INFORM SYST, V24, P301, DOI 10.2753/MIS0742-1222240109, DOI	6.5	
6	Ragu-nathan TS, 2008, INFORM SYST RES, V19, P417, DOI 10.1287/isre.1070.0165, DOI	13.59	
6	Wang KL, 2008, COMPUT HUM BEHAV, V24, P3002, DOI 10.1016/j.chb.2008.05.007, DOI	5.87	
5	Ayyagari R, 2011, MIS QUART, V35, P831, DOI 10.2307/41409963	28.78	
5	Tarafdar M, 2010, J MANAGE INFORM SYST, V27, P303, DOI 10.2753/MIS0742-1222270311, DOI	12.87	
5	Tarafdar M, 2011, COMMUN ACM, V54, P113, DOI 10.1145/1995376.1995403, DOI	12.2	
5	Riedl R, 2012, BUS INFORM SYST ENG+, V4, P61, DOI 10.1007/s12599-012-0207-7, DOI	7.25	
3	Barley SR, 2011, ORGAN SCI, V22, P887, DOI 10.1287/orsc.1100.0573, DOI	5.79	
10	Salanova M, 2013, INT J PSYCHOL, V48, P422, DOI 10.1080/00207594.2012.680460, DOI	11.11	
4	Riedl R, 2013, DATA BASE ADV INF SY, V44, P18, DOI 10.1145/2436239.2436242, DOI	10.62	
3	Fuglseth AM, 2014, COMPUT HUM BEHAV, V40, P161, DOI 10.1016/j.chb.2014.07.040, DOI	12.22	
3	Lee YK, 2014, COMPUT HUM BEHAV, V31, P373, DOI 10.1016/j.chb.2013.10.047, DOI	11.82	
3	Tams S, 2014, J ASSOC INF SYST, V15, P723 DOI 10.17705/1jais.00374	10.23	
4	Darcy J, 2014, J MANAGE INFORM SYST, V31, P285, DOI 10.2753/MIS0742-1222310210, DOI	5.88	
3	Turel O, 2012, EUR J INFORM SYST, V21, P512, DOI 10.1057/ejis.2012.1, DOI	4.97	
3	Shu Q, 2011, INT J HUM-COMPUT INT, V27, P923, DOI 10.1080/10447318.2011.555313, DOI	4.29	
3	Turel O, 2011, MIS QUART, V35, P1043 https://doi.org/10.2307/41409972	4.29	

CLÚSTER	*REFERENCES*	*STRENGTH*	*1982-2022*
4	Riedl R, 2013, ADV HUM-COMPUT INTER, V2013, P0, DOI 10.1155/2013/420169, DOI	3.98	
3	Sellberg C, 2014, COGN TECHNOL WORK, V16, P187, DOI 10.1007/s10111-013-0256-9, DOI	3.91	
2	Maier C, 2015, INFORM SYST J, V25, P275, DOI 10.1111/isj.12068, DOI	20.57	
2	Maier C, 2015, EUR J INFORM SYST, V24, P447, DOI 10.1057/ejis.2014.3, DOI	14.41	
2	Brooks' S, 2015, COMPUT HUM BEHAV, V46, P26, DOI 10.1016/j.chb.2014.12.053, DOI	6.54	
3	Hung WH, 2015, TELEMAT INFORM, V32, P143, DOI 10.1016/j.tele.2014.06.002, DOI	5.23	
2	Turel O, 2015, EUR J INFORM SYST, V24, P431, DOI 10.1057/ejis.2014.19, DOI	4.75	
2	Ravindran T, 2014, J ASSOC INF SCI TECH, V65, P2306, DOI 10.1002/asi.23122, DOI	4.73	
9	Oulasvirta A, 2012, PERS UBIQUIT COMPUT, V16, P105, DOI 10.1007/s00779-011-0412-2, DOI	4.72	
3	Tarafdar M, 2015, INFORM SYST J, V25, P103, DOI 10.1111/isj.12042, DOI	15.81	
4	Srivastava SC, 2015, INFORM SYST J, V25, P355, DOI 10.1111/isj.12067, DOI	13.04	
2	Bright LF, 2015, COMPUT HUM BEHAV, V44, P148, DOI 10.1016/j.chb.2014.11.048, DOI	4.42	
4	Darcy J, 2014, COMMUN ASSOC INF SYS, V35, P109, DOI 10.2753/MIS0742-1222310210	4.26	
4	Tarafdar M, 2014, J PERS SELL SALES M, V34, P51, DOI 10.1080/08853134.2013.870184, DOI	4.26	
2	Soror AA, 2015, INFORM SYST J, V25, P403, DOI 10.1111/isj.12065, DOI	3.74	
10	Barber LK, 2015, J OCCUP HEALTH PSYCH, V20, P172, DOI 10.1037/a0038278, DOI	3.74	
4	Galluch PS, 2015, J ASSOC INF SYST, V16, P1, DOI 10.17705/1jais.00387	11.08	
5	Jena RK, 2015, COMPUT HUM BEHAV, V51, P1116, DOI 10.1016/j.chb.2015.03.020, DOI	10.5	
2	Zhang SW, 2016, INFORM MANAGE-AMSTER, V53, P904, DOI 10.1016/j.im.2016.03.006, DOI	8.6	

CLÚSTER	*REFERENCES*	*STRENGTH*	*1982-2022*
2	Lee AR, 2016, COMPUT HUM BEHAV, V55, P51, DOI 10.1016/j.chb.2015.08.011, DOI	6.47	
2	Zheng XB, 2016, COMPUT HUM BEHAV, V65, P65, DOI 10.1016/j.chb.2016.08.011, DOI	4.86	
5	Fischer T, 2015, INFORMATION S ...... ETREAT ON NEUROIS 2015, V0, P9, DOI	4.01	
2	Turel O, 2016, EUR J INFORM SYST, V25, P432, DOI 10.1057/s41303-016-0002-5, DOI	4.01	
5	Joo YJ, 2016, COMPUT EDUC, V95, P114, DOI 10.1016/j.compedu.2015.12.004, DOI	6.42	
3	Tarafdar M, 2015, MIT SLOAN MANAGE REV, V56, P61, DOI 10.1111/isj.12042	4.75	
1	Fischer T, 2017, COMMUN ASSOC INF SYS, V40, P0, DOI 10.17705/1CAIS.04017	4.18	
10	Tarafdar M, 2019, INFORM SYST J, V29, P6, DOI 10.1111/isj.12169, DOI	7.81	
1	Stadin M, 2016, INT ARCH OCC ENV HEA, V89, P1049, DOI 10.1007/s00420-016-1140-8, DOI	4.24	
1	Alam MA, 2016, J AIR TRANSP MANAG, V50, P62, DOI 10.1016/j.jairtraman.2015.10.003, DOI	3.85	

Source extracted from the CiteSpace program

CAPÍTULO 3: THE IMPACT OF TELEWORKING TECHNOSTRESS ON SATISFACTION, ANXIETY AND PERFORMANCE[1]

ABSTRACT

The aim of the research project is to find out how technostress influences the satisfaction, anxiety and performance of teleworkers and university students. The growth of technology and the use of digital platforms has given rise to a phenomenon called teleworking, a modality of work that involves remote work with the use of ICTs. However, the faster the use of ICTs in organisations grows, the more difficult it becomes for teleworkers, leading to anxiety and stress. This feeling is known as technostress, and knowing its impact on workers is of vital importance for organizational success. The study was conducted through a literature review and the dissemination of an online questionnaire using PLS software. The analysis validated the measurement scale and analyzed the structural model at different stages, which confirmed its validity and reliability. The research concludes by affirming the high relationship between technostress, satisfaction, anxiety and performance. It is highlighted that the lower the technostress, the higher the satisfaction and performance, and the higher the technostress, the higher the anxiety and the lower the satisfaction. This research brings as an added value the validation of a scale of technostress together with the variables satisfaction, anxiety and performance not previously analyzed by other researches. In addition, the research provides a series of measures to mitigate the effects of technostress and suggests future lines of research. Thus, it highlights the importance of understanding the impact of technostress on teleworkers, to provide effective measures to mitigate it and thus increase the satisfaction and performance of workers.

KEY WORDS: Anxiety, Measurement scale, Performance, PLS software, Satisfaction, Technostress

3.1. INTRODUCTION

The growth of technology in recent years, and the implementation of telework with the emergence of Covid-19 (Estrada-Muñoz et al., 2021) has affected and will affect the work and personal lives of teleworkers sequentially (Wei et al., 2023) . Therefore, the purpose of this research is to analyse and investigate the effect of the use of technology on telework performance. Specifically, it examines how teleworkers and online students are affected by technostress, and how this impact influences their anxiety, satisfaction and performance with the use of these technologies.

[1] This chapter is part of the article: Fernández-Fernández, M., Martínez-Navalón, J. G., Gelashvili, V., & Román, C. P. (2023). The impact of teleworking technostress on satisfaction, anxiety and performance. Heliyon, 9(6). https://doi.org/10.1016/j.heliyon.2023.e17201

The great growth of technology, and the affordability of the internet and digital platforms gave rise to the so-called teleworking, a modality of work that involves the development of remote work activity and involves the use of ICTs (Information and Communication Technologies) (Stadin et al., 2016; Sullivan, 2003; Weinert et al., 2014), this has had both positive and negative consequences for teleworkers (Maier et al., 2014; Suarez Vasquez, 2020).

However, the faster the use of ICTs in organisations grows and increases, the more difficult it becomes for teleworkers to cope with the challenges they face, leading to anxiety and stress (Karabağ Aydın & Fidan, 2022; Tarafdar et al., 2011). This feeling of stress linked to the use of ICTs and digital platforms is called technostress (Ragu-Nathan et al., 2008; Srivastava et al., 2015; Tarafdar et al., 2019).

The concept of technostress, first defined by (Brod, 1984) was described as the stress appreciated by the teleworker due to the lack of adequate adaptation to ICT. Despite having emerged in the 1980s, today there are numerous research and definitions of the concept, and many other studies that examine the antecedents and inquire into the positive and negative consequences of technostress (Ayyagari et al., 2011; González-López et al., 2021; Salazar-Concha et al., 2021; Zhao et al., 2022)

Technostress is studied taking into account two relevant perspectives or aspects: on the one hand, the creators of technostress or technostressors and on the other hand, the inhibitors (Salazar-Concha et al., 2021; Tarafdar et al., 2011)). The former describe the aspects that cause stress as a result of ICT use and highlight the following five dimensions: work overload, invasiveness, complexity, insecurity and uncertainty (Li & Wang, 2020; Srivastava et al., 2015; Tarafdar et al., 2020)

On the other hand, technostress inhibitors are understood as those resources that mitigate the negative consequences caused by technostress creators (Fuglseth & Sørebø, 2014; Ragu-Nathan et al., 2008; Tarafdar et al., 2011). Researchers highlight the following three dimensions: facilitating literacy, providing computer support, and facilitating participation (Li & Wang, 2020; Pullins et al., 2015; Tarafdar et al., 2011).

The present research work will focus on the aspects that provoke technostress (technostress creators), focusing on teleworkers at universities in the Community of Madrid, in order to evaluate the real impact on them and the relationship with the constructs anxiety, satisfaction and performance.

According to a large number of studies the variables satisfaction, anxiety and performance are closely related to the variable techno-stress (Pullins et al., 2015; Shu et al., 2011; Tarafdar et al., 2011, 2019). However, none of the studies found related these four variables at the same time, so the research aimed to find out if there was a connection between them, analysing them as a whole.

3.2. THEORETICAL FRAMEWORK

3.2.1. Teleworking

The great push of technology over the last hundred years has provided millions of people with the means to realise a concept that until four decades ago seemed unattainable (Fernández-Fernández et al., 2021). This concept called "telework", although it originated in times of crisis, is the modality that aims to transform workers from the industrial society into workers of the information society (Ollo-López et al., 2020) .

Improvements in networked communication technology and the evolution of the Internet have enabled faster global dissemination of knowledge. These changes are also evident in the workplace. Conventional work is gradually being substituted by virtual and flexible work. Organizations have been investing heavily in telework policy planning, but there is little empirical research studying telework (Coelho et al., 2020)

Telework has experienced a high degree of discrepancy and ambiguity due to the extent of definitions and academic research (Bélanger & Allport, 2008; Estrada-Muñoz et al., 2021; Gajendran & Harrison, 2007; Shin et al., 2000). However, one aspect is clear: all authors agree that telework is considered to be remote work involving the use of ICTs (Saleem et al., 2021; Sullivan, 2003; Weinert et al., 2014).

Its origin dates back to the 1970s, and it was first used as a working network (Messenger & Gschwind, 2016) and in less than twenty years, it has become both a state and business policy. In conclusion, telework is defined as an optional work arrangement in which workers perform tasks at a location other than the main or central location, during at least part of their working hours through the use of IT platforms that allow them to interact with those inside and outside the organisation (Ollo-López et al., 2020; Suh & Lee, 2017).

Studies also show that teleworking can optimise performance and satisfy the need for autonomy (Weinert et al., 2014). Even so, some research focuses on the psychological consequences and show the mental effect of teleworking compared to office work (Morilla-Luchena et al., 2021). Their results show negative emotional consequences of telework and symptoms of stress on the mental health of teleworkers. Lack of boundaries, absenteeism, social isolation and lack of support and career progression could be the disadvantages of teleworking (Baert et al., 2020; Belzunegui-Eraso & Erro-Garcés, 2020; Maier et al., 2015; Weinert et al., 2014).

3.2.1.1. Information and communication technologies in teleworking

As has been interpreted, today's society is immersed in a rapid process of technological and organisational innovation, in which the development of ICTs is changing the context of work where new health threats are emerging. Therefore, digital platforms and information and communication technologies have acquired a fundamental role in this new way of working (Baert et al., 2020; Fuglseth & Sørebø, 2014).

The use of ICTs changes not only the way people do their work, but also the working environment and culture (Ragu-Nathan et al., 2008). As technology transforms the nature and speed of work, researchers are beginning to investigate its impact on teleworkers and organisations (Baert et al., 2020; Tarafdar et al., 2011). With 24/7 accessibility to work, it is prudent to explore the impact that "any situation, anywhere" work has on teleworkers (Atanasoff & Venable, 2017).

This use of ICTs and digital platforms can cause teleworkers a wide range of stressors (Fenner & Renn, 2010). Thus, although technologies create efficiency, productivity and flexibility (Riedl, 2013; Yossef et al., 2020), they also lead to job strain, health risks and an imbalance between effort and reward in the workplace (Atanasoff & Venable, 2017).

Anytime, anywhere connectivity allows teleworkers to make better use of the organisation's resources, but at the same time, it forces them to work harder than before. This concept is known as the technological paradox or incongruity (Belzunegui-Eraso & Erro-Garcés, 2020; Hajli et al., 2015; Suh & Lee, 2017).

This feeling of stress related to the use of information and communication technologies and the use of digital platforms is known as technostress (Califf & Brooks, 2020; Ragu-Nathan et al., 2008; S. C. Srivastava et al., 2015)..

3.2.2. Technostress

It is increasingly plausible that teleworkers face situations where the very technology that is understood to overcome limitations is the source of many other obstacles. These obstacles caused by the use of technology can be physiological, social and organizational(Atanasoff & Venable, 2017; Li & Wang, 2020). In addition, the stress caused can cause problems with concentration, sleep or social relationships (Salo et al., 2019)Another consequence is that it can negatively affect teleworkers' intention to continue using ICT (Fuglseth & Sørebø, 2014; Joo et al., 2016)and also reduce teleworkers' organizational commitment and job performance (Foroughi et al., 2022).

Although different definitions of technostress have been proposed (Al-Fudail & Mellar, 2008; Ayyagari et al., 2011; Ragu-Nathan et al., 2008; Salazar-Concha et al., 2021; Salo et al., 2019, 2022) most of them integrate psychological, physical or behavioral stress as a response to technostress.

Early definitions of technostress were quite general, and researchers frequently used the same term to refer to different technostress-related phenomena such as technophobia and technophobia addiction (Nimrod, 2018; Yossef et al., 2020). Initially, researchers studied technostress as a disease; however, later research treated it more as an inability to adapt to changes brought about by ICTs.

The phenomenon of "technostress" was first established in the literature by (Brod, 1984)and was described as the stressful situation perceived by the individual due to the lack of adaptation to new technologies in a beneficial way (Tarafdar et al., 2014, 2019, 2020). Definitions agree that technostress is a particular type of stress related to the use of ICTs, caused mainly by the speed at which changes in technology occur and the feeling of being unable to cope with them (Sahin & Çoklar, 2009; Salazar-Concha et al., 2021).

The technostress model explains how IT platforms create stressors and how these stressors affect teleworkers' stress in companies (Ayyagari et al., 2011; Tarafdar et al., 2019) . The main rationale of the technostress model is that teleworkers feel distress when they experience an imbalance between their capabilities and the demands required by their organization (Shu et al., 2011).

Although the above definitions are considerably employed in the literature, these definitions consider technostress to be negative and yet do not match the nature of stress, which is neither positive nor negative (Salazar-Concha et al., 2021). The authors establish technostress as "the condition of mental or physiological stimulation caused by the use of ICTs for work purposes, usually attributed to increased work overload, increased pace and wear and tear on personal time, among others."

According to the transactional theory of stress, technostress can cause both negative and positive consequences. In this sense, (Tarafdar et al., 2019, 2020) states that stress represents the situation of imbalance experienced by an individual between the requirements of a situation and the ability to satisfy them. There are many definitions of the concept and depending on the vision of the researchers, it can be considered positive or negative.

Not all people respond in the same way to certain internal and external disturbances; hence two concepts arise, techno-eustress and techno-distress (Tarafdar et al., 2019). Techno-eustress is a positive stress that causes satisfaction, joy, increases vitality, and does not cause disturbances or imbalances. This type of technostress originates due to the emergence of new challenges and opportunities allowing the development of skills. Thus, if ICTs are used correctly, it favours the development of the human being to achieve new goals (Salazar-Concha et al., 2021). The positive consequences are increased efficiency (e.g., decreasing time and effort by working faster or avoiding errors) and effectiveness (e.g., increasing the quality of service).

However, it is important to keep in mind that one risk that can cause technostress is overload. An overworked worker is stressed, which is clearly detrimental to his or her health. The worker may have greater personal development due to the stress of using technology; however, this will probably worsen his health, so it is advisable not to overuse it (Nimrod, 2018).

On the other hand, techno-distress is the negative effect caused by the use of ICTs. It originates due to the occurrence of threats or obstacles (Tarafdar et al., 2019). On many occasions, ICTs exceed the capabilities of users, and this causes users to see technology as a threat and not as a benefit. Some researchers stated that workers viewed ICT as threatening, with pressures beyond their own capabilities (Ragu-Nathan et al., 2008). Moreover, they perceive negative consequences if they do not deal with them (Khlaif et al., 2023). This type of technostress is the one most studied by the authors and on which most definitions of the term are based.

To measure technostress, the literature supports that technostress is defined using two dimensions: technostress creators and technostress inhibitors (Tarafdar et al., 2011). The creators of technostress describe the aspects that cause or provoke stress because of ICT use. In their detailed study on technostress, (Tarafdar et al., 2007) identified five drivers of technostress: work overload, invasiveness, complexity, insecurity and uncertainty (Li & Wang, 2020; Srivastava et al., 2013).

As for technostress inhibitors, they are defined as resources that could facilitate the reduction of negative consequences caused by technostress, as well as improve teleworkers' productivity and performance (Fuglseth & Sørebø, 2014; Ragu-Nathan et al., 2008; Tarafdar et al., 2011). According to many studies, within these, three inhibitors of technostress have been conceptualized: facilitating literacy, providing technical support, and facilitating participation. (Li & Wang, 2020; Pullins et al., 2015; Tarafdar et al., 2020). Other studies affirm that technological self-efficacy also helps to mitigate the effects of technostress, mainly on the uncertainty dimension (Cazan & Maican, 2023)

Despite studies of these concepts, researchers examining technostress (Fuglseth & Sørebø, 2014; Ragu-Nathan et al., 2008) are largely unaware of how specific technostress inhibitors can reduce technostress creators, which types of technostress inhibitors are most effective in doing so and how specific technostress creators and inhibitors affect people's work performance (Li & Wang, 2020). However, a key finding of new research is that the detrimental effects of technostress on psychological outcomes are greater than its effects on behavioral outcomes, with the difference being more pronounced in the private context (Nastjuk et al., 2023).

The present research study will focus on the negative effects of technostress. The aim is to assess the impact of the drivers of technostress on students and teleworkers and how it influences their satisfaction, performance and anxiety in teleworkers and students working online in universities in the Community of Madrid. From now on, online students will be referred to jointly with teleworkers in universities under the concept of "teleworkers".

3.2.3. Anxiety

As discussed, technostress has become an important research topic (Ayyagari et al., 2011; Maier et al., 2014, 2015; Tarafdar et al., 2010). In addition, most research on technostress focuses on the negative relationship between technostress and teleworker productivity in organisations (Foroughi et al., 2022; Tarafdar et al., 2010), where anxiety is explained as the main symptom of technostress (Brod, 1984; Yang & Lin, 2018).

In information systems research, feelings of anxiety have been shown to be one of the significant determinants of whether or not people intend to use information systems (Compeau & Higgins, 1995; Venkatesh et al., 2003; Yang & Forney, 2013). In other words, teleworkers will tend to avoid using technology if it causes them feelings of anxiety(Gelashvili et al., 2021; Wu et al., 2017; Yang & Lin, 2018).

Finally, although training in new technologies can reduce anxiety in the face of technostress, it can also be considered a stressor if it is perceived as work overload, increasing levels of burnout or decreasing perceptions of self-efficacy (Salanova et al., 2013). This is because they perceive an imbalance between the demands and resources related to ICT use that leads to the emergence of negative attitudes towards ICT, resulting in anxiety (Gelashvili et al., 2021; Karabağ Aydın & Fidan, 2022) .

3.2.4. Performance and innovation

The performance construct defines the extent to which teleworkers use ICTs to improve their work performance and outcomes, i.e. the degree to which the use of ICTs contributes positively to their work performance. ICTs make it easier for teleworkers to improve their work performance by increasing the efficiency of their tasks (Foroughi et al., 2022; Tarafdar et al., 2010), productivity (Yang & Lin, 2018) and innovation. They also lead to more effective decision making, better decision quality and shorter decision making time (Saleem et al., 2021; Yang & Lin, 2018).

Performance is a very complex multidimensional construct, which can be determined in different ways. As a consequence of the teleworker's important role in processing company information and performing work activities enabled by digital platforms, understanding how this relationship affects teleworkers' satisfaction with ICTs and their performance in ICT-mediated tasks is an important step towards achieving benefits from ICT use (Tarafdar et al., 2010).

Much ICT research studies the relationship between telework and technostress with variables such as productivity, satisfaction or performance (Weinert et al., 2014). (Bélanger & Allport, 2008) investigate the availability of information and communication technologies as well as teleworkers' communication patterns and how these influence perceived productivity, performance or satisfaction among teleworkers (Foroughi et al., 2022; Li & Wang, 2020; Saleem et al., 2021).

Given the growing importance of innovation capability in measuring worker performance, this study also considers it important to relate the concept of performance to that of innovativeness. Much research affirms its positive effect on worker performance (Dong et al., 2023; Y. Liu et al., 2023). Others highlight the role of innovation as a crucial determinant of business performance and employee performance in an organization (Yi et al., 2023; Yusof et al., 2023). These results are also related to the organizations' strategies, technological capabilities, and processes that workers adopt when developing innovation (Wang et al., 2023). For this reason, it is crucial to study the effects of this use of technologies to evaluate their performance and innovation capacity in the organization.

3.2.5. Satisfaction

The satisfaction variable and its importance has been extensively studied in different areas of the academic literature (Foroughi et al., 2022; Li & Wang, 2020; Saleem et al., 2021; Zhang et al., 2021). Job satisfaction is determined by the degree to which an organisation meets the needs of its teleworkers (Rutherford et al., 2009). In the field of technology, the satisfaction construct (Hwang & Park, 2022; Suh & Lee, 2017; Tarafdar et al., 2010; Zhao et al., 2020) refers to an individual's positive attitude and perception towards the ICTs they use in their day-to-day work processes (Tarafdar et al., 2010). Higher satisfaction leads to higher work (Atanasoff & Venable, 2017; Suh & Lee, 2017; Zhao et al., 2020), greater innovation in their work performance and better decision-making by teleworkers.

It is essential that teleworkers are satisfied with the digital platforms and information technology systems with which they interact and work and can use them effectively and efficiently to improve the quality and productivity of their work tasks (Chang & King, 2005; Zhao et al., 2022).

Moreover, this construct is closely related to the performance construct since, if teleworkers are satisfied with the applications they use, they can use them to improve the performance of their work activities. Similarly, the performance of teleworkers through the use of ICTs contributes to improving the quality and efficiency of their work(Hwang & Park, 2022; Tarafdar et al., 2010, 2019).

It is therefore important to bear in mind that they play a key role in determining the satisfaction and profitability of teleworkers using ICTs (Tarafdar et al., 2010). Thus, poor management of ICT use, leading to computer anxiety, for example, will lead to low teleworker satisfaction (Hajli et al., 2015) and poor performance outcomes.

Therefore, after a brief review of the concepts, the main objective of the research will be to investigate how the stressors of technostress impact on the performance, anxiety and satisfaction of teleworkers at universities in the Community of Madrid with the use of ICTs (Foroughi et al., 2022).

3.3. HYPOTHESIS

As described above, the organisation is increasingly dependent on information technology. Teleworkers need to constantly adapt to new technologies, at the same time as companies' requirements in terms of IT skills are becoming higher and higher (J. Wu et al., 2017). The moment teleworkers are not able to adapt to these requirements, technostress arises and affects teleworkers' performance, anxiety and satisfaction. This research will focus on studying the impact of technostress on students and teleworkers at universities in the Community of Madrid and how it affects their life and work performance. That said, the following hypotheses are proposed:

Hypothesis H1: *Technostress has a direct and negative influence on satisfaction*

Some research finds that technostress negatively affects people's satisfaction (Tarafdar et al., 2010). Indeed, this relationship manifests itself in each of the dimensions of technostress. Studies confirm that, due to technology overload, superiors often communicate more information than necessary, therefore, they have to spend more time and effort processing the information, leading to dissatisfaction with the use of the digital platforms they use (Maier et al., 2014; Tarafdar et al., 2010).

For its part, the invasion dimension deprives teleworkers of feeling "free" of technology and replaces it with a feeling of being "on call" by blurring the boundaries between home and workplace, leading to dissatisfaction with the digital platforms they use. As a result of the complexity, teleworkers have to spend time and effort learning to use ICTs (Pullins et al., 2015; Tarafdar et al., 2010; Zhao et al., 2020), leading to dissatisfaction and frustration with ICTs.

As a result of the *uncertainty* of constant ICT upgrades, teleworkers are forced to continually renew their skills as they quickly become obsolete. These constant updating requirements lead to dissatisfaction with ICTs (Tarafdar et al., 2010, 2019). Finally, the insecurity dimension arises when teleworkers fear losing their jobs because they are not able to cope with the learning requirements and adaptations of ICT-related work processes. Insecurity results in negative impressions about the use of technologies leading to dissatisfaction with the digital platforms employed. (Christ-Brendemühl & Schaarschmidt, 2020; Foroughi et al., 2022; Tarafdar et al., 2010).

Hypothesis H2: *Technostress directly and negatively influences performance*

Like satisfaction, the literature confirms how technostress negatively affects their performance. In this case, technology overload, with excessive ICT-related tasks, leads to hurried and inefficient information processing (Hwang & Park, 2022; Tarafdar et al., 2010), which is detrimental to teleworker performance.

On the other hand, the invasion dimension of technostress can affect performance due to unnecessary work interruptions (Pullins et al., 2015; Tarafdar et al., 2014). Complexity, involving time and effort, leads to decreased performance in ICT tasks. As a result of technological insecurity and uncertainty, teleworkers suffer from low self-confidence and poor performance in their activities, especially those involving the use of ICTs (Pullins et al., 2015; Tarafdar et al., 2020).

In addition, as mentioned above, the provoked stress can cause problems with concentration, sleep or social relationships (Salo et al., 2019) that can negatively affect teleworkers' intention to continue using ICT (Fuglseth & Sørebø, 2014; Joo et al., 2016) That fact also reduces teleworkers' organizational commitment and job performance (Foroughi et al., 2022)

Hypothesis H3: *Technostress directly and positively influences anxiety*

According to various studies, people have limited cognitive processing ability. When the information received exceeds the processing capacity, teleworkers may be overloaded (Yang & Lin, 2018) by information processing and thus lead to dysfunctional consequences (Yang & Lin, 2018). Information overload is often associated with a loss of control over the situation and a feeling of overwhelm, leading to anxiety among teleworkers (Bawden & Robinson, 2009; Foroughi et al., 2022; Koroleva et al., 2010). Therefore, we consider technostress, namely work overload, as an anxiety factor.

Anxiety is also characterized by an extreme fear of being judged negatively by others in social settings. Some studies have shown that the use of digital platforms can affect workers' mental health, including anxiety (Frost Some studies found that the use of technology worsened anxiety symptoms, specifically among those who spent too much time with ICT. In addition, some researchers identified a negative association between technology and anxiety, showing that individuals who used ICT intensively were at risk of developing anxiety (Foroughi et al., 2022).

From another perspective, invasion (Tarafdar et al., 2011) leads teleworkers to perform work during non-working hours, which generates anxiety. At the same time, teleworkers have the feeling of being tied down by technologies, and the encroachment of time and space by technologies causes work anxiety (J. Wu et al., 2017).

In conclusion, learning to use new technologies or working overtime on weekends leads to time disruption, which causes a conflict between work and family, and as a consequence, higher levels of work anxiety (Grillon et al., 2020; J. Wu et al., 2017).

Hypothesis H4: *Satisfaction directly and positively influences performance*

Another important variable in this study is the relationship between satisfaction and performance. High teleworker satisfaction implies that they are satisfied with digital platforms, accuracy, timeliness of information (Foroughi et al., 2022; Tarafdar et al., 2010), the ease with which they can be used (DeLone & McLean, 2003) and the security provided by ICTs, which positively affects their innovation capacity (Liu et al., 2023)

Satisfaction are feelings that express a person's pleasure or disappointment toward perceived job performance or outcome expectations (Zhao et al., 2020). In addition, many current applications allow teleworkers to develop creative and innovative ways of obtaining, managing and analysing information. Therefore, teleworker satisfaction improves teleworker performance through increased productivity and innovation. This is also consistent with the literature of studies related to technostress (Tarafdar et al., 2010), which show that behaviour towards ICTs affects their behaviour towards ICTs, where their use improves teleworker performance (Li & Wang, 2020).

Hypothesis H5: *Anxiety directly and negatively influences satisfaction*

It has been argued that job satisfaction of ICT teleworkers is closely associated with the cognitive and mental factors perceived during ICT employment and that perceived anxiety in a work environment significantly affects personal job satisfaction (Suh & Lee, 2017).

In addition, people suffering from anxiety experience functional impairment in occupational, educational and/or social settings, which is reflected in a poor quality of life and a feeling of dissatisfaction. Findings from previous studies have shown how these overwhelming difficulties can impact on various aspects of individuals' lives, affecting their enjoyment of life and decreasing their satisfaction (Foroughi et al., 2022).

Anxiety at work causes teleworkers to feel overwhelmed when they have not adequately coped with their tasks or the need for training related to the new information technology. In addition, teleworkers must constantly relearn new technologies and digital platforms as they are regularly renewed. This anxiety about constantly needing to acquire technology leads to user dissatisfaction (Gelashvili et al., 2021; Park & Cho, 2016).

Hypothesis H6: *Anxiety directly and negatively influences performance*

In most research, accuracy is considered the fundamental measure of performance efficiency. In this context, the more time spent on achieving a certain level of performance, the lower the efficiency of the process. Thus, teleworkers with a high level of anxiety have a low performance efficiency as their response time is longer, while teleworkers with a low level of anxiety have better results as they perform in a shorter time (Bawden & Robinson, 2009; Grillon et al., 2020; Li & Wang, 2020; Maruyama & Tietze, 2012).

High anxiety is therefore associated with performance comparable to low anxiety, but with a longer response time in several studies. However, some research also considers that the level of anxiety and its relationship with performance will depend on the type of stimulus received, whether external or internal, and whether it is neutral or threat-related (Eysenck et al., 2007).

On the other hand, teleworkers suffering from anxiety may show poor or insufficient processing efficiency compared to those with low anxiety, since, if they exert more effort, they achieve only comparable performance. Studies confirm that anxiety is associated with increased mental effort in two versions of a complex task: with the use of motor tasks, and with the use of motor tasks (Foroughi et al., 2022), and the use of cognitive tasks. Some researches also found higher effort samples in teleworkers with high performance anxiety (Eysenck et al., 2007; Grillon et al., 2020), and a lower innovativeness of workers (Liu et al., 2023; Yusof et al., 2023)thus confirming that the negative relationship between anxiety and performance (Grillon et al., 2020).

The proposed research model and hypothesis statement are shown in Figure 3.1 below:

Figure 3.1. Proposed structural model

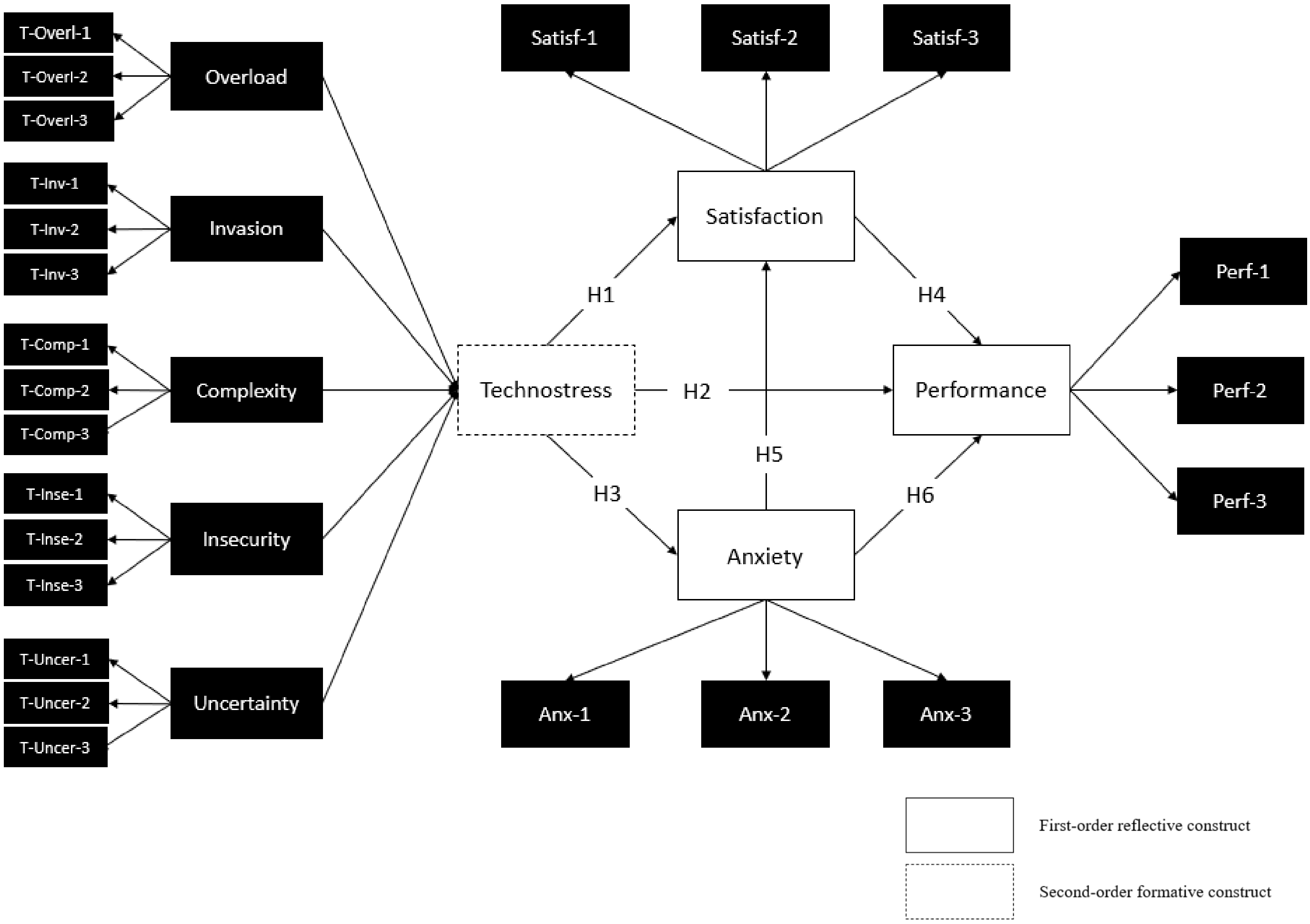


Figure compiled by the authors from the model obtained in PLS.

3.4. METHODOLOGY

Once the objectives to be achieved have been determined, and after having studied the most relevant concepts of this study in depth, we will detail the methodology used to describe and measure each of the variables and analyse the results of the research.

3.4.1. Data collection and sampling

To carry out this study, which is responsible for analyzing the impact of technostress and digital platforms on the anxiety, profitability and satisfaction of teleworkers in the Community of Madrid, an online questionnaire was carried out to collect the necessary data for the research. The sample of 451 people was collected during the month of April and May 2021, during the "new normal" in the ongoing Covid-19 pandemic.

Before the questionnaire was carried out, it went through an ethics committee at the Rey Juan Carlos University of Madrid, which evaluated the questionnaire and issued the ethical approval statement (No. 2206202217122). Then, the respondents, under previous consent, accepted the treatment of their data in which it should be noted that no information that could identify them was collected since the surveys were conducted anonymously. It is also worth mentioning that the data of the respondents do not collect information related to their health, since they are rather opinions and observations of the respondents.

The questionnaire, which aimed to cover the largest number of people in the Community of Madrid, was disseminated through social networks such as Facebook, Instagram, Whatsapp, LinkedIn and Twitter, guaranteeing respondents the confidentiality of their answers. This diversity gives rise to the possibility of grouping a more heterogeneous sample, which makes it possible to achieve a greater representation of the teleworker population in the Community of Madrid (Martínez-Navalón, Gelashvili, & Debasa, 2019).

In addition, the questionnaire was designed to be of short duration, in order to make it pleasant and to obtain a greater number of responses (Fernández-Fernández et al., 2021). The questionnaire was divided into five blocks. The first included respondent classification, where questions were asked regarding gender, age, occupation, and place of origin, among others. The second focused on the impact of technostress and its corresponding dimensions: work overload, uncertainty, insecurity, invasiveness and complexity. The third block elaborated three questions related to the anxiety variable, while the fourth related them to the performance variable. Finally, the survey also included three questions regarding the satisfaction variable.

The composition of the survey was based on validated measurement scales from research on technostress, satisfaction, anxiety and performance(Reyes-Menendez, Saura, 2019; Foroughi et al., 2022; Gelashvili et al., 2021; Tarafdar et al., 2010, 2015; Wu et al., 2017) .To carry it out, a five-point Likert scale questionnaire measuring sentiment was used, since Likert scale questionnaires are the most recommended due to the ease of response and the possibility of measuring the respondent's sentiment, allowing a broader study to be carried out (Martínez-Navalón, Gelashvili, & Debasa, 2019).

As a consequence of the division into blocks of the questionnaire and the plurality of questions, the measurement scale had 2 different levels within the 5 points: from "Strongly disagree" which equals 1 to "Strongly agree" which equals 5, and from "Never" which equals 1 to "Always" which equals 5 (Martínez-Navalón, Gelashvili, & Debasa, 2019).

3.4.2. Descriptive study of the variables

After detailing how the data were obtained, the methodology used in this research is specified. To this end, a descriptive study of the variables will be undertaken, followed by an analytical study in order to discover the relationships between the variables studied.

As mentioned above, the questionnaire was divided into five parts. Within the first block, questions were asked about gender, age, employment status and higher education. On the other hand, the block related to technostress divided and classified its questions into the following five dimensions: work overload, invasiveness, complexity, insecurity and uncertainty (Tarafdar et al., 2011). And then the variables satisfaction, anxiety and performance were analyzed separately.

It is important to note that the questionnaire was pre-tested with a sample of 26 respondents in order to detect possible flaws before mass dissemination. Following this test, and once minor details had been corrected, expansion began. Later, after collecting the questionnaire data, the variables were simplified and the data were transformed into quantitative values. This procedure was essential in order to be able to validate and analyse the results of the form at a later stage. The variables measured in the first respondent classification block are shown in Table 3.1 below.

Table 3.1. Classification results

Variable	Item	Frequency	Percentage
Gender	Male	159	35%
	Female	292	65%
	other	0	0%
Age	Under 18 years of age	2	0%
	Between 18 and 25 years old	151	33%
	Between 25 and 35 years old	55	12%
	Between 35 and 55 years old	185	41%
	Over 55 years old	58	13%
Completed higher education	Primary school education	3	1%
	Compulsory Secondary Education	8	2%
	Post-compulsory secondary education, Bachelor's Degree	98	22%
	Professional training	52	12%
	University degree	186	41%
	University Master's Degree	97	22%
	PhD	7	2%
Employment status	Student	137	30%
	Self-employed teleworker	33	7%
	Salaried teleworker in private company	180	40%
	Salaried teleworker in public administration	80	18%
	Teleworker member of cooperative	2	0%

Variable	Item	Frequency	Percentage
	Unemployed	7	2%
	Other	12	3%

Table based on the results of the questionnaire.

3.4.3. Descriptive study of the validation methods of the analysis

For data analysis and hypothesis testing, Structural Equation Variance Structural Equation Modelling (SEM) was used. This is a multivariate analysis method whose main objective is the prediction of dependent variables through the estimation of robust models. This program offers the possibility to analyze and determine the estimation of the measurement model and the structural model showing their dependent variables. In addition, it also serves to calculate and quantify the magnitude of both indirect and direct effects that some variables of this model have on others (Cachón-Rodríguez et al., 2021; Martínez-Navalón et al., 2023)

The method offers the benefit of determining whether or not the direction of the hypotheses is imposed and is considered the most reliable and advisable (Hair et al., 2019). The composition of the proposed model, which includes reflective and formative variables, makes this technique and software the most suitable for the analysis proposed in the study (Palos-Sanchez et al., 2019; Reyes-Menendez et al., 2019).

The Partial Least Squares (PLS) technique was chosen for the analysis, as it is one of the most comprehensive SEM methods for the analysis of factor, structural and composite models, allowing the measurement of latent variables (Hair et al., 2017; Van Riel et al., 2017).

Some articles and research such as (Reinartz et al., 2009), which reviewed more than 30 studies on business management and marketing, advised using the PLS model when the sample size is not large. Furthermore, this technique is widely recommended when using an exploratory approach (Hair et al., 2011), as it is capable of analysing variables composed of several dimensions (Hair et al., 2017), and has the power to recognise that the proposed model is a composite model. All this indicates that the PLS-SEM model is one of the most accurate techniques to perform this analysis (Henseler, 2017), which is why, in the present study, it was decided to use PLS-SEM (Reyes-Menendez et al., 2019).

It should be noted that this research was carried out in accordance with the guidelines of importante researches (Hair et al., 2013; Reyes-Menendez et al., 2018), and data analysis was carried out with the Smart PLS 3 software (Hair et al., 2011). The data analysis procedure was separated into two stages (Hair et al., 2014; Hair et al., 2017). In the first stage, the measurement instruments were assessed, and in the second stage, the structural model was assessed to find out whether there was a real correlation between the proposed variables and relationships.

On the other hand, it can be seen how most of the variables were modelled with reflective indicators except for the variable techno-stress, which was modelled with formative indicators by grouping its items into five dimensions, as it is a multidimensional variable.

The reason for configuring most of the variables with reflexive character was because they were considered as an outcome of latent variables (Sohaib et al., 2019) while the reflexive indicators were interchangeable (Hair J et al., 2017).

3.5. RESULTS

3.5.1. Validity and reliability of the measurement scale

As mentioned above, the PLS-SEM analysis was carried out in several steps (Hair Jr et al., 2017). First, validation of the measurement scale was carried out, followed by analysis of the structural model. It is important to mention that, in turn, the measurement scale was validated twice: first with the items of the multidimensional variable and then with the grouped dimensions. This involved the creation of first- and second-order models (Hair et al., 2014).

For the first-order model, all variable items were reflective, which is why criteria such as individual reliability, composite reliability, convergent validity and discriminant validity were tested (Martínez-Navalón et al., 2023). The results of this first analysis, which will be discussed below, are shown in Annex 1 in the Appendix A section.

In the first phase, the items passed favourably the cut-off indices of the first three criteria used, obtaining values above the 0.707 proposed by Carmines and Zeller for individual reliability, above the 0.70 Cronbach's alpha recommended by Nunnally and Bernstein's criteria for composite reliability, and 0.5 of Fornell and Larcker's criteria (Hair et al., 2017), which establishes the minimum level of average variance extracted or AVE (Henseler et al., 2009).

After overcoming the previous indices, the analysis of the Dijkstra-Henseler indicator (rho_A) was carried out, which offers greater strength to the results of the research, as it is the most reliable measure for the analysis of composite reliability (Dijkstra & Henseler, 2015; Martínez-Navalón, Gelashvili, & Debasa, 2019). The analysis was also positive, with all constructs comfortably above 0.7. This confirmed that all the constructs analysed were reliable and that they accounted for more than 50% of the variance of the items (Hair et al., 2017).

The validation of the first-order measurement scale concluded with the analysis of discriminant validity, which was carried out by means of two analyses. The first was the Fornell and Larcker analysis (Fornell & Bookstein, 1982) a technique that analyses the amount of variance captured by an indicator variable (AVE), which has to be greater than the variance that this variable has with any other variable in the model (Hair et al., 2017). As shown in the Table 3.2 below, the validity of the model was confirmed.

Table 3.2. First-order measurement model (Fornell and Lacker)

	Ans	T. Comp	T. Uncert	T. Insec	T. Inv	Perf	Satisf	T. Overl
Ans	0.914							
T. Comp	0.738	0.895						
T. Uncert	0.065	0.086	0.833					
T. Insec	0.645	0.545	0.137	0.844				

	Ans	T. Comp	T. Uncert	T. Insec	T. Inv	Perf	Satisf	T. Overl
T. Inv	0.334	0.310	0.220	0.322	0.853			
Perf	-0.412	-0.350	0.157	-0.344	-0.183	0.854		
Satisf	-0.515	-0.488	0.086	-0.422	-0.309	0.687	0.872	
T. Overl	0.311	0.240	0.215	0.365	0.624	-0.154	-0.278	0.843

Table compiled by the authors from PLS

The second analysis, carried out with the Heterotrait-Monotrait model (HTMT), which facilitates a more thorough and precise analysis of the discriminatory validity criterion (Henseler et al., 2015), which also confirmed the validity of the measurement scale as shown in the table 3.3 below:

	Anx	T. Comp	T. Uncert	T. Insec	T. Inv	Perf	Satisf	T. Overl
Anx								
T. Comp	0.831							
T. Uncert	0.148	0.17						
T. Insec	0.757	0.647	0.218					
T. Inv	0.383	0.361	0.278	0.388				
Perf	0.475	0.407	0.195	0.417	0.228			
Satisf	0.592	0.569	0.11	0.514	0.362	0.819		
T. Overl	0.348	0.267	0.297	0.443	0.772	0.192	0.325	

Table 3.3. First-order measurement model: (Heterotrait-Monotrait ratio (HTMT))

Table compiled by the authors from PLS

Once the measurement scale of the first-order model had been validated, we proceeded to analyse the second-order measurement scale, as it is a multidimensional model. First, the dimensions of the multidimensional variable were grouped by transforming each dimension into a necessary item that constructed the formative variable. As all the other variables had already been analysed, it was not necessary to measure them again and only the new grouped variable was analysed.

This variable, which is technostress, being formative in nature, was analysed using VIF collinearity analysis, which had to be less than 3 (Hair et al., 2019), and the weights. The relative relevance of the formative indicators is assessed with the weights and the highest value that the set of formative indicators of a variable can obtain is $1/\ n^{1/2}$, where n is the number of indicators, in our case 5. Therefore, the highest value should not exceed 0.447. This analysis is also shown in Table 3.4 below:

Table 3.4. Second-order measurement items. Constructs

Construct	Items	Weights	VIF
Anxiety	ANX-1	0.373	2.704
	ANX-2	0.366	3.309
	ANX-3	0.355	2.717
Satisfaction	SATISF-1	0.411	2.147
	SATISF-2	0.365	2.27
	SATISF-3	0.37	1.783
Performance	PERF-1	0.405	2.073
	PERF-2	0.43	1.613
	PERF-3	0.336	1.895
Technostress	T-OVERL	0.082	1.742
	T-INV	0.128	1.736
	T-COMP	0.633	1.47
	T-INSEC	0.409	1.556
	T-UNCERT	-0.214	1.065

Table compiled by the authors from PLS

Therefore, we go beyond the formative analysis and proceed to analyse its significance by Bootstrapping with 50,000 samples and a single tail, as this is how we set the hypotheses (Hair et al., 2014, 2019). This analysis is also shown in Table 3.5 below.

Table 3.5. Bootstraping. Weights

	Original Sample (O)	Statistics T (|O/STDEV|)	P Values
Anx-1 <- Anxiety	0.373	35.056	0.000
Anx-2 <- Anxiety	0.366	37.778	0.000
Anx-3 <- Anxiety	0.355	35.310	0.000
Complexity -> Technostress	0.633	10.210	0.000
Uncertainty -> Technostress	-0.214	4.173	0.000
Insecurity -> Technostress	0.409	6.289	0.000
Invasion -> Technostress	0.128	2.389	0.008
Perf-1 <- Performance	0.405	25.931	0.000
Perf-2 <- Performance	0.43	25.588	0.000
Perf-3 <- Performance	0.336	22.002	0.000
Satisf-1 <- Satisfaction	0.411	32.741	0.000
Satisf-2 <- Satisfaction	0.365	34.885	0.000
Satisf-3 <- Satisfaction	0.370	30.457	0.000

	Original Sample (O)	Statistics T (|O/STDEV|)	P Values
Overload -> Technostress	0.082	1.382	0.083

Table compiled by the authors from PLS

From the analysis we can see that all items are significant except invasion-technostress (0.008) and overload-technostress (0.083). However, according to (Hair et al., 2014) it is not ruled out if its weight is less than 0.05, so we maintain invasion. If it is higher, the loads should be analysed, and having a significant load according to (Hair et al., 2019) the overload item is also maintained. This analysis is also shown in Table 3.6 below.

Table 3.6. Bootstraping. Loads

	Original Sample (O)	Statistics T (|O/STDEV|)	P Values
Anx-1 <- Anxiety	0.909	82.245	0.000
Anx-2 <- Anxiety	0.929	104.219	0.000
Anx-3 <- Anxiety	0.904	54.337	0.000
Complexity -> Technostress	0.897	35.549	0.000
Uncertainty -> Technostress	-0.058	0.752	0.226
Insecurity -> Technostress	0.797	18.940	0.000
Invasion -> Technostress	0.460	8.667	0.000
Perf-1 <- Performance	0.880	68.683	0.000
Perf-2 <- Performance	0.846	52.906	0.000
Perf-3 <- Performance	0.833	39.096	0.000
Satisf-1 <- Satisfaction	0.888	82.663	0.000
Satisf-2 <- Satisfaction	0.885	66.928	0.000
Satisf-3 <- Satisfaction	0.843	41.398	0.000
Overload -> Technostress	0.417	6.866	0.000

Table compiled by the authors from PLS

Once the measurement scale has been validated and before carrying out the analysis of the proposed model, we must check that there is no multicollinearity of the structural model by means of the VIF. If VIF > 5 there will be multicollinearity problems, so ideally VIF should be below 3.3. As can be seen in the table 3.7 below, all values are less than 3.3 so there is no multicollinearity (Hair et al., 2019).

Table 3.7. Multicollinearity by VIF

	Anxiety	Performance	Satisfaction	Technostress
Anxiety		2.673	2.618	
Performance				

	Anxiety	Performance	Satisfaction	Technostress
Satisfaction		**1,496**		
Technostress	1	2.873	2.618	

Table compiled by the authors from PLS

3.5.2. Analysis of the results of the questionnaire

Once the measurement scale had been analysed and validated, the structural model was analysed to assess the predictive capacity of the model and the link between the hypotheses. However, it is important to perform the analysis of the algebraic sign, significance and magnitude of the coefficient ffi client, which serve to measure the predictive relevance of the model (Martínez-Navalón, Gelashvili, & Debasa, 2019). For this, the values of R^2must be high, since it will assume that the model can predict.

If R^2 is greater than 0.5 it is moderate and if it is less than 0.25 it is weak; acceptable values are also based on context and some disciplines, so that a very low value could be considered satisfactory (Hair et al., 2019). The Q^2 is used to evaluate the predictive accuracy of the model and is obtained by applying Blindfolding, which implies that the model has predictive validity with respect to the variable analysed). A Q^2 below 0.25 will have a small effect while one above 0.5 will have a large effect and any value in between will have a moderate effect (Hair et al., 2019). This analysis is also shown in Table 3.8 below.

Table 3.8. Blindfolding R^2 and Q^2

	R^2	Adjusted R^2	Q^2
Anxiety	0.618	0.617	0.511
Performance	0.479	0.475	0.339
Satisfaction	0.332	0.329	0.247

Table compiled by the authors from PLS

Thanks to this favourable structural model study, the hypotheses were tested and it was concluded that all relationships were significant, except for the relationship between anxiety and performance, and technostress and performance, which did not reach significant values to confirm their relationship and are therefore rejected. This analysis is also shown in Table 3.9 below:

Table 3.9. Hypothesis analysis and results

	Original Sample (O)	Statistics T (| O/Stdev|)	P Values	Status of the hypothesis
Anxiety -> Performance	-0.065	1.125	0.130	**Rejected**
Anxiety -> Satisfaction	-0.192	2.592	0.005	Accepted
Satisfaction -> Performance	0.643	15.143	0.000	Accepted

	Original Sample (O)	Statistics T	P Values	Status of the hypothesis
Technostress -> Anxiety	0.786	36.953	0.000	Accepted
Technostress -> Performance	-0.022	0.366	0.357	**Rejected**
Technostress -> Satisfaction	-0.413	6.009	0.000	Accepted

Table compiled by the authors from PLS

Therefore, once the measurement scale has been analyzed and validated and the structural model has been analyzed, the scheme would be as shown in Figure 3.2 below:

Figure 3.2. Structural model after PLS analysis

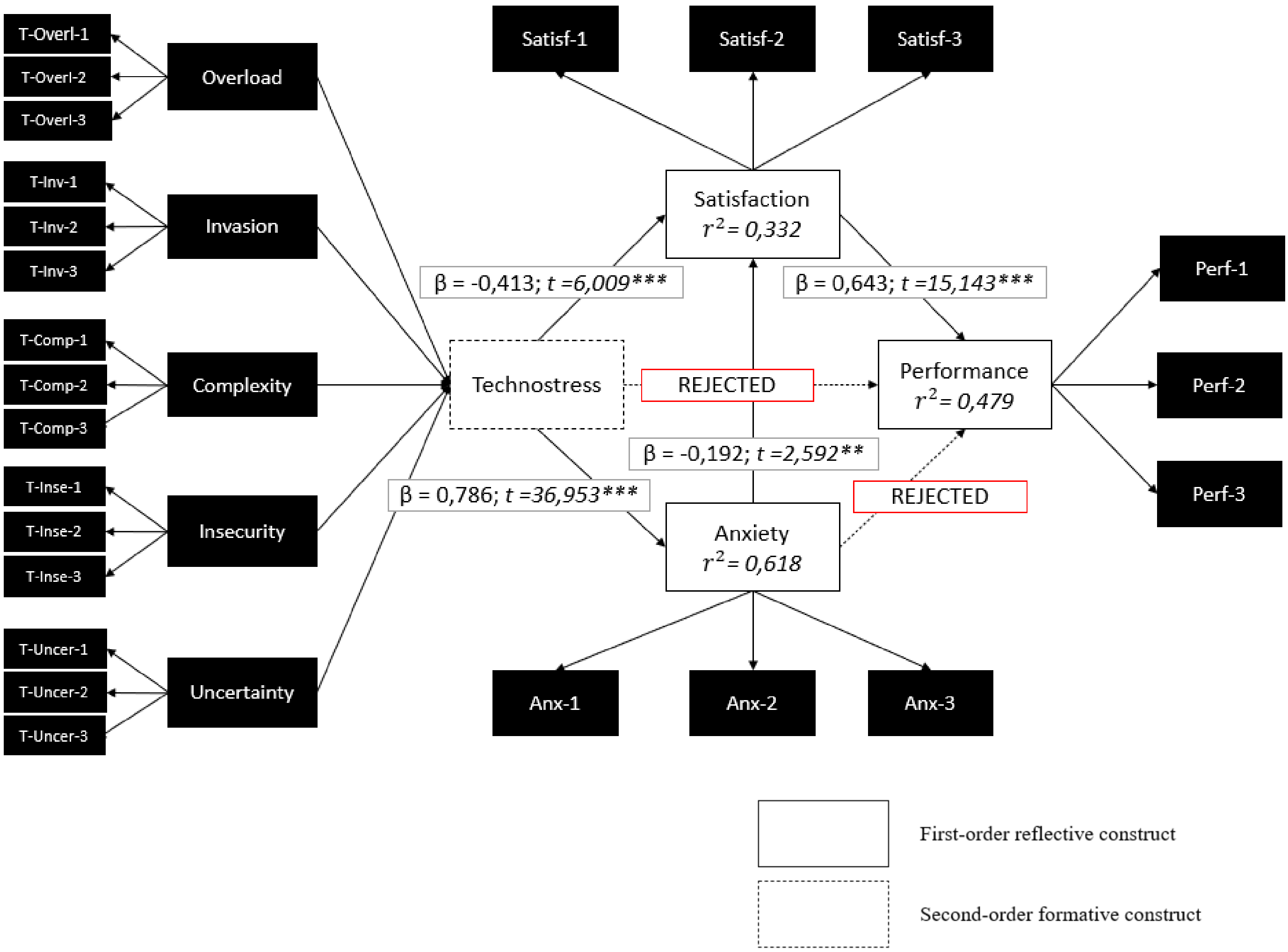


Figure compiled by the authors from PLS

3.6. DISCUSSION

Having reviewed the research literature and analysed the results of the questionnaire, it can be concluded that technostress significantly affects teleworkers and students at universities in the Community of Madrid, and this is reflected in one way or another in the way they approach their work. This has been shown in their performance, in how ICT use affects their job performance, in their satisfaction as a result of using digital platforms, and in teleworkers' anxiety when it comes having to do the use of technology in telework.

The emergence of Covid-19 and the arrival of the pandemic more than a year ago accelerated the growth of telework and platform use exponentially, making it a measure that is here to stay. As a result, its rapid implementation and transformation over the last few years has influenced the personal and working lives of its users.

The results of the research show that the technostress suffered by the use of ICTs during teleworking directly and negatively affects their satisfaction. This means that the higher the technostress experienced in the use of technologies, the lower the satisfaction of teleworkers using them. Likewise, higher satisfaction leads to higher work (Atanasoff & Venable, 2017; Suh & Lee, 2017; Zhao et al., 2020), greater innovation in their work performance and better decision-making by teleworkers . This supports the previously mentioned theories (Foroughi et al., 2022; Tarafdar et al., 2010; Zhao et al., 2022) and confirms our first hypothesis *H1. Technostress has a direct and negative influence on satisfaction.*

The model rejects that technostress directly and negatively affects performance due to lack of significance. Therefore, our second hypothesis is rejected and does not support the research mentioned in our literature (Hwang & Cha, 2018; Salo et al., 2019; Tarafdar et al., 2020). However, this is due to the fact that the approach of our research considers the consequences of technostress, i.e., it talks about techno-distress (Tarafdar et al., 2019). However, as discussed above, other researchers also consider techno-eustress whose positive consequences can increase performance, among other factors (Salazar-Concha et al., 2021). This implies that there is a relationship, but since it is not negative, as proposed in the model, we must reject our second hypothesis *H2. Technostress has a direct and negative influence on performance*.

On the other hand, it can be affirmed that technostress directly and positively affects teleworkers' anxiety. Thus, the greater the technostress perceived by teleworkers, the greater the degree of anxiety suffered (Foroughi et al., 2022; Grillon et al., 2020; Yang & Lin, 2018). This confirms the third hypothesis of our research *H3. Technostress has a direct and positive influence on anxiety.* As other researchers have commented, it is noted that learning to use new technologies or working overtime on weekends leads to time disruption, resulting in work-family conflict and, as a consequence, higher levels of work anxiety. The analysis carried out positively and directly connects the dimensions of technostress with the anxiety variable, which is why the hypothesis is confirmed (Grillon et al., 2020; Yusof et al., 2023; Zhao et al., 2022).

In addition, the analysis shows that this satisfaction directly and positively affects performance. This means that the higher the satisfaction of teleworkers, the higher their job performance. This aspect is really important since it relates the variables technostress, satisfaction and performance in a clear and concise way, i.e., the higher the techno-stress, the lower the satisfaction and therefore the lower the performance. Thus, our fourth hypothesis *H4. Satisfaction has a direct and postive influence on performance* is supported and confirmed, in accordance with research supported by other researchers (Li & Wang, 2020; Zhao et al., 2022). As supported by research, high teleworker satisfaction implies that they are satisfied with the digital platforms, accuracy, timeliness of information (Foroughi et al., 2022; Tarafdar et al., 2010) ease of use (DeLone & McLean, 2003), and security provided by ICTs, which positively affects their innovativeness (Liu et al., 2023) and performance.

Furthermore, it can also be concluded from this research that anxiety directly and negatively affects satisfaction. Therefore, a high level of technostress will lead to high levels of anxiety, which will decrease teleworkers' satisfaction. The hypothesis *H5. Anxiety has a direct and negative influence on satisfaction* is also supported by previous research, as anxiety at work causes teleworkers to feel overwhelmed when they have not adequately coped with their tasks or the need for training related to the new information technology (Foroughi et al., 2022; Gelashvili et al., 2021; Suh & Lee, 2017). This anxiety about constantly needing to acquire technology leads to user dissatisfaction. Thus, this confirms the importance of considering the three variables together if one wants to assess or measure how the variable technostress affects teleworkers.

Finally, our analysis does not confirm that anxiety directly and negatively affects performance due to a lack of significance. According to some studies, teleworkers with a high level of anxiety have a low performance efficiency as their response time is longer, while teleworkers with a low level of anxiety have better results as they perform in a shorter time (Foroughi et al., 2022; Li & Wang, 2020; Ng & Lee, 2016). However, as discussed in the theory, many times these variables are influenced by external or internal stimuli, or neutral or threat-related stimuli. This fact affects individuals (Eysenck et al., 2007), and could justify that our last hypothesis H6 is not confirmed.

3.7. CONCLUSIONS

It is important to take into account that the results obtained project very relevant data to be assessed when establishing telework as a working modality and when implementing the use of ICTs for the performance of their activity. The benefits that companies can derive from the technology will largely depend on the quality of its use, and hence teleworkers' satisfaction with ICTs. Its important to point out the importance of right management of ICTs in the company, because teleworkers often do not have the right conditions and computer equipment to carry out their activities, which reduces their satisfaction and hampers their performance. This is why managers could consider the possibility of providing equipment that creates the right environment for teleworking in the right conditions, reduces their anxiety and the time they spend using ICT, increases their satisfaction and therefore also increases their performance.

Therefore, this study can serve as a basis for investigating a clearly important aspect given the evolution of society and the importance of technology in their daily lives, since, despite its many benefits, misuse and inadequate work management can have consequences that harm teleworkers and diminish their quality of life. This would be reflected in their performance and could therefore lead to poorer results for the organisation. The literature review of the technostress concept have shown that the term is clearly increasing in importance. The most recurrent themes now are those related to social networks, and to work overload in particular. It might be interesting, therefore, to investigate how users are affected by the technostress produced by the use of social networks, on their satisfaction, anxiety and performance. Also to study how the work overload dimension of technostress affects individual teleworkers' satisfaction, anxiety, and performance.

3.7.1. Theoretical implications

This research provides theoretical implications for the academic literature. Almost all of the literature analysed on the relationship between the variables studied was theoretical, which shows the importance of the results of this study for academia. Contributions in the theory are as follows: (i) a specific measurement scale has been validated to show the relation between technostress, satisfaction, anxiety and performance. This could be of great interest to other researchers in measuring technostress in a broader and more comprehensive way for future researc; (ii) results have shown that there is a direct and negative relationship between technostress and variables such as satisfaction and anxiety, the latter being the so-called 21st century disease that has brought the attention of the academic literature. We therefore consider this study to be a pilot study for the academic literature, calling for further studies to reinforce these results; (iii) more focus should be on the technostress importance for the company performance, since the results have rejected the relationship between technostress and performance, although the literature has supported this relationship. Therefore, more quantitative studies with a larger and more generalised sample are needed.

3.7.2. Practical implications

The implications for the practical application of these findings could be as follows: (i) managers need to realise how the use of ICTs in the organisation can affect teleworkers. This will enable them to adopt different measures to avoid technostress as not all teleworkers will experience technostress in the same way or to the same degree; (ii) taking into account the dimensions of technostress mentioned above, senior managers should be aware of work overload, invasion of private life, uncertainty due to continuous updates, complexity and perceived insecurity in the use of ICTs. In addition, they should take into account the teleworker's levels of satisfaction and anxiety, since the teleworker's performance, and hence the work of the organisation and the success of the company, will depend on this; (iii) this research paper offers a number of measures that senior managers can take to mitigate technostress, like the possibility to offer training courses to solve problems of complexity and uncertainty for those users who find it difficult to adapt to the technologies. Also, it would be interesting to monitor the time teleworkers spend online, to prevent them from exceeding their actual working hours, thus avoiding invasion of their private lives and favouring work-life balance; (iv) it is vital for senior management to be aware of changes in the mood and performance of teleworkers, as these can be symptoms of problems related to technostress, and it is important to detect them in order to address them. The more managers are aware of the impact of technology use on their organisation and their teleworkers, the more effective they will be in implementing systems to help teleworkers mitigate the damage. Therefore, the greater the satisfaction and performance of teleworkers, which directly affects the success of the organisation.

3.7.3. Limitations

This study is not free of limitations. Having studied and surveyed teleworkers and online students, it would be interesting to study the differences between the impact of technostress on students and teleworkers separately. In addition, a descriptive study of the variables has been carried out, but it has not yet been analysed whether there are differences between respondents in relation to their gender, their age range, their level of education, the work they do or even the family unit in which they live. Future research therefore aims to mitigate these limitations. Another limitation of the study is the sample, since only one Autonomous Community sample was used. Therefore, it would be interesting in future studies to observe whether there are differences depending on the geographical of the sample analysed. In addition to this, it should be noted that the sample is not entirely random and therefore it is important to take into account the convenience of the questionnaire, as the selection responds to subjective criteria such as proximity, kinship, university or friendship.

On the other hand, the items of the performance construct reflect respondents' self-perceived job performance and not the independent assessments of a supervisor. Therefore, there may be a certain degree of subjective bias in the measurement of this construct. It is also important to note that, due to the situation in which the study is framed during the still ongoing Covid-19 pandemic, the research may have been influenced by experiences of technostress and use of technologies during confinement that may have been aggravated by the pandemic situation.

3.8. APPENDIX

Annex 3.1. First-order measurement items. Constructs

Construct	Items	Variable	weights	CA	CR	rho_A	AVE
Anxiety	Anx-1	I hesitate whether or not to use digital platforms for teleworking because I might make mistakes.	0.907	0.902	0.938	0.902	0.836
	Anx-2	Using digital platforms for teleworking is intimidating for me.	0.929				
	Anx-3	I feel insecure about using digital platforms for teleworking.	0.905				
Satisfaction	Satisf-1	I am fully satisfied with the use of digital platforms in teleworking.	0.889	0.843	0.905	0.847	0.761
	Satisf-2	My experience with the use of digital platforms at work has met my expectations.	0.886				
	Satisf-3	I am proud of my work in the use of digital platforms in teleworking.	0.84				

Construct	Items	Variable	weights	CA	CR	rho_A	AVE
Performance	Perf-1	Digital platforms improve my productivity in teleworking	0.883	0.815	0.89	0.821	0.729
	Perf-2	Digital platforms allow me to telework comfortably	0.84				
	Perf-3	Digital platforms allow me to do more work than would otherwise be possible.	0.839				
Telework overload	T-Overl-1	I feel forced to work faster because of the use of digital platforms in teleworking.	0.806	0.804	0.881	0.847	0.711
	T-Overl-2	I feel forced to do more work than I can cope with because of the use of digital platforms in teleworking.	0.861				
	T-Overl-3	I feel forced to work on a very tight schedule because of the use of digital platforms in teleworking.	0.862				
Invasion	T-Inv-1	I spend less time with my family due to teleworking and the use of digital platforms.	0.841	0.813	0.889	0.854	0.727
	T-Inv-2	I have to keep an eye on my work during my free time due to teleworking and the use of digital platforms.	0.793				
	T-Inv-3	I feel that my personal life has been invaded as a result of teleworking and the use of digital platforms.	0.919				
Complexity	T-Comp-1	I don't know enough about digital platforms in telework to manage my work satisfactorily.	0.893	0.876	0.924	0.877	0.802
	T-Comp-2	I need a lot of time to understand and manage the new technologies in teleworking	0.91				
	T-Comp-3	I often find it too complex to understand and manage the new technologies in teleworking	0.883				
Insecurity	T-Inse-1	I feel a constant threat to my job security because of the new technologies that are technologies	0.832	0.798	0.881	0.803	0.712
	T-Inse-2	I do not share my knowledge with colleagues for fear of being replaced.	0.823				

Construct	Items	Variable	weights	CA	CR	rho_A	AVE
	T-Inse-3	I feel threatened by teleworking colleagues with more recent technological knowledge technological know-how.	0.875				
Uncertainty	T-Uncer-1	In our organisation, new technologies are constantly being used for teleworking.	0.863	0.789	0.871	0.84	0.693
	T-Uncer-2	In our organisation, there are constant changes in the computer equipment we use for teleworking.	0.792				
	T-Uncer-3	In our organisation, there are frequent updates to the digital platforms that we use for teleworking	0.841				

CAPÍTULO 4 : HOW LEGITIMACY INFLUENCES RELATIONSHIP QUALITY IN ORGANIZATIONS USING DIGITAL PLATFORMS FOR ONLINE MANAGEMENT[2]

Abstract:

Nowadays, organizations must have high legitimacy levels to be able to obtain greater resources, be more efficient and thus increase their chances of survival in the sector. In addition, organizations need to achieve high values regarding the Relationship Quality model constructs (satisfaction, trust, and commitment) to increase the possibilities of establishing and maintaining long-term relationships with their stakeholders. With the emergence of technology, organizational relationships and management are conducted in an online manner. For this reason, this research focuses on analyzing the relationship that exists between organizational legitimacy, satisfaction, trust, and commitment in the context of the online organization, more specifically in higher education. The purpose of this paper is to identify which is the most accurate manner to effectively manage organization resources through the use of digital platforms when planning strategies considering their stakeholders. To achieve this objective, a questionnaire was created and a sample of 830 questionnaires from different stakeholder groups from a Spanish public organization was obtained. The sample was analyzed using the PLS-SEM methodology (partial least squares structural equation model). The obtained results confirm the existence of a direct and positive relationship between the legitimacy and the Relationship Quality constructs, concluding that the legitimacy level of the institution influences and precedes the satisfaction, trust, and commitment of the stakeholders of the organization. The conclusions obtained from this research contributes to the higher education management field when planning future strategies, helping organization managers and political leaders to have a more objective vision of what the different stakeholders perceive about the institution.

Keywords:

Legitimacy, Satisfaction, Trust, Commitment, Relationship Quality, Organization

4.1. INTRODUCTION

Organizations play an important role in improving social and economic welfare through knowledge transfer (Martínez-Navalón et al., 2023) . One of the most important and influential organizations are universities as they are responsible for the training of students, which will have an impact on society (Martínez-Navalón, Gelashvili, et al. 2023). The higher education system is considered one of the fundamental pillars for a country´s competitiveness and growth (Gelashvili et al., 2023).

Historically, Spanish public universities prioritized short-term outcomes, hindering personalized stakeholder demands (Cantarutti & Pothos, 2022). Applying market

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principles to social institutions like universities is unsuitable; considering stakeholder satisfaction is crucial (Cantarutti & Pothos, 2022). Addressing this, universities should adopt relational marketing, focusing on nurturing stakeholder interactions (Godfrey et al., 2011). This emphasizes lasting relationships through satisfaction, trust, and commitment (Schlesinger et al., 2017), reshaping stakeholder preferences (Gelashvili et al., 2023; LW. Wu, 2010) .

Financing public institutions is pivotal; resources, whether public or private, are essential for long-term survival and impact, like enhancing research prestige (O'Kane et al., 2015). High legitimacy levels are key for organizational sustainability, as they showcase recognition for adapting to accepted norms (Cattaneo et al., 2016) . Achieving stakeholder support is critical for legitimacy within higher education (López & González, 2012).

This study examines the relationships between university legitimacy, satisfaction, trust, and commitment, surveying 830 professors and students of the universities of Madrid. Structural equation modeling through Smart PLS analyzed the data, revealing the influence of university legitimacy on Relationship Quality constructs, especially trust and satisfaction, crucial for enduring higher education stakeholder relationships. These findings guide higher education managers in intangible asset management and inform resource allocation by political leaders.

The paper follows this introduction with several sections. The theoretical framework highlights legitimacy, satisfaction, trust, and commitment aspects, proposing hypotheses grounded in legitimacy's influence. The paper is structured as follows: it commences with a description of the methodology and data analysis, subsequently presenting the results. The study then draws to a close with conclusions, managerial implications, a discussion of limitations, and suggestions for future research directions.

4.2. THEORETICAL FRAMEWORK

4.2.1. Legitimacy

Legitimacy is considered as one of the fundamental pillars of the Institutional Theory and is recognized as one of the most relevant intangible assets for organizations (Cruz-Suárez et al., 2014). In order to maintain or improve their legitimacy level, organizations must introduce strategies that align with stakeholders´ demands and social requirements (Suchman 1995, Bitektine and Haack 2015, Deephouse et al. 2017). Scholars like (Barley, 2008) have analyzed how legitimate organizations represent a high degree of institutionalization, which results in less need to justify their activities and actions in the market.

To analyze the legitimacy level of organizations or univerisities, it is important to understand the different dimensions of legitimacy. These dimensions are based on the general perception that an organization´ actions and activities are desirable, appropriate, and correct within the social environment. Moreover, these different dimensions are assessed based on different behavioral dynamics (Díez-Martín, Blanco-González, & Díez-de-Castro, 2021; Haack et al., 2021; Miotto et al., 2020).

The literature review has identified different classifications of legitimacy dimensions (Cruz-Suárez et al., 2014). The period spanning from the late 20th century to the early

21st century marked a notable surge in the creation of classifications, coinciding with the emergence of several seminal research papers within the realm of legitimacy.. Table 4.1 presents the most relevant dimensions, highlighting those provided by Suchman (1995) (Díez-Martín, Blanco-González, & Díez-de-Castro, 2021; Martínez-Navalón, Blanco-González, & Díez-Martín, 2019).

Table 4.1. Legitimacy dimensions

Authors	Legitimacy dimensions
(Stryker, 1994)	Consent, approval, and norms cognition
(Aldrich & Fiol, 1994)	Cognitive and socio-political
(W. R. Scott, 1995)	Divides the socio-political dimension in regulative, normative, and cognitive
(Suchman, 1995)	Pragmatic, moral and cognitive
(Archibald, 2004)	Regulative and cultural
(Bansal & Clelland, 2004)	Create environmental dimension for companies
(Díez-Martín, Blanco-González, & Prado-Román 2021)	Bibliometric analysis: Pragmatic, moral and cognitive

Source: Own elaboration

This research utilized the dimensions proposed by (Suchman 1995) which encompass legitimacy's three key dimensions: pragmatic, moral, and cognitive. Recent studies predominantly adopt this categorization (Deephouse et al. 2017). Pragmatic legitimacy concerns an organization's capacity to address stakeholders' interests and needs. Organizations form direct relationships within a specific environment, potentially yielding substantial influence, as stakeholders endorse policies satisfying their demands (Bloodgood et al., 2017; Tost, 2011).

Moral legitimacy assesses the organization's normative aspects positively (Cruz-Suárez et al., 2014) . It gauges the acceptability of services, techniques, procedures, or structures, exemplified by adhering to social expectations in relationships with employees or customers (J. W. Scott, 1991).Cognitive legitimacy pertains to actions that ensure proper organizational performance and strategy execution. Stakeholders view these actions as optimal solutions to problems (Díez-Martín, Blanco-González, & Díez-de-Castro, 2021).

In the university context, legitimacy is foundational for sustainability, impacting resource acquisition, especially for public universities reliant on public funds (Cattaneo et al., 2016). Institutions aligning with stakeholder norms enhance survival and resource access, crucial for legitimacy (Deephouse 1996, Ruef & Scott 1998, Díez-Martín et al. 2013, Cruz-Suárez et al. 2014, Iglesias-Pérez et al. 2018, Martínez-Navalón, Blanco-González, & Díez-Martín 2019). Conforming to paths and meeting stakeholder demands maintains and elevates legitimacy (Dillard et al., 2004).

Legitimacy in universities is fostered through academic knowledge dissemination, pivotal for rankings and reputation (O’Kane et al., 2015) . Research paper quantity and quality significantly shape university rankings (Deephouse et al. 2017, Lim 2017, Bitektine et al. 2020, Miotto et al. 2020, Blanco-González et al. 2021).

4.2.2. Relationship Quality

The existing research about relationship quality has been focused on understanding stakeholders needs and feelings, in order for organizations to develop policies to generate and transmit value to increase satisfaction, trust and commitment levels (Kumar & Reinartz 2016). Its main objective is to identify and evaluate all the elements that could have an influence on the correct generation and management of a commercial relationship with the use of digital platforms (Al Dmour et al. 2019).

The relationship quality model gauges a relationship's suitability in meeting stakeholders' needs (Hennig-Thurau & Klee, 1997). It reflects the overall strength of the relationship and its alignment with agents' expectations. The level of relationship quality significantly impacts relational marketing success (Bennett & Barkensjo, 2005) and stakeholder loyalty (Walsh et al., 2010), fostering favorable future behavior towards the organization (Garbarino & Johnson, 1999; Al Dmour et al. 2019).

When analyzing the relationship quality concept, no consensus has been reached in the literature regarding its definition and dimensions . However, the great majority of the researchers agree on the existence of three main dimensions (Sivaraks et al., 2011) as key elements of the quality of the relationship approach:

- The satisfaction level that stakeholders have with the received services or products from a specific company.
- The trust level towards the organization.
- The commitment level that stakeholders have regarding their relationship with the institution.

Stakeholder satisfaction assesses both perceived service and expected service (Jani & Han, 2011). This evaluation is typically approached from utilitarian and hedonistic perspectives. The former examines satisfaction as an outcome of cognitive knowledge acquisition, while the latter includes an affective element, shaping satisfaction within stakeholder groups (Al-dweeri, 2011). The satisfaction variable incorporates cognitive and affective aspects. Stakeholder satisfaction significantly impacts decisions regarding maintaining relationships with service providers. Dissatisfaction with services offered diminishes the likelihood of relationship continuity.

Trust is pivotal for nurturing stable and cooperative partnerships between organizations and stakeholders (Bilgihan & Bujisic 2015). Relying on a supplier's integrity is vital for forging successful relationships, enhancing organizational efficiency by reducing transaction risks and costs.

In trust's literature review, research predominantly measures the variable, highlighting its multidimensional nature (Lassala et al., 2010). This construct entails competence, benevolence, and honesty dimensions. Competence reflects an organization's expertise, enhancing control over activities (Cantarutti & Pothos, 2022), ensuring efficient service delivery (San Martín et al., 2004; Tseng, 2022) . Benevolence signifies an organization's commitment to mutual benefit (Sanzo et al. 2003, Díez-Martín, Blanco-González, &

Díez-de-Castro 2021). Honesty involves upholding obligations and promises, anticipating sincerity and adherence to service commitments (Prado-Román et al. 2014, Gelashvili et al. 2021, Tseng 2022).

Commitment is pivotal for sustaining enduring relationships (Nguyen et al., 2016). It facilitates coordinated behavior between stakeholders and the organization, striving for shared outcomes. Gounaris, (2005)defines commitment as the expressed desire and willingness to invest resources, aligning with stakeholders' intent to reinforce the relationship. Commitment stands as a distinguishing factor in successful relationships , involving short-term sacrifices for long-term gains (Aurier & N'Goala, 2010; Wong & Sohal, 2006). Affective indicators primarily gauge commitment, assessing the emotional connection between the organization and its stakeholders (Fullerton 2011, Hasandoust & Saravi 2017).

4.2.3. Relationships between legitimacy and the relationship quality model

Stakeholders evaluate an organization's adherence to moral, ethical, and social norms in relationships, influenced by Institutional Theory (Chaney et al., 2015). Legitimacy, driven by strategic implementation, is vital for survival (Deephouse et al. 2017). The relationship quality approach emphasizes successful exchanges through satisfaction, trust, and commitment management. In today's competitive landscape, legitimacy plays a crucial role in influencing engagement (Deephouse et al. 2017).

When enhancing legitimacy, organizations must align with stakeholder expectations, leading to increased satisfaction (Martínez-Navalón, Blanco-González, & Díez-Martín 2019). Demircioglu & Audretsch (2017) highlight how innovative policies in the public sector improve efficiency, performance, and legitimacy, ultimately enhancing stakeholder satisfaction (Martínez-Navalón, Gelashvili, et al. 2023).

H$_1$: *Legitimacy has a direct and positive effect over stakeholder satisfaction in universities that use digital platforms in online management.*

Within Institutional Theory, legitimacy stands out as one of the most pivotal factors that can determine the success or failure of organizations.. Legitimacy is a key intangible asset (Díez-Martín et al., 2010), that shows that an organization is accepted by its stakeholder groups (Deephouse et al. 2017). Legitimated organizations are perceived as significant, trustworthy within their social system (Suchman 1995) .Through the implemention of legitimated actions, organizations will increase their stakeholders´ trust and institutional credibility (Lim, 2017). Public organizations must meet the following requirements: they must be valuable, politically sustainable, legitimated and feasible, which generated desires results and creates trust within their stakeholders (Broucker et al. 2017, Díez-Martín, Blanco-González, & Prado-Román 2021, Zapp et al. 2021).

H$_2$: *Legitimacy has a direct and positive effect over stakeholder trust in organizations that use digital platforms in online management.*

Today, many organizations see legitimacy as a duty tied to adhering to established norms. This generates social legitimacy—a reflection of stakeholders' endorsement of an organization's actions. Social legitimacy emerges when institutions prioritize social responsibility, cultivating positive stakeholder attitudes and behavior. Institutions prioritizing social responsibility cultivate positive stakeholder attitudes. Failure in social commitments weakens support, impacting legitimacy (López & González 2012). Employing social strategies strengthens stakeholder commitment (Brammer et al., 2007). Social commitment aligns organizational and stakeholder efforts, driven by corporate strategies ((Dillard et al. 2004, Díez-Martín, Blanco-González, & Prado-Román 2021)

***H_3*:** *Legitimacy has a direct and positive effect over stakeholder commitment in organizations that use digital platforms in online management*.

Satisfaction stems from positive experiences, signifying an organization's fulfilment of stakeholder desires and expectations. It greatly impacts attitudes and trust toward the enterprise, influencing the trust level social groups bestow (Selnes, 1998). Widely recognized as preceding customer attitude and trust, this holds especially true when stakeholders find contracted services satisfying (Aurier & N'Goala, 2010; H.-H. (Sunny) Hu et al., 2009). High satisfaction levels significantly boost trust, essential for nurturing enduring relationships (Chen et al., 2011) . When stakeholders perceive value, satisfaction aligns with trust in the organization (J.-G. Martínez-Navalón et al., 2023)

***H_4*:** *Stakeholder satisfaction has a direct and positive effect over their trust level in organizations that use digital platforms in online management.*

Scholars widely affirm satisfaction's positive impact on commitment (Dwivedi & Johnson, 2013; Fullerton, 2011b; Kim & Brymer, 2011), fostering emotional bonds. Stakeholder satisfaction significantly contributes to positive sentiments (trust) and behaviors (commitment) toward the institution (Prado-Román et al., 2014). High stakeholder commitment benefits enduring relationships, pivotal for understanding interests and fostering joint efforts (Morgan & Hunt 1994).

Stakeholders often develop a sense of belonging, strengthening commitment and enhancing their experience (Fullerton 2011) Satisfaction as a commitment precursor is affirmed by (Schlesinger et al. 2014) and validated by (Trivellas & Santouridis 2016), highlighting their pivotal roles in higher education's competitive landscape

***H_5*:** *Stakeholder satisfaction has a direct and positive effect over their commitment level in organizations that use digital platforms in online management.*

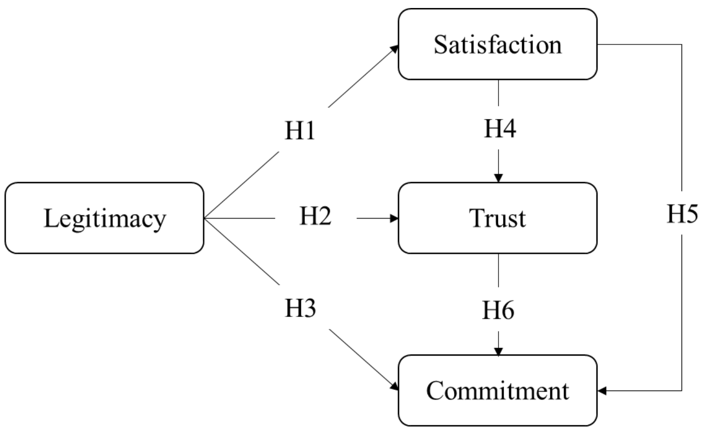
Within the literature review, scholars highlight the importance of trust since it is considered a key factor for enhancing relationships in the long-term (Bilgihan & Bujisic, 2015). The literature of the field shows its critical capability and conviction to make the relationship grow and become stronger, regardless the potential risks. Its main purpose is to increase consumers´ commitment to strengthen the relationships (Moorman et al., 1992). It can be said that the higher the trust level perceived by the customer, the higher the commitment level towards the relationship with the company would be (Flavián & Guinalıú, 2006). In fact, trust can be identified as an antecedent of commitment (Hsu et al. 2010).

Stakeholders´ commitment and trust are both key factors for the development and maintenance of long-term relationships (Sánchez-Franco et al., 2007) . When stakeholder groups show a high commitment level in the relationship with the corporation, it is more likely that they will have a deeper interest in continue being involved with the institution (Fullerton, 2011; Díez-Martín, Blanco-González, & Prado-Román, 2021)

H_6: *Stakeholder trust has a direct and positive effect over stakeholder commitment in organizations that use digital platforms in online management.*

In Figure 4.1 the proposed model to test the relationship quality in the Spanish organization context (hypotheses 4, 5, 6) and legitimacy is presented (hypotheses 1, 2 y 3).

Figure 4.1. Proposed model



Source: Own elaboration

4.3. MEHOTODLOGY AND DATA COLLECTION

4.3.1. Data analysis and collection

For empirical research and data treatment, Smart PLS was employed, estimating structural and measurement models while predicting dependent variables (Hallak et al., 2018). This technique facilitates calculation of direct and indirect effects between variables. Smart PLS was chosen for several reasons: its suitability for exploratory and innovative research, complexity of the theoretical model, and inclusion of both formative and reflective variables (Hair et al., 2014, 2018, 2020).

Data analysis drew from a self-administered survey collecting opinions of universities of Madrid. The organization's prominence within Spanish higher education influenced its selection, encompassing diverse stakeholders across Spain. The data collection spanned from May to June 2023. Surveys were distributed via email and social media, favoring effective responses, particularly from students (Escurra & Salas 2014, Martínez-Navalón, Gelashvili, et al. 2019). The survey included 35 Likert-scale questions to measure constructs comprehensively, resulting in 830 effective responses (Table 4.2).

Table 4.2. Sample description

Variables classification	Variable	Frequency	Percentage
Gender	Male	322	39%
	Female	508	61%
Age	18-22	452	54.46%
	22-30	174	20.96%
	30-45	118	14.22%
	45-60	75	9.04%
	>65	11	1.33%
Stakeholder group	Students	649	78.19%
	Professors	181	21.81%

Source: Own elaboration

Through the descriptive analysis of the data a deeper understanding of the results can be obtained since the stakeholders’ profile can be known. First, the sample is formed by a higher number of females (61% compared to 39% males). Second, the age range with higher representation are those between 18-22 and 22-30, with a 54.46% and 20.96% respectively. This age distribution is related to the high representation of students that are 78.19% of the total responses.

To develop a more extensive descriptive analysis, the detail of the different stakeholders by age group has been included in Table 4.3. In this table the most representative age group for students are the range between 18-22 with a 69.654%, while in the case of professors those age groups between 30-45 and 45-60 are the most representative with percentages of 26.52 % and 35.36% respectively.

Table 4.3. Stakeholders´ descriptive analysis

Stakeholders	Age	Frequency	Percentage
Students	18-22	452	69.65%
	22-30	126	19.41%
	30-45	54	8.32%
	45-60	15	2.31%
	>65	2	0.31%
Professors	18-22	0	0.00%
	22-30	48	26.52%
	30-45	64	35.36%
	45-60	60	33.15%
	>65	9	4.97%

Source: Own elaboration

The used indicators to measure the considered variables of legitimacy, satisfaction, trust, and commitment were obtained after developing the bibliographic review, thus the measurement scale was based on previous existing scales. The indicators applied for this research are presented in Table 4.4.

Table 4.4. Measurement instrument

Dimensions	Item	Question	
LEGITIMACY			(Díez-Martín et al. 2013, Chung et al. 2016, Alexiou & Wiggins 2018, Iglesias-Pérez et al. 2018, Martínez-Navalón, Blanco-
Pragmatic	LEGP-1	My organization provides me a personal benefit through the use of digital platforms.	
	LEGP-2	My organization helps be to develop my skills as a	

		person thanks to the use of digital platforms	González, & Díez-Martín 2019, Díez-Martín, Blanco-González, & Díez-de-Castro 2021, Díez-Martín, Blanco-González, & Prado-Román 2021)
	LEGP-3	It satisfies my needs through the use of digital platforms	
Moral	LEGM-1	My organization fulfils the law through the use of digital platforms	
	LEGM-2	My organization behaves in an honest manner through the use of digital platforms	
	LEGM-3	My organization is socially responsible through the use of digital platforms.	
Cognitive	LEGCOG-1	I know the activities developed by my organization thanks to the use of digital platforms	
	LEGCOG-2	I consider that these activities are developed in the best possible manner (technically speaking)	
	LEGCOG-3	My organization is managed correctly through the use of digital platforms	
SATISFACTION	SAT-1	I feel satisfied with my organization´s digital platforms (applied methodology, content of academic programs, professors´ capabilities, etc)	(Forgas et al. 2010, Liu et al. 2017, Schlesinger et al. 2017, Assaf et al. 2018, Martínez-Navalón, Blanco-González, & Prado-Román 2019)
	SAT-2	The experience of using digital plafroms in my organization has fulfilled my expectations.	
	SAT-3	In general terms, I feel satisfied with the choice of selecting my organization	
TRUST			
Honesty	CON1-HON	My organization fulfils its promises	
	CON2-HON	My organization makes promises that I can trust	
	CON3-HON	My organization is transparent in with its academic offer	

	CON4-HON	My organization is managed in an ethical and transparent manner	
Benevolence	CON1-BEN	My organization offers beneficial advice and recommendations for its stakeholder groups (students, professors and society in general)	(Casaló, L. V.; Flavián, C.; Guinalíu 2008, Forgas et al. 2010, Veloutsou 2015, Heo & Lee 2016)
	CON2-BEN	My organization cares about its stakeholders´ present and future interest (students, professors and society in general)	
	CON3-BEN	My organization develops actions considering their impact on their stakeholders (students, professors and society in general)	
	CON4-BEN	My organization takes into consideration its stakeholder groups (students, professors and society in general)	
Competence	CON1-COMP	My organization meets its students´ needs	
	CON2-COMP	My organization shows the necessary capacity to develop its activity	
	CON3-COMP	The professors and researchers are competent	
	CON4-COMP	My organization knows its students that enables the institution to develop programs, courses or conferences that adapt to their needs	
	CON5-COMP	The organization is competent	
	CON6-COMP	My organization trains competent students	
Commitment	COM1	I am very committed in my relationship with my organization	(Assaf et al., 2018; Fullerton, 2005; Japutra et al., 2016)
	COM2	I would defend my organization if others criticized it	

COM3	I make efforts to maintain a relationship with my organization
COM4	When someone speaks positively of my organization i feel proud
COM5	I consider my organization´s success as my own
COM6	I feel part of my organization

Source: Own elaboration

4.4. RESULTS

After presenting the data and methodology, we show the following results. When the model is estimated through PLS-SEM, several steps must be followed (Hair et al., 2018). First, the relationship between the indicators and each variable must be analyzed, followed by the relationships between constructs.

4.4.1. Measurement model evaluation (1st order)

Within this research multidimensional variables are studied; therefore dimensions are combined to generate second order latent variables, which are formed by the given dimensions (Hair et al., 2014). Under this scenario, the first order model must be analyzed first to group the indicators into dimensions and develop the second order evaluation. The primary model consists solely of reflective indicators, underscoring the importance of adhering to the following criteria: individual and composite reliability, convergent validity, and discriminant validity.

Initially, individual reliability is assessed. To do so, the loadings must be considered (λ), and their value must over 0.70 as established by (Carmines & Zeller 1979). This criteria indicates that every item is representing at least 50% of the variance of the construct (Martínez-Navalón, Gelashvili, & Debasa, 2019). Considering the obtained results, the measurement scale can be validated since every indicator fulfills the requirements.

Likewise, regarding the composite reliability, the criteria proposed by (Nunnally & Bernstein 1994) must be followed. These criteria considered a Cronbach Alpha value of 0.7 appropriate on early stages, while a value of 0.8 and 0.9 for more established research. In this research every Cronbach alpha is around 0.82, so they are considered acceptable. However, to provide a more robust study, the Dijkstra-Henseler (rho_A) indicator is included, which represent the unique constant reliability measurement. The obtained results show values over 0.7 which represent a correct ratio (Dijkstra & Henseler 2015), therefore, the composite reliability requirements are achieved (Table 4.5).

In addition, the analysis of the convergent validity represents the evaluation of the amount of a construct´s variance obtained through its indicators compared to the variance from the standard error, which is called average variance extracted (AVE). This process is developed according to the criteria provided by (Fornell & Larcker 1981) which sets a minimum value of 0.5 for the constructs. In Table 4.5 , the results on this matter are presented showing that every variable fulfills the requirements, since each construct explains more than 50% of the variance of their own indicators.

In the process of validating the measurement instrument, it is essential to conduct an examination of discriminant validity. This analysis assesses the extent to which a construct captures variance from its respective indicators (AVE), and this should exceed the variance it shares with other constructs within the mod (Fornell & Larcker 1981) (Table 4.6). For this study, the Heterotrait-Monotrait (HTMT) ratio has been employed to corroborate discriminant validity, enhancing the thorough validation analysis of the model (Hair et al., 2018).

The confidence intervals should not exceed 0.9 which indicates that the considered variables are empirically different (Henseler et al., 2015). As it appears in Table 4.5, every variable surpasses the requirements. However, to achieve the required values, the following indicators had to be removed due to their high collinearity and their high discriminant validity index: LEGCOG-3, SAT-1, CON3-HON, CON4-HON, CON2-COM, CON4-COM.

Table 4.5. Measurement instruments analysis (reliability and convergent validity)

Variable	Indicator	Loadings	Weights	CA	CR	Rho_A	AVE
Pragmatic Legitimacy	LEGP-1	0.93***	n/a	0.93	0.95	0.93	0.87
	LEGP-2	0.94***					
	LEGP-3	0.93***					
Cognitive Legitimacy	LEGC-1	0.91***	n/a	0.83	0.92	0.85	0.85
	LEGC-2	0.94***					
Moral Legitimacy	LEGM-1	0.94***	n/a	0.85	0.93	0.85	0.87
	LEGM-2	0.96***					
	LEGM-3	0.90***					
Satisfaction	SAT-2	0.97***	n/a	0.94	0.97	0.94	0.94
	SAT-3	0.97***					
Trust Honesty	CON1-HON	0.97***	n/a	1	1	1	1
	CON2-HON	0.97***					

Variable	Indicator	Loadings	Weights	CA	CR	Rho_A	AVE
Trust Benevolence	CON2-BEN	0.93***	n/a	0.88	0.92	0.88	0.8
	CON3-BEN	0.91***					
	CON4-BEN	0.79***					
Trust Competence	CON3-COM	0.9***	n/a	0.84	0.9	0.85	0.76
	CON5-COM	0.84***					
	CON6-COM	0.88***					
Commitment	COM1-	0.91***	n/a	0.94	0.95	0.94	0.75
	COM2-	0.92***					
	COM3-	0.88***					
	COM4-	0.87***					
	COM5-	0.88***					
	COM6-	0.91***					

CA= Cronbach alpha; CR=Composite reliability; AVE=Average variance extracted; VIF=Varianza inflator factor.

*p-value<0.05, **p-value<0.01, ***p-value<0.001; n/a=Not applicable

Table compiled by the authors from PLS

Table 4.6. Measurement instruments 1st order. Discriminant validity (Fornell-Lacker, 1981)

	Com	T.Ben	T. Com	T.Hon	L.Cog	L.Mor	L.Prag	Sat
Com	**0.897**							
T.Ben	0.729	**0.884**						
T.Com	0.722	0.792	**0.845**					
T.Hon	0.748	0.826	0.765	**0.969**				
L.Cog	0.632	0.670	0.640	0.653	**0.922**			
L.Mor	0.713	0.740	0.726	0.725	0.641	**0.934**		

	Com	**T.Ben**	**T. Com**	**T.Hon**	**L.Cog**	**L.Mor**	**L.Prag**	**Sat**
L.Prag	0.716	0.706	0.751	0.732	0.615	0.660	**0.935**	
Sat	0.800	0.775	0.790	0.832	0.611	0.707	0.799	**0.971**

Com=Commitment; T.Com=Trust competence; T.Hon=Trust honesty; T.Ben= Trust benevolence; L.Cog=Cognitive legitimacy; L.Mor=Moral legitimacy; L.Prag=Pragmatic legitimacy; Sat= Satisfaction

Table compiled by the authors from PLS

Table 4.7. Measurement instruments 1st order. Discriminatn validity (Heterotrait-Monotrait ratio HTMT)

	Com	T.Ben	T.Com	T.Hon	L.Cog	L.Mor	L.Prag	Sat
Com								
T.Ben	0.783							
T.Com	0.785	0.886						
T.Hon	0.792	0.896	0.839					
L.Cog	0.608	0.766	0.743	0.733				
L.Mor	0.759	0.811	0.806	0.778	0.723			
L.Prag	0.759	0.767	0.829	0.781	0.693	0.709		
Sat	0.845	0.840	0.868	0.886	0.687	0.757	0.852	

Com=Commitment; T.Com=Trust competence; T.Hon=Trust honesty; T.Ben= Trust benevolence; L.Cog=Cognitive legitimacy; L.Mor=Moral legitimacy; L.Prag=Pragmatic legitimacy; Sat= Satisfaction

Table compiled by the authors from PLS

4.4.2. Measurement model evaluation (2nd order model)

After validating the first-order measurement scale, the items are categorized into the dimensions of the variables, and the analysis of the second-order measurement instrument begins. In the second order model, both legitimacy and trust have formative dimensions. Therefore, a different analysis must be developed for these variables´ indicators and the potential collinearity issues must be addressed (Hair et al., 2018). According to (Hair et al., 2019), the collinearity is measured through the variance inflator factor (VIF) whose values must fulfill the 3.3 criteria. In this research every formative indicator is under the required value, therefore no collinearity problems are identified. In addition, the weights were analyzed and every one exceeded the required values of 0.5 (Hair et al., 2011b, 2018)(Tabla 4.8).

Table 4.8. Measurement instrument 2nd order (reliability and convergent validity)

Construct	Indicator	Weights	VIF
Legitimacy	Pragmatic	0.54***	1.99
	Cognitive	0.19***	1.91
	Moral	0.41***	2.11
Trust	Honesty	0.46***	3.50
	Benevolence	0.23***	3.89
	Competence	0.39***	2.99

VIF=Variance inflation factor;

*p-value<0.05, **p-value<0.01, ***p-value<0.001

Table compiled by the authors from PLS

Finally, the discriminant validity for the second order constructs is evaluated. To do so, the Fornell and Larcker (1981) and the Heterotrait-Monotrait (HTMT) ratio were considered, showing that the measurement instrument fulfills both criteria in a satisfactory manner (Table 4.9).

Table 4.9 Measurement instrument 2nd order. Discriminant validity (Fornell-Lacker, 1981) and (Heterotrait-Monotrait ratio HTMT)

	Fornell-Lacker				HTMT		
	Com	Trust	Leg	Sat		Com	Sat
Com	**0.897**						
Trust	0.729	**0.884**					
Leg	0.722	0.792	**0.845**		Com		
Sat	0.748	0.826	0.765	**0.969**	Sat	0.845	

Com=Commitment; Leg=Legitimacy; Sat= Satisfaction

Table compiled by the authors from PLS

4.4.3. Structural model evaluation

For the analysis of the structural model the Boostrapping method (5000 subsamples) was applied. This method enables the evaluation of the statistical significance of the coefficient paths. Before defining the significance of the established relationships, the analysis between the antecedent variables must be evaluated to avoid multicollinearity issues in the structural model. To do so, the VIF criteria proposed by (Hair et al., 2014) is applied showing that every relationship has a VIF with values under 5 which is the appropriate requirement. In addition, the goodness model fit index (SRMR) must be analyzed. According to (Hu & Bentler 1998) the model-fit is appropriate when the SRMR ratio is lower than 0.08, which is fulfilled in this research since the SRMR is 0.032.

Additionally, through the analysis of the structural model, the significance of the relationships is confirmed, thus, all the hypotheses are accepted. However, the confidence intervals will also be evaluated, to complete the analysis. Since this analysis is non-parametric, it is not based on any type of distribution. After the application of the confidence intervals, the results show that all the proposed hypotheses continue to be accepted, since the value 0 for the path coefficients is not present in any relationship of the confidence intervals (Henseler et al., 2009)(Table 4.9).

Moreover, predictive power analysis gauges the extent to which the variance of a particular construct is elucidated by other predictive constructs, and it is assessed using the determination coefficient R^2. The obtained values in this research are considered moderated for the commitment and satisfaction variables with a 70% and 69,2% respectively, and substantial for satisfaction with a value of 82,7% (Hair et al., 2014). With the aim of completing the R^2 analysis, the contribution of the constructs over each other is evaluated.

To do so, the (f^2) effect is analyzed, which evaluated the degree through which one exogenous construct contributed to the explanation of an endogenous one. In the achieved results diversity depending on the considered variable is observed. In the case of legitimacy if has a strong effect over satisfaction and trust with a 2.24 and 0.44 respectively, while the effect over commitment in relatively low with a value of 0.072. When considering satisfaction, the effect over trust is high with a 0.35 but low over commitment. Finally, trust has a low effect over commitment with a value of 0.02.

The last step, is to analyze the predictive relevance (Q^2), which indicates that the highest the value the more predictive relevance the model has (Geisser, 1975). The obtained values for this research show a strong predictive relevance (Hair et al., 2018). The results on the structural model evaluation are presented in Table 4.10 and Figure 4.2

Table 4.10. Hypotheses testing

Hipotheses	Path coefficient ($\mathscr{B}$ standarized)	T-value (bootstrap)	F^2	Confidence intervals	
				5,0%	95,0%
H1. Legitimacy-->Satisfaction	0.83***	52.83	2.244	0.805	0.857
H2. Legitimacy-->Trust	0.50***	16.85	0.445	0.454	0.551
H3. Legitimact-->Commitment	0.32***	5.93	0.072	0.226	0.410
H4. Satisfaction-->Trust	0.45***	14.13	0.361	0.396	0.500
H5. Satisfaction-->Commitment	0.37***	7.61	0.101	0.267	0.453
H6. Trust-->Commitment	0.20***	3.4	0.022	0.106	0.301

R^2: Commitment=0.700; Trust=0.827; Satisfaction= 0.692

Q^2: Commitment=0.521; Trust=0.606; Satisfaction=0.617

*p<0.05; **p<0.01 ***p<0.001

Table compiled by the authors from PLS

Figure 4.2. Final model

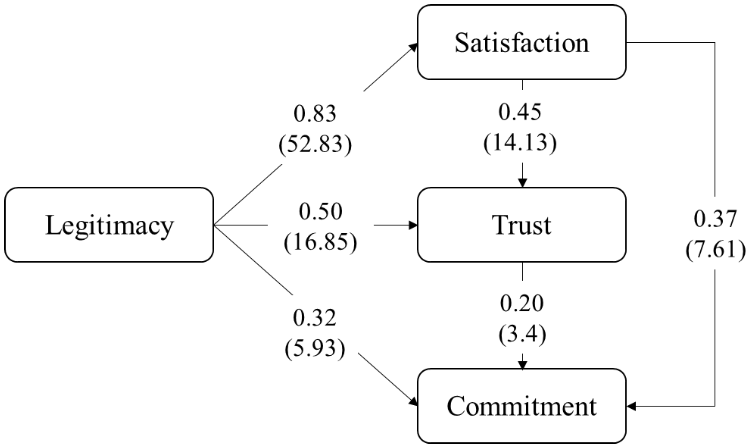


Table compiled by the authors

4.5. CONCLUSIONS

The results of this research confirm the association between an organization's legitimacy and the Relationship Quality constructs. Legitimacy has a positive and direct effect on stakeholder satisfaction, trust, and commitment, with high predictive levels in the higher education context. Notably, legitimacy has a significant impact on satisfaction and trust with the usage of digital platforms. This link is critical for university managers when formulating strategies to be perceived as legitimate and to establish lasting relationships with stakeholders in the higher education sector. Moreover, legitimacy has been found to be an antecedent of commitment, although its impact is lower.

Regarding the proposed relationships in the Relationship Quality Theory, the results demonstrate their presence in the academic environment. These relationships have a direct and positive impact. On the one hand, satisfaction on trust and on the other hand on commitment, as well as trust on commitment. According to these results, organizations must satisfy their stakeholders and be perceived as trustworthy to earn their commitment towards the institution.

Organizational managers should take into account the findings of the structural model of this research. The results have several implications for organization and university management since they can be applied to diverse stakeholders of these institutions. For alumni, universities are increasingly focusing on maintaining relationships with them after they finish their degrees. Many higher educations institutions have created an office dedicated to their alumni while developing activities to enhance their commitment to the university through digital platforms. Under this scenario, legitimized universities are more likely to maintain their relationships with their alumni. In case of students and professors, higher satisfaction levels can be achieved when universities implement legitimacy policies. For example, when a university fulfils the law, it is considered legitimate, and thus, their stakeholders' satisfaction, trust level, and commitment are enhanced.

In general terms, organization managers and politicians must understand that improving the relationship with stakeholders is achieved by enhancing the legitimacy levels of the institution on a moral perspective (the institution must behave correctly and according to social expectations), a pragmatic one (its objectives must align with those of its stakeholders). Organizations and universities must implement actions to promote transparency in their management, implement environmental policies, human resources social policies, etc., as these activities could enhance their social acceptance.

The measurement scale used in this research to assess legitimacy, satisfaction, commitment and trust through digital platforms in the higher education sector was validated, making it applicable to other educational institutions, such as schools, high schools, or vocational training centres.

With regard to the limitations of this study, several aspects should be mentioned. First, although the sample size is sufficiently large, the data collected come from only one Spanish public university. The inclusion of a wider variety of universities would provide a more complete picture of the higher education sector in Spain. Second, universities have more stakeholders than the groups included in this research. Although the groups included in this report are some of the main ones, the inclusion of other stakeholders, such as management teams or administrators, could lead to a more complete analysis.

Consequently, the first area of future research may be to replicate this study with the same institution in a few years and compare the results to identify any potential impact on university legitimacy. In addition, researchers could incorporate a larger sample of public universities and more stakeholders, to better understand the management of intangible assets in the higher education sector. In addition, other intangible assets, such as loyalty, attachment or dissatisfaction, could be included in the model to assess the impact of legitimacy on them.

CHAPTER 5: CONCLUSIONS

5.1. CONCLUSIONS

In this final chapter, we consolidate the key findings and insights gained throughout this comprehensive investigation into the impact of digital platforms on university student workers: the influence of technostress and the impact on the legitimacy and relationship quality of their organization.

In reflecting on the findings and implications of this study, it is essential to highlight the relevance and significant contributions it has made to the understanding of the dynamics between digital technology and human relationships in the modern era. In addition, this chapter offers practical, theoretical recommendations and future lines of research that emerge from the findings, contributing to a deeper and more nuanced understanding of a phenomenon as relevant and constantly evolving as technostress.

In the **second chapter** of this Doctoral Thesis, through the bibliometric analysis of technostress, this research has succeeded in describing the intellectual structure of the technostress knowledge domain and identifying research trends, which allows us to define the evolution of this field of study. This includes tracing the trajectory of technostress research in the first two decades of the 21st century and identifying the most prominent published studies.

Previous analyses had been qualitative (systematic literature reviews) and quantitative in nature, by analyzing influential variables through the use of questionnaires and statistical methods. The results complement the previous qualitative reviews in several aspects (Fisher & Wesolkowski, 1999; Tarafdar et al., 2011; G. Zhao et al., 2022).

First, this paper reveals the main lines of research, where work overload stands out as a trend during the last years. Unlike other bibliometric studies on technostress (Cuervo Carabel et al., 2018; Grummeck-Braamt et al., 2021; Salazar-Concha et al., 2021) it can be observed how studies published in 2016 and 2017 have been gaining importance in these past six years, to become burst articles considered as reference articles on technostress: Alam, (2016); Fischer & Riedl, (2017); Stadin et al., (2016).

Secondly, unlike previous research, the bibliometric analysis allows us to identify articles that not only stand out for their importance and the number of co-citations, but that are still trending today. Trending topics include work overload (Alam, 2016; Fischer & Riedl, 2017; Stadin et al., 2016), as mentioned above; social networking (Lee et al., 2016; S. Zhang et al., 2016), teaching (Joo et al., 2016) and technostress measurement scales (Tarafdar et al., 2019).

As discussed, the results show a linear evolution of the research field and suggest that technostress research is still developing a premature phase of research that focuses on analyzing the creators and mitigators of technostress and attempts to study its influence on other variables. However, once a basic body of knowledge is developed, the research field may evolve into new discussions.

In this analysis, we also show the pathways and connections through which research on technostress has been disseminated and identify the research that has contributed most to the dissemination of this area of knowledge. The literature agrees in considering the articles by Ayyagari et al., (2011); Ragu-Nathan et al., (2008) as two of the key articles to connect the different research areas (Grummeck-Braamt et al., 2021; Salazar-Concha et al., 2021).

Previous research, however, has ignored the structural equations article by Hair et al., (2018), considered a turning point, as it is the most widely used methodology in technostress research. These three articles represent the cornerstone of the technostress domain and constitute the bridge that connects different lines of research. For this reason, scholars wishing to investigate technostress should analyze these articles in depth.

Finally, it should be noted that this bibliometric analysis also uncovers research gaps or emerging areas. Prominent among these is the area of teaching, an emerging field that has received little attention in the academic literature. Surprisingly, there has been a notable absence of articles focusing on how technostress affects students and teachers in educational settings. This notable gap in research leads to the decision to thoroughly explore and analyze this topic in the following chapter of this Doctoral Dissertation.

The findings in the **third chapter** of this Dissertation offer valuable information that should be considered when implementing the use of digital platforms in organizational activities. The benefits that organizations can derive from technology depend largely on the quality of its use and, therefore, on the satisfaction of teleworkers with digital platforms.

It can be inferred that technostress significantly affects university users, and this is reflected in various aspects of their work. This impact is manifested in their performance, in how the use of digital platforms affects their work performance, in their satisfaction as a result of the use of digital platforms, and in the anxiety of teleworkers when having to use technology in teleworking.

Within the framework of this research, it emerges that the technostress caused by the use of digital platforms during telework has a direct and negative impact on the level of satisfaction of workers. That is, as the degree of techno-stress linked to technology increases, the satisfaction of employees who make use of it decreases. Moreover, higher satisfaction is associated with increased productivity (Atanasoff & Venable, 2017; Suh & Lee, 2017; Zhao et al., 2020), greater innovation in job performance, and more effective decision making by workers. These results support the previously mentioned theories (Foroughi et al., 2022; Tarafdar et al., 2010; Zhao et al., 2022).

Likewise, it is found that technostress has a direct and positive impact on the anxiety experienced by teleworkers. In other words, as teleworkers' perceived technostress increases, so does their level of anxiety (Foroughi et al., 2022; Grillon et al., 2020; Yang & Lin, 2018). As noted by other researchers, the need to learn to use new technologies or work overtime on weekends can disrupt work-life balance, which in turn generates work-family conflicts and, as a result, increases work anxiety. The analysis carried out establishes a positive and direct relationship between the dimensions of technostress and the anxiety variable, thus validating the hypothesis (Grillon et al., 2020; Yusof et al., 2023; Zhao et al., 2022).

Furthermore, the analysis evidences that this satisfaction has a direct and positive impact on job performance. In other words, the higher teleworkers' satisfaction, the higher their job performance. This finding is of great importance in establishing a clear and concise connection between the variables of technostress, satisfaction and performance. That is, the greater the technostress, the lower the satisfaction and, therefore, the lower the performance.

On the other hand, this research also reveals that anxiety has a direct and negative impact on satisfaction. Consequently, a high level of technostress leads to high levels of anxiety, which in turn decreases user satisfaction. Therefore, it confirms the relevance of considering these three variables together to assess or measure the impact of technostress on workers and students when using digital platforms in their organization's environment.

Finally, the results of this research in the **fourth chapter** confirm the influence of an institution's legitimacy on relationship quality constructs. In the context of higher education and the use of digital platforms, it is observed that legitimacy exerts a positive and direct impact on student and faculty satisfaction, trust and engagement. This means that when educational institutions manage their digital platforms in a transparent, ethical and trustworthy manner, they generate a perception of legitimacy among users. This legitimacy, in turn, translates into increased user satisfaction with the platform, as they feel supported and trust the institution.

In addition, legitimacy also significantly influences the trust that users place in digital platforms. When they perceive that the institution acts legitimately and fairly in managing technology, they are more willing to trust the system and the information it provides. This is especially crucial in academic environments, where trust and integrity of digital platforms are basic to the learning process.

Likewise, legitimacy contributes to user engagement with the platform and the institution. When students and faculty perceive that the institution is legitimate in its technological approach, they are more motivated to actively participate in the use of digital tools and online academic activities. This increased involvement in turn can improve the performance and quality of the educational experience.

In conclusion, legitimacy plays an essential role in the academic and digital world when it comes to relating it to variables such as employee and student satisfaction, trust and engagement. Its positive and direct impact highlights the relevance of institutions maintaining high standards of legitimacy when using digital platforms to foster stronger and more satisfying relationships with their users.

This link is crucial for university managers when formulating strategies to be perceived as legitimate and establish strong relationships with university workers and students. In addition, legitimacy has been found to be an antecedent of commitment, although its impact is minor.

It can be concluded, therefore, that this Doctoral Thesis effectively fulfills the research objectives that were previously stated. Along the way, fundamental answers to the questions and objectives outlined at the beginning of the study have been obtained. The findings and analyses presented in each chapter conclusively support the achievement of our purposes and contribute to the advancement of knowledge in the field of digital platforms, and their impact on different variables such as technostress, satisfaction, engagement, anxiety, performance, trust and legitimacy in work and academic environments.

5.2. PRACTICAL IMPLICATIONS

The culmination of this research not only results in a significant advance in the understanding of digital platforms and their impacts on work and academic environments, but also opens the door to a fundamental aspect of any study: the practical implications. Throughout this journey of exploration, the complex connections between digital technology and human experience are unraveled, identifying key factors that influence technostress, satisfaction, trust and legitimacy, among other variables in the technological field.

Now, it is time to reflect on how these findings can be translated into concrete actions and tangible benefits for professionals, organizations and communities. In this section, we explore in detail the practical implications of this dissertation, outlining how the findings can inform and optimize practice in a variety of settings, with the goal of promoting healthier and more effective use of digital technology and the health of those who interact with it.

The **second chapter** of the Doctoral Thesis, which develops the conceptual map of technostress through bibliometric analysis, provides professionals and organizations with useful information when carrying out different actions related to the management of technostress in work or educational settings. In addition, it can facilitate the design of strategies to address technostress among employees or students, promoting a healthy use of technology. Also, it can inform the development of training programs and resources to help people manage technostress effectively by uncovering the fundamentals of technostress creators and inhibitors.

Finally, the results obtained from the bibliometric analysis can help promote the well-being and mental health of workers and students by providing insights into how to address technostress and its effects.

In more detail, the **third chapter** provides key practical implications from these findings. This section emphasizes the importance for managers to understand how the use of digital platforms in the institution can affect users, whether they are workers or students. This will enable them to take specific measures to prevent technostress, given that its manifestation and degree vary among individuals. In addition, when considering the dimensions of technostress, senior managers should be attentive to issues such as work overload, invasion of private life, uncertainty due to constant updates, complexity and the perception of insecurity associated with the use of digital platforms.

Likewise, it is crucial for managers to pay attention to the level of employee satisfaction and anxiety, as this directly impacts their performance, which in turn affects the work of the company and the overall success of the organization. Current research provides a number of measures that senior managers can implement to mitigate technostress, such as offering training programs aimed at addressing the complexity and uncertainty perceived by those users who face difficulties in adapting to technologies.

In addition, it is beneficial to track the time teleworkers spend online, preventing them from exceeding their actual working hours. This helps to avoid invasion of their private life and promote an appropriate work-life balance. In this regard, it is essential that senior managers are aware of how variations in users' mood and performance can be indicators of significant problems related to technostress, allowing them to be addressed in a timely and effective manner.

The greater the level of awareness by managers of the impact of technology on their organization and teleworkers, the greater their effectiveness in implementing systems aimed at mitigating adverse effects. This, in turn, translates into increased teleworker satisfaction and performance, which has a direct impact on business success.

The fourth chapter, in addition to providing valuable conclusions, raises a set of crucial practical implications. It is essential that managers of organizations and universities pay attention to the results of the structural model developed in this research, as they offer relevant insights for the management of these institutions and their relationship with different stakeholders. In particular, when dealing with alumni, universities should focus on maintaining and strengthening connections with them after they complete their studies.

In this regard, many universities have chosen to create offices dedicated exclusively to their alumni, while developing activities that promote engagement through digital platforms. In this context, it is observed that universities that have established strong legitimacy are more likely to maintain long-lasting relationships with their alumni.

As for students and faculty, it has been shown that the implementation of policies that foster legitimacy can lead to higher levels of satisfaction. For example, when a university demonstrates a strong commitment to compliance with the law and behaves ethically and in accordance with social expectations, it is perceived as a legitimate institution. This, in turn, translates into increased stakeholder satisfaction, trust and commitment.

In conclusion, managers of organizations and political leaders must understand that improving relations with stakeholders is achieved by increasing the degree of legitimacy of the organization, both from a moral perspective (complying with ethical and social standards) and a pragmatic one (aligning objectives with those of stakeholders). Therefore, it is vitally important that institutions and universities implement measures that promote transparency in their management, responsible environmental policies and human resource practices that promote social welfare.

5.3. THEORICAL IMPLICATIONS

This study provides valuable insights into the relationship between digital platforms, technostress and various dimensions, such as satisfaction, engagement, trust and legitimacy the context of university workers and students. Thus, like any research, it is important to recognize that the findings have theoretical implications that can broaden and enrich the field of technostress and organizational psychology.

This bibliometric study of technostress in the **second chapter** may have several important implications for research. To begin with, it identifies the most relevant areas of research in the study of technostress; this can be very interesting for guiding future research and directing research efforts in the most critical areas.

In addition, it uncovers the most influential authors of the concept, including Ayyagari, Maier, Tarafdar (Ayyagari et al., 2011; Maier et al., 2014, 2015; Tarafdar et al., 2020and thematic research trends, which may be useful for detecting the most critical areas and for guiding future research. Notable trending topics include work overload (Alam, 2016; Fischer y Riedl, 2017; Stadin et al., 2016), as discussed above; social networks (Lee et al., 2016; Zhang et al., 2016), teaching (Joo et al., 2016) and technostress measurement scales (Tarafdar et al., 2019).

In addition, the papers are classified by lines of research. This knowledge is fundamental to understand the domain because it represents the starting point to generate new advances. Likewise, it can be very interesting for new researchers who want to advance in a particular line of research or even to generate new lines of research. Knowing these connections saves a great deal of effort and time for researchers in their understanding of the research domain, especially during the initial phases of developing the conceptual framework.

The quantitative analysis performed with PLS software in the **third chapter** also offers significant theoretical implications for the academic literature. Most of the existing literature on the relationship between the variables studied remained in the theoretical realm, which highlights the importance of the findings of this study in the academic context. First, a specific measurement scale has been validated for the first time to assess the relationship between technostress, satisfaction, anxiety and performance. This combination of four variables had not been previously investigated in the literature, which could be of great interest to other researchers who wish to address technostress in a more comprehensive and detailed manner in future research.

In addition, more attention should be paid to the importance of technostress and its impact on the performance of workers and students in organizations, since the results have rejected the relationship between technostress and performance, although the literature has supported this relationship. For this reason, more quantitative studies with a larger sample are needed to assess whether technostress is related to high levels of performance, or if, on the contrary, it negatively affects performance.

The **fourth chapter** of this Doctoral Thesis focuses on the measurement scale used to assess how the use of digital platforms impacts on legitimacy and other variables such as satisfaction, trust and commitment in the academic, university and digital environment through the use of digital platforms. It is important to note that this scale has been subject to a rigorous validation process, which means that its dimensions and questions have been thoroughly evaluated to ensure its reliability and validity in the context of this research.

A key aspect of this validation is that the findings show that the scale is not only applicable in the university setting but can also be extended and used with confidence in other educational institutions, such as schools, colleges or vocational training. This adaptability and applicability in a variety of educational settings is a significant advantage, as it allows the scale to be used effectively to measure legitimacy, satisfaction, trust and commitment at different educational levels.

Finally, by demonstrating the relevance of legitimacy theory in the digital context and its connection to emotional and engagement variables, this study extends the applications of this theory beyond traditional settings and may inspire future research in other fields.

5.4. LIMITATIONS AND FUTURE LINES OF RESEARCH

Despite the significant advances and contributions obtained throughout this doctoral thesis, it is important to recognize that no study is free of limitations. However, considering these limitations, several promising future lines of research are open. The most relevant ones are detailed below.

In the **second chapter**, a bibliometric analysis of technostress is conducted with CiteSpace, which provides useful insight into trends and patterns in the study. However, it is important to highlight some potential limitations. To begin with, CiteSpace can only analyze bibliographic databases that are available in its system, so, future major publications on the topic that are later than December 2022 or that are not in the Web of Science database could not be analyzed.

Second, CiteSpace analyzes bibliometric data (author, publication, keywords, etc.), but does not perform a comprehensive analysis of the text of the articles. This means that it is not able to fully capture the content of research articles. Bibliometric analysis can provide data on the amount of research conducted on technostress, but it cannot provide a complete understanding of the context in which the research was conducted. In addition, the bibliometric study analyzes co-cited references; therefore, it does not take into consideration papers that are not trending or as highly cited at the time of analysis.

Finally, the cluster names are not predetermined categories, but are based on experts' assessments of the content of the research analyzed. This fact limits bibliometric analysis research, as it is difficult to differentiate conclusions based on evidence from those based on expert speculation and heuristics.

However, in the analysis of technostress, several trends that are emerging in current research are identified. With the emergence of new technologies such as artificial intelligence, augmented reality or robotics, it would be interesting to explore how these technologies may contribute to technostress and in what ways strategies can be developed to manage it. In addition, with the emergence of telecommuting and the increase in telecommuting due to the COVID-19 pandemic, researchers could analyze how the use of technology in telecommuting may contribute to technostress and how strategies can be developed to manage it.

Likewise, this study also allows for an analysis of gaps and areas where research is scarce or non-existent, which may be useful in identifying areas of research where more effort is needed. Similarly, it would be interesting to investigate how cultural factors may influence technostress and in what ways it could be combated, as it has been observed that the perception of technostress may vary in different cultures. Finally, it would be interesting to analyze technostress further with another bibliometric system that would allow us to analyze future lines of research, in order to make a comparison and see how the concept of technostress has evolved.

The **third chapter** also presents some limitations that should be considered. First, it is important to note that the sample was not selected completely randomly, as it was based on subjective criteria such as geographic proximity, family relationships, university affiliation or friendship. This raises questions about the representativeness of the sample and the generalizability of the results.

In addition, although the study focused on online workers and students, it would be interesting to investigate whether there are significant differences in the impact of technostress on these two groups separately. A more detailed analysis could also be conducted to examine whether there are differences according to gender, age, educational level, occupation or family background of the respondents.

Another limitation is related to the geographic location of the sample, since it was limited to a specific Autonomous Community. It would be valuable in future research to explore whether there are geographical differences in the experiences of technostress. In addition, the dimensions of job performance were based on respondents' self-perception, which could introduce a subjective bias in the measurement. Independent evaluations from supervisors or other sources would be useful for a more objective assessment. Also, the context of the ongoing Covid-19 pandemic may have influenced experiences of technostress and technology use, which should be considered in future research.

Finally, the limitations of the **fourth chapter** stand out for several reasons. First, although the sample size is sufficiently large, the data collected come from a single Spanish public university. The inclusion of a wider variety of universities would provide a more complete picture of the higher education sector in Spain.

Second, universities have more interest groups than those considered in this research. Although the groups considered are some of the most relevant, the inclusion of other stakeholders, such as management or administrative staff, could lead to a more complete analysis. Consequently, the first area of future research would be to replicate this study with the same institution in a few years' time and compare the results to identify any potential impact on university legitimacy.

In addition, researchers could incorporate a larger sample of public universities, as well as more stakeholders, to better understand how the university sector functions. Moreover, other variables, such as loyalty, attachment or dissatisfaction, could be added to assess the influence of legitimacy on them.

Finally, the main future line of research of this Doctoral Thesis would now be to analyze the impact of technostress directly on legitimacy, an area that is notable for the absence of previous studies in this area. This approach would promise to contribute significantly to the organizational field, opening new perspectives on how academic institutions are perceived in the digital age. Given that technostress can negatively affect emotional well-being, understanding how it relates to legitimacy could lead to the implementation of policies and resources aimed at mitigating this effect and promoting the mental health of the university context.

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