APROXIMACIÓN A LA TRANSFORMACIÓN DIGITAL EN LA GESTIÓN DE LAS PYMES: ESPECIAL REFERENCIA A LAS EMPRESAS KIBS

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A lo más importante que uno tiene, la familia.

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“Nada en la vida es para ser temido, es sólo para ser comprendido. Ahora es el momento de entender más, de modo que podamos temer menos” Marie Curie.

Resumen

Esta Tesis Doctoral está formada por el compendio de tres artículos de investigación publicados en revistas de impacto científico, pertenecientes al Journal Citation Reports (JCR) de la Web of Science (WOS), con el objetivo de proporcionar un análisis exploratorio de los procesos de transformación digital (TD) en las pymes, con especial referencia a pequeñas empresas que ofertan servicios intensivos en conocimientos (Kibs) con alto valor añadido para sus clientes.

La evolución de esta tesis refleja la complejidad de esta temática ya que se considera un concepto multidisciplinar y ha sido objeto de muchas investigaciones. El primer proceso analítico que se efectúa es una revisión sistemática de la literatura a través de la bibliometría, con el objetivo de resumir la información existente a través de diferentes métricas y de ordenar su estructura conceptual. El propósito es conocer el tamaño del efecto y mostrar evidencias del comportamiento en un subgrupo conceptual de la TD, que estudia los factores que intervienen en la gestión organizativa de las pymes en el ámbito de la TD. Una vez aplicados los filtros metodológicos, se identificaron 311 artículos en el periodo 2015-2022 obtenidos de la base de datos WOS y Scopus por ser los más representativos de esta temática. Los resultados muestran que existe una orientación clara de la TD a modificar los procesos organizativos en las pymes, para que sean más ágiles y así poder responder ante los cambios bruscos que se originan en los mercados. Los elementos que delimitan la TD se basan en las tecnologías digitales a implementar, las estrategias a seguir y las capacidades digitales a comprender, y se muestra el impacto que estos elementos propician en la arquitectura de las organizaciones.

Una vez identificada la necesidad de investigación de la enorme producción científica que analiza la TD de forma holística. Se deben recopilar estudios cualitativos y cuantitativos que recojan evidencias empíricas, concretas y verificables de la temática basada en la TD en la gestión de las pymes.

Sobre el esquema analizado en la investigación teórica, se estudia el papel decisivo de las tecnologías de la información para llevar a cabo una TD en la gestión de las empresas Kibs. En este sentido, se necesita una respuesta estratégica orientada hacia la innovación de las tecnologías que debe ser impulsada por la gestión de las capacidades digitales, a través de la gestión de los recursos para formular y desarrollar productos y procesos basados en el conocimiento, el talento y la experiencia. Así mismo, se evalúa el rendimiento organizativo de

este proceso de integración tecnológico. Para validar su correlación, se elabora un modelo de ecuaciones estructurales (SEM) a partir de una muestra de 335 participantes.

El último estudio propuesto en esta tesis doctoral tiene como objetivo un análisis exploratorio inductivo de los factores que desencadenan la TD, aplicando la metodología de la teoría fundamentada, sobre el análisis de 18 entrevistas a expertos de una agrupación profesional de empresas kibs. Los hallazgos obtenidos tienen en cuenta la literatura analizada sobre los factores de la TD que afectan a las pymes, y contextualizan este fenómeno a la realidad de un sector concreto mediante la exploración de experiencias de profesionales. Se presenta un marco conceptual de una TD orientada a las empresas, que se basa en la gestión de la innovación y seguir estrategias de innovación abierta, en el que la implantación de tecnologías digitales es necesaria para la interacción que se origina entre las administraciones públicas y el sector privado, y así poder optimizar la gestión del conocimiento y crear valor añadido en los servicios prestados a sus clientes.

Abstract

This doctoral thesis comprises three research articles published in scientific journals listed in the Journal Citation Reports (JCR) of the Web of Science (WOS). Its aim is to provide an exploratory analysis of digital transformation (DT) processes in small and medium-sized enterprises (SMEs), with a particular focus on knowledge-intensive service (KIS) companies that offer high added value to their customers.

The thesis evolution reflects the subject's complexity, which is multidisciplinary and extensively researched. The first analytical process involved a systematic review of the literature using bibliometrics. The aim was to summarize the existing information using various metrics and order its conceptual structure. The purpose is to determine the effect size and provide evidence of behaviour in a conceptual subgroup of TD. This subgroup studies the factors involved in the organizational management of SMEs in the field of TD. After applying the methodological filters, we identified 311 articles from the WOS and Scopus databases that are most representative of this subject in the period 2015-2022. The results indicate that TD has a clear orientation towards modifying organisational processes in SMEs to increase agility and enable them to respond to sudden market changes. The delimiting elements of TD are based on the digital technologies to be implemented, the strategies to be followed, and the digital capabilities to be understood, and shows the impact on the architecture of organisations.

The need for research on the enormous scientific production that analyses TD holistically has been identified. Qualitative and quantitative studies should be collected to gather empirical, concrete, and verifiable evidence on the subject of TD in SME management.

This research examines the crucial role of information technologies in conducting technology diffusion in knowledge-intensive business services (KIBS) management, based on the analyzed scheme in theoretical research. To achieve this, a strategic response focused on technology innovation is required, which should be led by the management of digital capabilities. This involves managing resources to formulate and develop products and processes based on knowledge, talent, and experience. The organisational performance of this technology integration process is also assessed. To validate its correlation, a structural equation model (SEM) is constructed from a sample of 335 participants.

The final study presented in this doctoral thesis aims to conduct an exploratory, inductive analysis of the factors that trigger TD. The grounded theory methodology was applied to analyse 18 interviews with experts from a professional group of KIBS companies. The findings consider the literature on TD factors affecting SMEs and contextualize this phenomenon to the reality of a specific sector by examining the experiences of professionals. This article presents a conceptual framework for a business-oriented technology development, based on innovation management and following open innovation strategies. The framework emphasizes the importance of implementing digital technologies to facilitate interaction between public administrations and the private sector, with the aim of optimizing knowledge management and creating added value in the services provided.

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CAPÍTULO 1. Introducción y objetivos

1. Introducción

En la actualidad nos encontramos con un entorno empresarial en evolución constante y con un fuerte proceso de digitalización, por lo que se deben aprovechar las oportunidades que ofrece la transformación digital (TD) a través de la implantación y explotación de las tecnologías digitales (Nambisan et al., 2017).

Las investigaciones orientadas a implantar la TD en las organizaciones empresariales se han realizado a partir del siglo XXI. Los resultados de estos estudios muestran que estamos ante un fenómeno complejo y difícil (Hess et al., 2016) con una terminología poco clara que revela cierta confusión en sus conceptos, debido a su generalidad en las temáticas analizadas (Loonam et al., 2018). Tal es así que hasta la fecha no existe una definición comúnmente aceptada del término de TD. A continuación, se recoge en la tabla nº1 diferentes definiciones identificadas en la literatura analizada.

Tabla 1º. Muestra de definiciones de la TD

Recurso científico.	**Definiciones de la TD.**
(Liu et al., 2011)	La TD es una transformación organizativa que integra tecnologías digitales y procesos empresariales en una economía digital.
(Lucas, et al., 2013)	La TD es un proceso que implica la adopción de tecnologías digitales transformacionales, que impactan en las funciones, habilidades y estrategias de la organización.
(Fitzgerald et al., 2013)	La TD es el uso de las nuevas tecnologías digitales, como las redes sociales, la tecnología móvil, los análisis o los dispositivos integrados, para lograr importantes mejoras empresariales (experiencia del cliente, nuevos modelos de negocio, etc.).
(Matt et al., 2015)	Las estrategias de TD adoptan una perspectiva diferente y persiguen objetivos distintos. Desde una perspectiva centrada en la empresa, estas estrategias se centran en la transformación de productos, procesos y aspectos organizativos debido a las nuevas tecnologías.
(Hess et al., 2016)	La TD o digitalización muestra los cambios que las tecnologías digitales pueden provocar en el modelo de negocio, los productos, los procesos y la estructura organizativa de una empresa.
(Bondar et al., 2017)	La TD es una interconexión coherente de todos los sectores económicos y una adaptación de los agentes a las nuevas circunstancias de la economía digital.
(Hinings et al., 2018)	La TD es el efecto combinado de varias innovaciones digitales que dan lugar a nuevos actores (y agrupaciones de actores), estructuras, prácticas, valores y creencias que cambian, amenazan, sustituyen o complementan las reglas del juego existentes en organizaciones, ecosistemas, sectores o campos.
(Vial, 2019)	La TD es un proceso que pretende mejorar una entidad desencadenando cambios significativos en sus propiedades mediante combinaciones de tecnologías de la información, la informática, las comunicaciones y la conectividad.

(Warner & Wäger, 2019)	La TD es un proceso continuo de renovación estratégica que utiliza los avances de las tecnologías digitales para crear capacidades que renueven o sustituyan el modelo empresarial, el enfoque colaborativo y la cultura de una organización.
(Munim et al., 2020)	Se efectúa un estudio sobre la aplicación de big data e Inteligencia Artificial en la industria marítima. Se expone cuál es su aportación a la TD en dicha industria.
(Sott et al., 2021)	Identifica las relaciones existentes entre el modelo de procesos empresariales y la industria 4.0 más utilizados en las fábricas inteligentes.
(Chawla & Goyal, 2021)	Estudio multidisciplinar de la TD en el sector industrial. Hay cuatro áreas de investigación (organizativa, instrumentos aplicados, procesos operativos y aspectos sociales).

Fuente: elaboración propia

La naturaleza diversa de la TD afecta a la actividad mercantil y social en general. En la tabla anterior, se han podido mostrar un resumen de las cuantiosas publicaciones que intentan conceptualizar la TD desde diversos aspectos. Se percibe como un factor de cambio en todos los contextos, concretamente en la esfera empresarial. Las definiciones muestran una TD que se alinean en determinados ámbitos, desde el uso de nuevas tecnologías como habilitadores tecnológicos[1], la mejora de las operaciones y procesos empresariales, hasta la creación de estrategias y modelos de negocios digitales que buscan optimizar las relaciones con sus proveedores-clientes y el rendimiento empresarial, analizando los posibles impactos en el entorno. Los investigadores creen que la TD propicia el desarrollo de las organizaciones existentes y son el detonante de las nuevas organizaciones.

Así mismo la literatura científica analiza en mayor medida la innovación basada en el producto, no prestando atención a un factor determinante para la generación de otra fuente de ganancias competitivas como es la innovación de procesos (Gallouj & Savona, 2008), que genera cambios y mejoras en los procesos empresariales (Nwankpa & Roumani, 2016; Lizano-Mora et al., 2021) a través de la búsqueda de la TD.

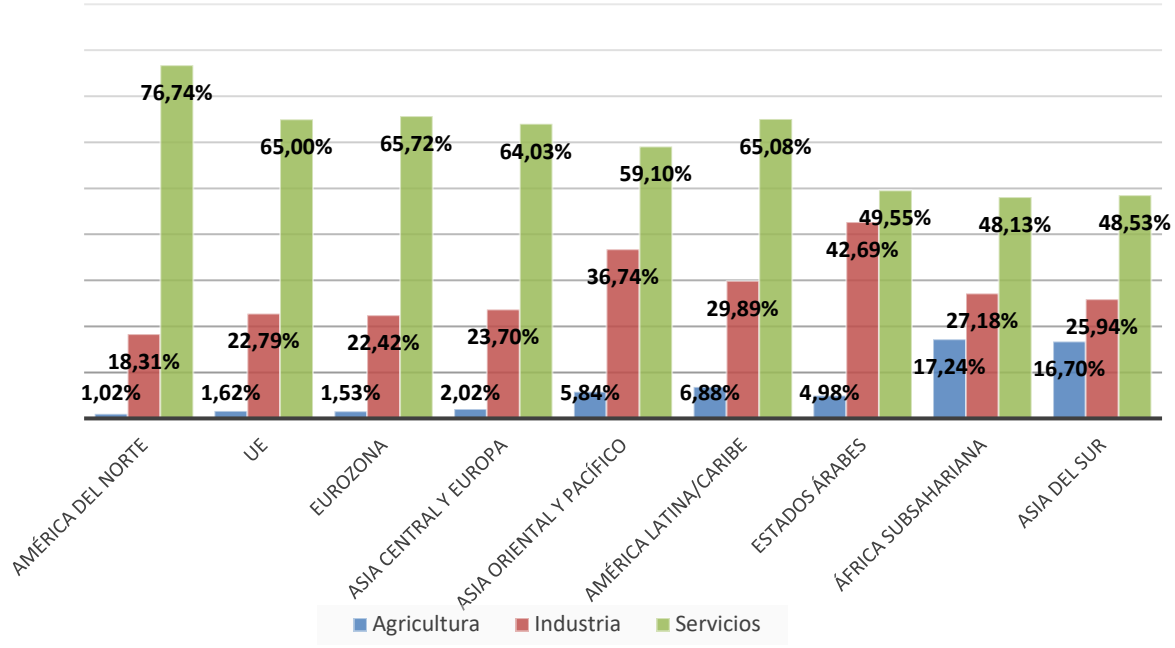
La TD se considera un elemento esencial de la cuarta revolución industrial que cambia la forma de entender las organizaciones (Fachrunnisa et al., 2020). Este proceso digitalizador tiene múltiples estudios científicos en diferentes sectores industriales, pero hay una ausencia de trabajos científicos en el sector servicios en general.

[1] Se entiende por habilitadores tecnológicos las distintas tecnologías utilizadas en las funcionalidades de las empresas, tales como internet de las cosas (IoT), cloud computing, analítica de big data, realidad aumentada, simulación virtual, etc. (Kagermann et al., 2013).

Las pequeñas y medianas empresas (pymes), ya sean como entidades emergentes o establecidas, han impulsado los procesos de TD e innovación (Apostolov & Coco, 2021). No obstante, aunque en muchos estudios las iniciativas de la TD han tenido éxito y conducen a un rendimiento óptimo (Loonam et al., 2018; Vial, 2019), hay múltiples informes y literatura científica que muestran el fracaso de las organizaciones empresariales en la implantación de estrategias orientadas a la TD, debido a que se enfrentan a la necesidad de adaptarse rápidamente a los factores volátiles del entorno digital (Sailer et al., 2019).

Las pymes son un elemento básico de la economía mundial y desempeñan un papel importante en el impulso del crecimiento económico, ya que representan el 99% de las empresas y alrededor del 60% del valor añadido del sector empresarial. Se necesita aprovechar su potencial para contribuir a las grandes transiciones económicas y para realizar un mundo más inclusivo (OECD, 2023). Asimismo, los servicios son el factor productivo más importante de las economías mundiales. En lo relativo a las economías más desarrolladas, hay que destacar a la UE y Norte-América con un 65% y 76,74% respectivamente de aportación del sector servicios sobre el producto interior bruto total (gráfico 1º).

Gráfico 1º. Aportación de los sectores económicos al producto interior bruto (PIB) ejercicio 2021



Fuente: World Bank, (2022)

Dentro del sector servicios de las pymes, encontramos las industrias de servicios empresariales intensivos en conocimiento (Kibs) que muestran tasas de crecimiento elevadas en las economías mundiales (Janger et al., 2017). Esta rama de servicios es una de las mejores posicionadas ante el reto de la transformación tecnológica y digital, destacando los servicios de actividades profesionales y tecnológicos, entre otros.

Los Kibs se especializan en diversas áreas de conocimiento en las que se involucran profesionales altamente cualificados. Comprenden empresas que prestan servicios de carácter multidisciplinar, destacando: servicios fiscales, contables, jurídicos, de asesoramiento y otros servicios de consultorías de gestión, así como de diseño y de mantenimiento de sistemas informáticos (Miles et al., 2017). Los servicios prestados a sus clientes generan conocimiento con alto valor añadido, satisfacen sus necesidades a través de la difusión de información y conocimientos de alta calidad (Chung & Tseng, 2019).

Los rasgos distintivos de las empresas Kibs son el conocimiento y la innovación y representan los factores determinantes que componen los servicios que prestan (Lafuente et al., 2017). Estos dos elementos se relacionan con la creación y transferencia de nuevas tecnologías, que incurren en niveles altos de I+D e intensivas actividades de formación de su personal, que permiten adquirir habilidades y transferir esos conocimientos a través del uso de las herramientas tecnológicas prestando servicios de alto nivel profesional. El objetivo es resolver problemas complejos a sus clientes, complementando sus procesos productivos mediante los conocimientos legados de alto valor añadido (Ashok,2018).

Una economía moderna y competitiva necesita este tipo de servicios intensivos en conocimientos, donde las empresas Kibs requieren nuevos conocimientos y desafíos tecnológicos para entornos cambiantes (Wyszkowska-Kuna, 2016). Si se examinan los datos relativos a España todos los sectores más representativos de las empresas Kibs, a excepción de los servicios de I+D que forman un subsector con menor impacto productivo, representan un crecimiento relevante en los indicadores macroeconómicos mostrados en la tabla nº2.

Tabla nº2. Magnitudes del sector servicio de las empresas Kibs españolas (pymes)

	2020			2021		
Sector servicios	**Excedente bruto de explotación**	**Valor añadido**	**Cifra de Negocios**	**Excedente bruto de explotación**	**Valor añadido**	**Cifra de Negocios**
62. Consultoría relacionadas con la actividad informática	1.631.275	6.828.462	12.139.056	1.838.295	7.596.936	12.582.172
69. Actividades jurídicas y de contabilidad	6.310.558	12.072.403	18.456.122	6.757.719	12.394.480	18.739.111
70. Servicios y consultoría de administración de empresas	1.939.307	7.203.782	12.354.282	2.190.031	7.824.816	14.208.461
71. Servicios de arquitectura e ingeniería	2.887.237	7.463.171	16.371.608	3.368.481	7.946.552	16.842.999
72. Investigación y desarrollo	652.544	2.122.353	2.405.699	429.437	1.455.568	2.534.828
73. Publicidad y estudios de mercado	1.137.965	3.110.211	9.703.095	1.501.300	3.622.809	10.987.420

Nota: Unidades: Miles de euros

Fuente: adaptación del INE, (2021)

El crecimiento de las empresas que realizan este tipo de servicios se debe a que desempeñan funciones que sus usuarios encuentran muy útiles. Las empresas Kibs aplican el conocimiento especializado que intercambian con sus clientes, originándose una retroalimentación entre ambas partes, por un lado, se enfrentan a los problemas organizativos/productivos de sus clientes, y por otro, el cliente proporciona conocimiento sobre su industria, entorno competitivo, tecnologías disponibles, regulaciones, problemas laborales, etc., de tal forma que la información fluye en ambos sentidos.

En esta tesis doctoral el sector de empresas Kibs a estudiar es la agrupación profesional de gestores administrativos de España[2]. Se componen de gestorías administrativas y de empresas de I+D. La totalidad de gestorías administrativas analizadas en este estudio son pymes que emplean a menos de 250 trabajadores y tienen unos ingresos anuales inferiores a 50 millones de euros. En concreto, la mayor proporción procede de microempresas con menos de 10 empleados y un volumen de negocio inferior a 2 millones de euros. La clasificación de microempresas, pequeñas y medianas empresas se basa en el número de empleados y el volumen de ingresos anuales de acuerdo con la metodología que aplica la Comisión Europea (European Commission, 2003).

[2] Los servicios de la agrupación profesional de gestores administrativos se encuadran en la rama de actividad 62. Consultoría relacionada con la actividad informática, 69. Actividades jurídicas y de contabilidad. y 70. Servicios y consultoría de administración de empresas, que representan los indicadores productivos más representativos de todos los sectores de las empresas Kibs.

Las gestorías administrativas prestan servicios profesionales de carácter multidisciplinar. Se destaca la elaboración de trámites fiscales, laborales y administrativos a sus clientes ante las administraciones públicas en régimen de representación. Otra de las actividades importantes que desarrollan es la consultoría empresarial de organizaciones que quieran externalizar sus procesos. Esto supone ofertar una gran multiplicidad de servicios a las empresas de forma integrada, aunando servicios de asesoría fiscal, jurídicos, auditoría, contabilidad y teneduría de libros, entre otras.

Las empresas de I+D participan de forma independiente en actividades innovadoras (Tseng et al., 2011) y apoyan a las gestorías en el conocimiento y desarrollo de la innovación tecnológica, cumpliendo las tres funciones básicas que tienen las Kibs dentro de su sistema de innovación: 1º como facilitadores de la innovación cuando apoyan a las gestorías en sus procesos de innovación (implantación de programas informáticos de gestión fiscal, administrativa, contable, etc.); 2º como portadores de la innovación, cuando transfieren el conocimiento existente entre el ecosistema de empresas que conforman el sector profesional de gestores administrativos (formación continua sobre las innovaciones tecnológicas a aplicar) y 3º como generadores de la innovación cuando desempeñan un papel decisivo en el inicio y desarrollo de los servicios que prestan las gestorías (implementación de plataformas digitales que conectan a las administraciones públicas con las gestorías y permiten realizar sus trámites de forma efectiva y segura) (Gallouj, 2002; He & Wong, 2009).

El ejercicio de la profesión de los gestores administrativos se realiza de forma colegiada a través de los colegios profesionales[3] como órgano representativo, los cuales tienen como ámbito de actuación principal el apoyo y control de los gestores administrativos, velando por el correcto cumplimiento de las normas legales de sus actuaciones profesionales y respetando el código deontológico al que están sometidos (Decreto 424/1963).

La representación, coordinación y la defensa de la profesión y de los colegios profesionales ante las administraciones del estado, como único interlocutor válido, se efectúa a través del Consejo General de los Gestores Administrativos, considerada una corporación de derecho público con personalidad jurídica propia (Decreto 424/1963). En este sentido, cuentan con la posibilidad de

[3] Los colegios profesionales son corporaciones de derecho público, amparadas por la ley y reconocidas por el Estado Español, con personalidad jurídica propia y plena capacidad para el cumplimiento de sus fines (Ley 2/1974).

firmar múltiples acuerdos y convenios de la más variada tipología con las distintas administraciones públicas existentes. Estos acuerdos son muy relevantes ya que sientan las bases de actuación para llevar a cabo las gestiones administrativas, y son garantes de los derechos de los ciudadanos.

En este contexto, el estado español apuesta por la transformación digital en los procesos de negocio de su tejido empresarial, tal es así que ocupa el puesto número 7 de los 27 estados miembros de la UE en el año 2022 dentro del Índice de la Economía y de la Sociedad Digitales (DESI) elaborado por la Comisión Europea[4], que evalúa el desarrollo de las competencias digitales en los países de la UE. Estos resultados mejoran el comportamiento obtenido en años anteriores, destacando el indicador de integración de tecnología digital en las empresas con una evolución actual en sus resultados muy positiva con respecto a la media del resto de países de la UE, especialmente en lo relativo al nivel de intensidad digital básico adquirido por las pymes, el intercambio electrónico de información de las empresas y las TIC (tecnología de la información y comunicación) para la sostenibilidad medioambiental. El resto de las dimensiones también tienen un comportamiento favorable, el indicador conectividad digital mantiene uno de los rendimientos más altos de la UE.; y los servicios públicos digitales y el capital humano mejoran ligeramente su competitividad con respecto a años anteriores (European Commission, 2022).

El estado español para conseguir sus objetivos de digitalización está adoptando una amplia gama de medidas para impulsar el tejido empresarial, y en concreto a la pequeña empresa, a través del plan de recuperación y resiliencia que incluye proyectos de innovación digital, como por ejemplo el suministro de herramientas digitales y otras medidas en los procesos de digitalización (Orden ETD/1498/2021). Las ayudas se centran en las pequeñas empresas ya que en la mayoría de los sectores la TD es aún incipiente. Uno de los principales objetivos se centra en potenciar tres tecnologías clave para la TD empresarial: cloud computing, inteligencia artificial y big data, ya que su implantación en las pymes es poco significativa y es necesario su impulso para el desarrollo de los negocios.

[4] El Índice de Economía y Sociedad Digital (DESI) mide cinco dimensiones relacionadas con la digitalización: conectividad, capital humano, uso de servicios de internet, integración de la tecnología digital en las empresas y servicios públicos digitales.

Las inversiones en recursos tecnológicos tienen una evolución dispar dependiendo del tamaño de las empresas españolas. En el año 2021 hay que destacar el importe total destinado en adquirir servicios en consultoría tecnológica con 5.733,23 millones de euros, así como gastos relativos a adquirir software por valor de 4.172,29 millones de euros y gastos en bienes TIC por valor de 3.335,15 millones de euros. Los gastos tecnológicos según el tamaño de empresas revelan un impacto muy superior en las grandes empresas con respecto a las pymes, de tal forma que su exposición a software y bienes tecnológicos representan aproximadamente el 70% del total, y crece en la partida de servicios y consultoría TIC hasta el 77% (tabla nº3).

Tabla nº3. Inversiones TIC en España

Inversión en tecnología empresarial	**Ejercicio 2021**					
Partidas	**total**	**Pyme**	**Gran empresa**	**Pyme (%)**	**Gran empresa (%)**	**Total (%)**
Gasto total en bienes TIC	3.335.153	1.000.986	2.334.167	30,01%	69,99%	100,%
Gasto total en software, estándar o a medida	4.172.295	1.344.398	2.827.896	32,22%	67,78%	100,%
Gasto total en servicios y consultoría TIC, servicios de telecomunicaciones o de otros servicios	5.733.233	1.313.573	4.419.660	22,91%	77,09%	100,%
Nota: Unidades: Miles de euros.						

Fuente: INE, (2021a)

La realidad de los mercados muestra un escenario muy cambiante motivada por su orientación a las TIC. Las organizaciones, como las gestorías administrativas, se ven obligadas a adaptar su gestión y funcionamiento interno al entorno en el que se mueven. En este contexto, es necesaria la implantación o transformación de estrategias empresarias a través de establecer proyectos orientados a las tecnologías disruptivas, para conseguir la alineación de las empresas con los diferentes usuarios del mercado, destacando a los clientes como eje central de sus estrategias (Muñoz & Avila, 2019).

Las gestorías administrativas prestan servicios profesionales que se basan en sus habilidades, conocimientos, experiencias, relaciones y reputación de carácter profesional (Greenwood et al., 2005). Este tipo de empresas ya utilizan como herramientas tecnológicas la digitalización de documentos, software de gestión integral (ERP y CRM), aplicaciones informáticas de gestión profesional, la comunicación por correo electrónico y el uso de las redes sociales que pueden tener importantes implicaciones en la comunicación interna y externa (Chui et al., 2012; Saura et al., 2019). Así mismo se deben aprovechar la cantidad de datos que se reciben con el uso de cloud computing, que permiten a las empresas almacenar y compartir recursos con gran

flexibilidad. También, la analítica big data y los métodos estadísticos avanzados a través de su procesamiento de datos con el uso de programas informáticos están aumentando la eficiencia de las empresas del sector servicios (Kronblad, 2019). De esta manera, se pueden analizar esta ingente cantidad de datos no estructurados para ser interpretados hacia una nueva inteligencia comercial, estrategias más informadas y mayor velocidad de servicio (Mayer-Schonberger & Cukier, 2013). Con esta digitalización se pretenden cambiar los procesos comerciales, tener mayor valor añadido en los negocios y así incrementar el volumen de operaciones para crear ingresos.

Por tanto, las tecnologías a implantar en las empresas del sector servicios, como las gestorías administrativas, y a modo de resumen se han identificado en la literatura científica con dos tipos de dimensiones (Brynjolfsson & Mcfee, 2014). La primera relacionada con la mejora originada en las máquinas, que incluye tecnología como la Inteligencia Artificial, big data, realidad aumentada, robótica avanzada. La segunda basada en el aumento de la conectividad, que incluye tecnología como internet móvil, redes sociales, Skype, IoT, la nube y el blockchain (Breunig & Skjølsvik, 2017, p. 4)

Para poder implantar las estrategias en un entorno totalmente digitalizado y atender las demandas de un mercado tan cambiante, las organizaciones necesitan profesionales con habilidades de liderazgo que desarrollen los procesos claves a través de las capacidades dinámicas, para configurar los activos y competencias de las nuevas necesidades digitales (Kor & Mesko, 2013; Summa, 2016). El objetivo es incidir sobre los aspectos clave organizativos, tales como el capital de conocimiento, el capital humano (Birasnav et al., 2011), el rendimiento de la gestión (Nguyen et al., 2017) y el rendimiento de la innovación (Jia et al., 2018). En principio, cuanto más rápido se adapten las empresas a las demandas del mercado, más probabilidades tendrán de conseguir ventajas sobre sus competidores (Summa, 2016).

El interés de esta temática requiere una categorización formal en la literatura ya que la TD es un concepto multidisciplinar que se debe acotar. Se va a tratar de ordenar el corpus del conocimiento mostrando la relevancia que la TD representa en el desarrollo de los procesos de la gestión empresarial. Los factores que se van a analizar en este estudio están basados en las herramientas digitales, la gestión de la innovación y los recursos y capacidades organizativas, considerados los elementos básicos para elaborar estrategias y modelos de negocio

empresariales que se adapten a los mercados disruptivos. Estos factores de la TD detectados en la literatura se van a explorar en el sector de empresas Kibs, en concreto a través del sector profesional de gestores administrativos de España, teniendo en cuenta que es una profesión que genera valor añadido a los mercados ya que intervienen en el proceso productivo de sus clientes y ayudan a optimizarlo en el desarrollo de su actividad. Este ámbito de estudio científico es muy amplio e inexplorado y justifica la elaboración de esta tesis doctoral.

2. Evolución y fases de la TD en las organizaciones empresariales

Para mostrar la evolución de la TD se van a exponer los tres factores externos más relevantes que la impulsan. En primer lugar, el desarrollo tecnológico que supuso la llegada de internet y su posterior adopción mundial que origina el surgimiento de múltiples tecnologías, entre las que podemos destacar la Web 2.0, la banda ancha, los smartphones, el reconocimiento de voz, etc. Seguidamente, se generalizó el uso de las tecnologías digitales que originan profundos cambios en la sociedad y en los sectores productivos, con mercados más competitivos por aumentar su intensidad en el flujo de datos y por ser más globales. Por último, el uso de nuevas tecnologías ha sofisticado el comportamiento del consumidor/cliente, al estar mucho más informado y conectado a la amplia gama de productos y servicios existentes en los mercados. En consecuencia, es necesario adoptar estrategias en las organizaciones orientadas a las nuevas tecnologías para ofertar productos y servicios atractivos para los clientes, encontrando la forma de innovar que sirva para adoptar las implicaciones de la TD y así obtener un óptimo rendimiento operativo (Hess et al., 2016), ya que si las empresas no aprovechan las tecnologías sus clientes perderán el interés por estas organizaciones.

La TD tiene un carácter multidisciplinar y antes de analizar su evolución temática basada en la gestión de los negocios, se va a mostrar un enfoque que delimite claramente sus fases de cambio digital. En la literatura se identifican tres etapas: digitization[5], digitalization[5] y TD (Kraus et al., 2022).

-Digitization es el proceso de codificar la información analógica a un formato digital para que los ordenadores puedan procesar la información (Dougherty & Dunne, 2012; Loebbecke & Picot, 2015). También se refieren a una optimización de tareas cambiando los procesos analógicos en digitales (Sebastian et al., 2017). A modo de ejemplo, el uso de formularios digitales y software

[5] Ambos términos se muestran en inglés dada la polisemia de dicho concepto en la lengua española.

informáticos en los procesos de gestión administrativa y fiscal ante los diferentes organismos públicos, así como la mera elaboración de informes económicos-financieros de carácter interno para analizar la evolución de las organizaciones.

-Digitalization. El siglo XXI es el máximo exponente de los grandes avances tecnológicos, se pueden destacar el uso generalizado de teléfonos móviles, infraestructuras de redes móviles, desarrollo de centros de procesamiento de datos y modelos de computación distribuida (Heavin & Power, 2018; N. Evans & Price, 2020). Estos procesos digitales son más avanzados que los originados en la fase anterior y necesitan nuevas formas de comunicación y colaboración en el lugar del trabajo. El uso de las nuevas tecnologías y datos digitales se aplican para transformar y mejorar los procesos empresariales, permitiendo conocer mejor las experiencias con los clientes y proporcionarles valor añadido (Pagani & Pardo, 2017).

-La transformación digital es la fase más difundida y aglutina las dos etapas anteriores. Se puede definir como como la integración de la tecnología digital en todos los procesos y operativas de una organización, lo que a su vez nos conduce al desarrollo de nuevos modelos de negocio y cambios en la infraestructura empresarial junto a la forma en que la organización opera y ofrece valor a sus clientes (Pagani & Pardo, 2017; Vial, 2019). En definitiva, va más allá de la visión de la digitalization basada en cambiar pequeños procesos y tareas organizativas. Es un cambio que afecta a toda la forma de concebir la empresa y está relacionada con los cambios estratégicos a formular en el modelo de negocio por la implantación de tecnologías digitales (Sebastian et al., 2017).

Figura nº1. Síntesis sobre los aspectos generales de la TD debatida en la literatura

Fuente: elaboración propia

A modo de resumen, la literatura muestra una TD que se orienta a la adopción de nuevas tecnologías y la mejora de procesos, que conlleva la creación de nuevos modelos de negocio orientados hacia lo digital. Se analiza el impacto de la TD en las relaciones con los diferentes agentes que interactúa en un mercado disruptivo (clientes, proveedores, competidores, etc.) y cómo afecta al rendimiento organizativo.

Una vez establecida una comprensión básica de la TD, se va a mostrar la relevancia de su impacto estratégico en la gestión interna de las pymes como objetivo general a alcanzar en esta tesis.

La corriente investigadora se centra en el desarrollo integral de las pymes, pero no mediante ideas innovadoras abstractas que propician soluciones digitales concretas que caracterizan la digitalization de una organización, sino a través de la búsqueda de soluciones digitales a los conceptos empresariales digitales, que se basan en la manera de gestionar las pymes y que deben captar el cambio organizativo inducido por las tecnologías digitales. Por ello, las organizaciones deben estar adecuadamente preparadas para introducir modificaciones significativas en los productos o servicios a diseñar, los procesos empresariales y estrategias a seguir para elaborar modelos de negocios orientados a la TD. A continuación, se muestran los componentes más relevantes de la TD organizativa, que articulan los cambios que deben originarse dentro de la empresa para responder adecuadamente a la disrupción digital.

1. **Recursos digitales.** La dotación de recursos digitales aglutina los activos físicos e intelectuales de la empresa y sus capacidades dinámicas, cuyo objetivo es gestionar estos activos para garantizar el éxito y la supervivencia empresarial ante el cambiante entorno en el que desarrollan su actividad (Schilke et al., 2018).

   Hay que redefinir la empresa para crear y ofrecer valor a los clientes en la búsqueda de la TD, y para ello se necesitan desarrollar nuevos activos y capacidades digitales. Entre los activos digitales las empresas necesitan: almacenamiento de datos, infraestructuras de información y comunicación (Verhoef et al., 2021) y adquisición y desarrollo de las tecnologías digitales, tales como redes sociales (Li et al., 2018), IoT (Richter et al., 2017), dispositivos móviles (Pousttchi et al., 2015), la nube (Du et al., 2016), nuevas aplicaciones informáticas y plataformas digitales (Tiwana et al., 2010). Las inversiones realizadas en tecnologías fomentan la generación de datos, como el uso de big data, para ofertar servicios que se adapten mejor a las necesidades de los clientes y generar una ventaja competitiva (Guenther et al., 2017), o

para monetizarlos en su propio beneficio (Loebbecke & Picot, 2015). En lo relativo a las capacidades digitales dinámicas permiten a las organizaciones utilizar sus recursos digitales con fines basados en la innovación, y proporcionan unas competencias necesarias para crear procesos empresariales que se adaptan a las necesidades del mercado (Peteraf et al., 2013; Li et al., 2018). Se componen de tres mecanismos: detectar oportunidades/amenazas, aprovechar oportunidades y transformar el modelo de negocio de la empresa (Teece, 2007; Pavlou & El Sawy, 2011). Se pueden clasificar en individuales y organizativas.

-Las Capacidades individuales son necesarias en las pymes para crear una estructura organizativa ágil y que permita tomar decisiones más rápidamente (Pérez-Gómez et al., 2018). El capital humano debe tener una serie de valores, conocimientos y experiencias que determinan sus habilidades para influir en el crecimiento de la organización (Molloy et al., 2011), destacando las siguientes características: capacidad de construir información fiable a partir de fuentes digitales, pensamiento crítico, capacidad de leer y comprender material dinámico, capacidad de transmitir, comunicar y acceder a la información y capacidad para gestionar la información entrante.

-Capacidades organizativas. Son aquellas competencias de alto nivel cuyo objetivo es dirigir las competencias ordinarias administrativas, operativas y de gestión, hacia esfuerzos de alta rentabilidad (Teece, 2014). Las organizaciones necesitan ciertos niveles de capacidades de tecnologías de la información para un uso correcto de tecnologías digitales, tales como plataformas digitales de colaboración (Soluk & Kammerlander, 2021), medios sociales y blogs (Bouwman et al., 2018). Destacamos las siguientes capacidades que afectan a los procesos organizativos: crear una mentalidad digital, promocionar la innovación a través de ecosistemas y elaborar capacidades de detección generativas; recopilando información de la evolución del mercado a través del uso de las tecnologías (Warner & Wäger, 2019).

2. **Estrategias digitales**. La estrategia y la tecnología digital están transformando el modo en el que las empresas crean valor, y se considera un factor decisivo en la TD (G. L. Evans, 2017; Kane et al., 2015). La estrategia digital empresarial es uno de los conceptos más destacados en los negocios y se centra en la alineación de la gestión estratégica y la tecnología de la información (Holotiuk & Beimborn, 2017; Nadeem et al., 2018). Se observa que la competencia entre las empresas se basa cada vez más en aprovechar los medios digitales,

posibilitando la reestructuración del modelo de negocio de las empresas, lo que conduce a la transformación (Bataineh et al., 2015; Kahre et al., 2017).

Las estrategias digitales buscan una estructura organizada con diseños jerárquicos flexibles que abarcan a todos los recursos digitales de los negocios (Banker et al., 2006; Kohli & Grover, 2008; Becker & Schmid, 2020). Las empresas deben reconocer el papel de las tecnologías de la información y poder desarrollarlas y explotarlas, bien mediante el uso de las tecnologías existentes en el mercado o creando nuevas tecnologías si actúan como líderes en el mercado (Horlacher & Hess, 2016; Becker et al., 2018). La orientación y la integración de la nueva tecnología suelen crear cambios en la creación de valor añadido en toda la empresa. Se requiere una estructura organizativa ágil, unida a métodos de trabajo flexibles con un personal cualificado en habilidades tecnológicas, integrando de forma óptima las nuevas actividades digitales dentro de las estructuras corporativas y su influencia en la elaboración de los productos y procesos de la empresa (A. Bharadwaj et al., 2013; Nowotarski & Paslawski, 2015; Sebastian et al., 2017). Para llevar a cabo los cambios estratégicos el aspecto financiero es muy relevante, y se deben usar de forma orientada a los objetivos, ya que errores de inversión por parte de las pymes suelen ser problemáticos para adoptar las estrategias digitales; por ser más limitados sus recursos financieros que las grandes empresas (Pullen et al., 2009; Bidan et al., 2012).

Investigaciones recientes amplían la visión estratégica basada únicamente en la tecnología de la información, por no ser eficaz para impulsar y apoyar las iniciativas estratégicas de digitalización actuales, hacia una combinación de estrategias centradas: en el mercado, en la empresa y en el aprendizaje (Quinton et al., 2018). Se muestran avances en el conocimiento de las estrategias, a través de investigaciones longitudinales en las que se fusionan cuatro dimensiones de la orientación digital: alcance de la tecnología digital (características de las funcionalidades de las tecnologías orientadas a los clientes), capacidades digitales (Habilidades humanas y organizativas de las tecnologías), coordinación del ecosistema digital (ámbito externo y organizativo en el que las empresas interactúan con las partes interesadas a través de los ecosistemas tecnológicos abiertos) y la configuración de la arquitectura digital (capacidad de la tecnología digital para orientar a las organizaciones a la generatividad) (Kindermann et al., 2021).

3. **Tipos de estrategias transformadoras.** Existe una amplia variedad de estrategias basadas en implementar el crecimiento digital en las empresas. Hay que destacar estrategias de desarrollo de plataformas digitales basadas en la innovación de servicios abiertos (Hagiu & Wright, 2015; Cusumano et al., 2019). Su implantación está motivada por dos factores principales: la gran escalabilidad de la plataforma que permite conectar a un número creciente de usuarios a bajos costes (clientes, proveedores y prestadores de servicios complementarios), y los efectos de red que la refuerzan (Eisenmann et al., 2006; Min & Kim, 2021). Otro tipo de estrategias están basadas en la gestión del conocimiento, con el objetivo de responder a los rápidos cambios tecnológicos mediante el intercambio de conocimiento y experiencias entre el capital humano de la organización, que permite adquirir nuevas habilidades/conocimientos para alcanzar sus objetivos a nivel personal y organizativo (Liao et al., 2007; Castagna et al., 2020).

   Por último, hay que destacar la relevancia investigadora que representa el fenómeno estratégico de la ambidestreza, cuyo objetivo es buscar la eficiencia en la gestión empresarial junto a la adaptación a los cambios en el entorno disruptivo. Se debe lograr un equilibrio entre la exploración y la explotación tecnológica (Scuotto et al., 2019; Del Giudice et al., 2021)

4. **Rendimiento organizativo**. Las características organizativas son los factores clave que permiten el rendimiento de las pymes, desde la gestión de la innovación, la gestión del conocimiento, la gestión de los recursos humanos y organizativos hasta la planificación estratégica (Poudel et al., 2019; Rehman et al., 2019). Estos elementos organizativos se deben orientar hacia los factores que originan una TD plena, tales como los recursos y capacidades digitales (Nwankpa & Datta, 2017; Wang et al., 2020). Por un lado, hay que destacar las capacidades digitales individuales relacionadas con el capital humano de la organización (Scuotto et al., 2021), en el que el comportamiento del líder a través del liderazgo transformacional es clave para impulsar el intercambio de conocimiento innovador entre los empleados (Nguyen et al., 2017; Ritala et al., 2018). Por otro lado, también son relevantes las capacidades organizacionales motivadas por la aparición de las tecnologías digitales, entre las que se pueden destacar aplicaciones informáticas de gestión, plataformas móviles, redes sociales, analítica big data, etc. (Nwankpa & Datta, 2017; Wiesböck et al., 2020).

El rendimiento empresarial es un indicador de éxito o de fracaso de las organizaciones (Rehman et al., 2019) y puede medirse por aspectos financieros (Rentabilidad de las inversiones (ROI), rentabilidad financiera (ROE), los beneficios, crecimiento del volumen de operaciones, etc.) y no financieros (tamaño de la plantilla, crecimiento de cuota de mercado, satisfacción del cliente, ingresos por empleado, etc.) (AlMujaini et al., 2021).

3. Proceso metodológico

El diseño de investigación se efectúa para realizar un adecuado balance conceptual en el que se encuentra la TD en el ámbito organizativo de la gestión de las pymes. A continuación, se va a mostrar el esquema metodológico de este estudio.

Figura nº2. Fases metodológicas para la prospección de la TD

Fuente: elaboración propia

-En primer lugar, se efectúa una revisión sistemática de la literatura mediante un proceso de análisis bibliométrico, que explora de forma cuantitativa la literatura sobre la TD en las pymes y proporciona un mapa de la estructura de conocimiento (Rojas-Sánchez et al., 2022). Se utiliza el paquete de software Bibliometrix basado en el lenguaje R y complementado por la función

Biblioshiny (Aria & Cuccurullo, 2017). Para complementar la revisión bibliométrica, se realiza un análisis de contenido a texto completo de los artículos más relevante objeto de este estudio.

El análisis bibliométrico se inicia con la recogida de recursos bibliográficos de dos bases de datos (WOS y Scopus). Para ello, se buscaron metadatos de autor, fuentes y documentos para el periodo investigado: 2015-2022.

Se utiliza la metodología PRISMA para sistematizar y filtrar la búsqueda de los artículos identificados en las bases de datos, seleccionando normas de exclusión de los documentos extraídos[6] (Moher et al., 2009). Para garantizar que se identificaban los documentos más relevantes tratando de minimizar los errores, se organizan cadenas de búsqueda de las palabras clave para todas las bases de datos, tal y como se indica a continuación: "digit* transfor*"OR "digital capabilit*" OR "digital technolog*" y "SME". Se utilizó un asterisco en nuestra búsqueda como símbolo de truncamiento. Se identificaron 1804 artículos relacionados con la TD en las pymes. Una vez aplicados los filtros de exclusión, se validan 169 artículos de WOS y 262 artículos de Scopus. La revisión bibliométrica se enfoca, por un lado, hacia un análisis de las métricas más relevantes basadas en los autores, recursos y documentos, y por otro, hacia la estructura del conocimiento basada en las redes de co-ocurrencia por palabras de autor (análisis conceptual) junto a un análisis de redes de co-citaciones (análisis intelectual).

Además de incorporar la automatización y bibliometría en los resultados de esta tesis, se efectúa un análisis a texto completo de los 59 artículos más relevantes de la muestra seleccionada. El objetivo es mejorar la comprensión y ordenar el corpus del conocimiento existentes en los aspectos más específicos de la TD en la gestión interna de las pymes.

-En segundo lugar, se debe analizar el entorno real de las pymes mediante la exploración de sus experiencias y percepciones sobre el grado de TD que tienen implantadas en sus organizaciones, y la manera de gestionar sus procesos para adaptarse a los mercados disruptivos en los que desarrolla su actividad. Para ello se efectúan dos estudios:

[6] Criterios de exclusión de los artículos: 1º. Los resultados de la investigación deben incluir solo artículos publicados de investigación o de revisión científica, 2º. Los resultados deben incluir únicamente estudios publicados en inglés, ya que son los más difundidos en todo el mundo, 3º. Los documentos seleccionados deben aportar una clara relación con la temática estudiada en los procesos de TD en las pymes, 4º. Los artículos seleccionados deben estar clara y suficientemente descritos y explicados, debe estar perfectamente definida la metodología, los objetivos principales y las preguntas de investigación de los artículos.

1. **Uno de carácter cuantitativo**, mediante encuesta a los propietarios de las gestorías administrativas de España y a través de un análisis estadístico de mínimos cuadrados parciales de ecuaciones estructurales (PLS-SEM).

   Se utilizó un cuestionario autoadministrado online para la recogida de datos. Los participantes fueron los propietarios de las gestorías administrativas. Para determinar la validez, la legibilidad y la utilidad de los instrumentos de medición se efectúo un pretest (MacKenzie et al., 2011) con 45 gestores. Se obtuvo una muestra válida de 335 cuestionarios bajo la técnica de muestreo a conveniencia. La encuesta incluye cinco medidas que tratan de acotar el término de la TD a través del análisis de la gestión de la innovación existente en las empresas Kibs: capacidad digital, tecnología digital, estrategia digital, apoyo de la dirección y rendimiento organizativo. Las opciones de respuestas se basan en una escala Likert de 5 niveles. Para validar la fiabilidad de las escalas se ha calculado el Coeficiente de Correlación Intraclase (Koo & Li, 2016), herramienta estadística que estudia la homogeneidad y correlación interna de los constructos. Este índice muestra unos resultados óptimos por lo que las mediciones utilizadas en los indicadores muestran una concordancia alta y por tanto sus conclusiones son válidas.

   El análisis del modelo diseñado se efectúa a través de ecuaciones estructurales de mínimos cuadrados parciales (PLS-SEM). Esta metodología utiliza bloques de variables para estimar los parámetros del modelo a través de la maximización de la varianza explicada de las variables dependientes (Chin, 1998). Analiza datos multivariantes para modelar las variables latentes denominadas compuestos, las cuales se forman de combinaciones lineales de sus indicadores (Henseler et al., 2014). Por tanto, este estudio relacionado con cinco componentes de la TD (capacidad digital, tecnología digital, estrategia digital, apoyo de la dirección y rendimiento organizativo) solo se puede modelar a través de compuestos para realizar buenas estimaciones. El objetivo de la investigación es confirmatorio por lo que es necesario establece las relaciones causales entre variables que especifican cómo y por qué ocurren ciertos fenómenos empíricos. Para evaluar el modelo estructural se utilizó la versión del software SmartPLS 3.3.6 (Ringle et al., 2015), que ofrece una serie de criterios estadísticos para realizar un análisis sistemático e integrador del modelo de medida y estructural.

2. **Otro de carácter cualitativo** a través de la teoría fundamentada, para mostrar empíricamente los procesos de la TD que inciden en la gestión organizativa de la agrupación profesional de gestorías administrativas en España. Se efectúan 18 entrevistas personales a diferentes expertos y profesionales relacionados con la actividad que se circunscribe al ámbito profesional de los gestores administrativos de España[7]. La selección de los candidatos se efectúa a través de un muestreo intencional por ser el método más utilizado en los análisis cualitativos (Elo et al., 2014).

   Para analizar los datos que se obtienen de las preguntas formuladas se siguieron los principios de la teoría Fundamentada, basados en las etapas de la codificación abierta, axial y selectiva (Corbin & Strauss, 2014). En este tipo de estudio el investigador visualiza los datos a través de la interpretación de la realidad social y reconstruye las experiencias y los significados de los expertos entrevistados (Charmaz, 2006). Este proceso se efectúa a través del software de análisis de datos cualitativos MAXQDA10. En primer lugar, se realizó una codificación abierta, leyendo las transcripciones párrafo a párrafo para identificar las interconexiones entre los códigos. Todos los temas emergentes se codificaron utilizando códigos descriptivos (Corbin & Strauss, 2014) y se elaboró un mapa de codificación inicial. En la fase de codificación axial, se investigaron más a fondo las propiedades y dimensiones de los conceptos identificados inicialmente mediante el proceso de comparación constante, se trazaron relaciones y posteriormente surgen categorías y subcategorías de la temática estudiada (Glaser & Strauss, 2009). En la fase de codificación selectiva, las dimensiones, los resultados y los factores se sintetizaron en un marco conceptual. En la última fase se refinaron la redacción y la coherencia interna, y finaliza el proceso de la codificación con la saturación de los datos garantizando la validez de las conclusiones, por haber llegado a este nivel de análisis conceptual mediante el descubrimiento de las categorías centrales, que organizan el resto de las subcategorías para llegar a la teoría formal. La participación de dos investigadores y expertos en TD en el proceso de codificación, así como el alto grado de acuerdo en la codificación y la saturación de los datos garantizaron la validez de las conclusiones.

[7]Participantes de las entrevistas: 1º propietarios de las gestorías administrativas con una dilatada experiencia en el sector, que han desempeñado funciones gerenciales de diversa índole. 2º consultores expertos, especialistas en implementar proyectos relacionados con la actividad profesional de los gestores administrativos. 3º funcionario público que desempeña labores directivas en la delegación especial de la Agencia Estatal de la Administración Tributaria (AEAT) de Andalucía, Ceuta y Melilla y es experto en nuevas tecnologías.

4. Objetivos

La TD presenta diferentes enfoques centrados en la gestión empresarial. De manera muy concisa se van a exponer los principales objetivos que aborda esta tesis doctoral.

A través de un enfoque teórico se trata de contextualizar la relevancia de las pymes en los mercados disruptivos en los que desarrolla su actividad económica. Para ello, se ofrece una visión estructurada sobre la temática relacionada con la TD en las pymes, basándonos en un enfoque interno de la organización. Se analizan los habilitadores de la TD que permiten a las pymes resolver de forma prioritaria su complejo proceso de TD para ser competitivas ante las circunstancias cambiantes del mercado.

Como complemento a esta revisión exploratoria de la literatura, que permite construir un estudio teórico, se efectúa una validación empírica que confirma y confronta en el campo práctico el primer paso teórico. Se efectúan dos investigaciones: una de carácter cuantitativa y otra de índole cualitativa basadas en dos modelos empíricos, que analizan un sector económico formado por pymes, que ofertan servicios profesionales intensivos en conocimiento y se caracterizan por generar importantes fuentes de conocimiento y valor en la economía.

5. Estructura de la tesis

Esta tesis doctoral se ha elaborado por compilación según lo establecido en el artículo 62, 63 y 64 de la normativa de estudios de doctorado de la Universidad de Sevilla. Se ha estructurado en 5 capítulos, mostrando el primer capítulo la idoneidad del tema a tratar a través de la justificación teórico-académica y práctica, así como los objetivos propuestos. Los tres capítulos siguientes muestran los artículos publicados en revistas de la colección Social Sciences Citation Index (SSCI)[8], que cuentan con un índice de calidad JCR con un factor de impacto (JIF) que se encuentran entre el primer y el tercer cuartil. El quinto capítulo expone un resumen de los principales resultados expuestos en la compilación de artículos publicados en la colección principal de la WOS, así como su discusión y las principales conclusiones, contribuciones y limitaciones del universo del estudio efectuado con sus procedimientos metodológicos.

[8] ***Technological Forecasting and Social Change*. Elsevier Science inc.**. (JIF 2022:12.0;JIF Rank:11/154; JIF Quartile:Q1).
Frontiers in Psychology. Frontiers Media SA (JIF 2022: 3.8;JIF Rank: 34/147; JIF Quartile: Q1).
Journal of Service Theory and Practice. Emerald Group Publishing LTD (JIF 2022:4.6;JIF Rank:84/154; JIF Quartile:Q3).

Esta tesis doctoral opta a la mención Doctorado Internacional en el título de doctor y, para cumplir con lo establecido en el artículo 68 de la normativa de estudios de doctorado de la Universidad de Sevilla, se va a redactar en inglés el apartado del resumen y las conclusiones.

CAPÍTULO 2. Evolution of digital transformation in SMEs management through a bibliometric analysis

Referencia bibliográfica

Marino-Romero, J. A., Palos-Sánchez, P. R., & Velicia-Martín, F. (2024). Evolution of digital transformation in SMEs management through a bibliometric analysis. *Technological Forecasting and Social Change*, *199*,123014.https://doi.org/10.1016/j.techfore.2023.123014

Evolution of digital transformation in SMEs management through a bibliometric analysis

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Abstract: This document performs a systematic review of the literature and bibliometrics on the orientation of digital transformation (DT) in the organizational and management processes of small and medium-sized enterprises (SMEs) in the 2015-2022 period. For this analysis, the bibliometrix and biblioshiny software packages have been used to perform the data extraction and quantitative analysis of the research articles, obtained from the Web of Science (WOS) and Scopus databases. 311 articles related to DT in SMEs were identified as the most representative publications of the subject to be analyzed. The results show that there is a clear orientation of DT to modify organizational processes in SMEs so that they are more agile and are thus able to respond to the sudden changes that originate in the markets. The elements that delimit DT in this study are the digital technologies to implement, the strategies to follow and the digital capabilities. Finally, the main limitations, problems and gaps in the research are presented.

Palabras clave: digital transformation, digital technology, digital capabilities, SMEs, bibliometrix, digital strategy.

1. Introduction

DT arises from the implementation of digital technologies in society and in business sectors in general. (Verhoef et al., 2021; Vial, 2019). This originates a large amount of research in different areas of social science, such as business management (Hai, 2021; Daradkeh, 2021), technology (Yadav & Pavlou, 2020; Lichtenthaler, 2021), marketing (Melović et al., 2020; Hauer et al., 2021) and socio-economic development (Tebepah, 2020; Kazim, 2021). This has generated a wide range of scientific research.

Researchers often highlight the importance of classifying the literature about a research area using the main topics of a subject. Therefore, academic work that studies the influence of DT on the management of SMEs should be analyzed, taking into account that SMEs constitute 99.8% of all European companies and 65% of global employment in the European business economy in 2021 (Gorgels & Priem, 2022).

Studies about implementing DT in SMEs use unclear terminology, and some confusion exists in the concepts used, given the ubiquity and complexity of the term (Lanzolla, et al., 2018; Hess et al., 2016). Using this as the main aim of our study, we will try to show the most relevant elements that determine DT in the analyzed bibliography. This term will be limited to the literature about digital technologies (Nambisan et al., 2017; Apostolov & Coco, 2021) and organizational transformation at different levels, such as sharing of resources and digital capabilities (Yeow et al., 2018; Warner & Wäger, 2019). This includes the need to reconfigure processes and structures using new business models and new ways of managing the implemented strategies. (Garzella et al., 2021; Müller et al., 2021). Finally, the performance of an organization is analyzed as a way of quantifying the success or failure of its objectives (Richard et al., 2009). It is argued that the approach of SMEs to DT for business management should be analyzed. This justifies the use of a bibliometric review for the research. In addition, there are no known studies exclusively dedicated to this topic.

Therefore, a systematic review of the literature (SRL) about the use of DT for SME management was performed. Its objectives are 1) detect the most productive sources and authors, 2) describe the characteristics and interrelationships of the relevant studies and 3) generate the conceptual and intellectual structure of the subject. To achieve these objectives, the articles published in the scientific production indexed in the Web of Science (WOS) and in the Main Collection of Scopus between 2015 and 2022 were consulted, and a bibliometric analysis that shows the distribution and quantitative relationship of the structural and dynamic aspects of the scientific literature was performed (Bornmann & Marx, 2018; Donthu et al., 2021).

This study analyzes the relevant data of previous research to answer the following research questions: Is there a real interest in the crucial factors which need to be managed by SMEs when implementing DT? (Q1) If so, which authors, journals and countries publish the most on this topic and which articles are cited the most in other publications? (Q2) Is there a consistent body of

researchers who collaborate effectively? (Q3) What are the main research areas and constructs of the investigated topic? (Q4) and What are the gaps in the current research and possible areas of future research? (Q5).

The rest of the document is structured as follows: in the second section, there is a summarized review of the literature, presenting the most determining elements of DT and the main objectives of this study. The third section describes the methodology followed. Then, the results are presented identifying the relevant authors, the documentary analysis and the knowledge structure of DT in SMEs. To finish, a discussion of the results and the conclusions are made.

2. Literature Review

DT in SMEs is a multidisciplinary concept and has been researched extensively. First, in this paper, the different digital technologies which exist are explained and these are considered an important asset for successful implementation of the technology (Gawer & Cusumano, 2014; Vial, 2019). Next, the changes that must happen within the company so that it can respond adequately to digital disruption will be stated, which include the adaptation of the dynamic digital capabilities to the business (Karimi & Walter, 2015; Soluk & Kammerlander, 2021) as one of the processes for technology adoption and the implementation of business models that use digital strategies (Breunig & Skjølsvik, 2017; Sebastian et al., 2017)**.**

2.1 Components of organizational DT

2.1.1 Digital technology as a disruptive factor for SMEs

The objective of DT in SMEs is technological innovation as a new development paradigm, and as they are more flexible than large companies can adopt innovation more easily (Fletcher & Griffiths, 2020). Digital technologies are considered disruptive in two areas of a business, customer behavior and the competitive landscape. For this reason, recent literature has been specially interested in digital technologies as they are the drivers of technological advances. SMEs have transformed data and digital devices into tools which must be used to provide their services and take advantage of the opportunities that these instruments offer (Zott & Amit, 2017). These are the assets that the company needs to digitally transform the business.

New information technology (IT) solutions, such as Internet-based innovations, strengthen the internationalization of SMEs, improve the quality and speed of communications and increase the digital presence of SMEs at a reduced cost (L. Li et al., 2018; Olvera-Lobo & Castillo-Rodríguez, 2018).

2.1.2 Study of the capacities needed to implement DT in SMEs

Dynamic capabilities have been recognized as one of the mechanisms that can facilitate DT in organizations (Fischer et al., 2020; Warner & Wäger, 2019). There is a debate about whether they have the potential to provide a competitive advantage in changing environments, where the strategic foundations are speed and adaptability. (Eisenhardt & Martin, 2000; Peteraf et al., 2013). Overall, researchers believe that companies need dynamic capabilities to remain competitive in a digital environment. (Svahn et al., 2017; Raj et al., 2020).

Dynamic capabilities mean using innovation to provide a series of skills that allow the company to create new products and processes, responding to changing market needs. This has three stages, 1) detecting opportunities/threats, 2) seizing opportunities and 3) transforming the business model of the company (Teece, 2007; Pavlou & El Sawy, 2011). To develop dynamic capabilities both the behavior of the individuals in the company and the organizational processes must be identified. (Wilden et al., 2013; Bendig et al., 2018).

The scientific literature considers dynamic capacity as the digital capacity or DT, and studies how this adapts to changes in the business environment by identifying or reorienting digital technologies, and where appropriate, using other new technologies. The goal is to know the motivational factors of customers, address their needs and create personalized value (Goerzig & Bauernhansl, 2018; Matarazzo et al., 2021).

DT capabilities are developed in two ways by focusing on individual skills and using organizational competencies.

Individual digital capabilities are seen as the driving force for the adoption of new technology as a central aspect of the industrial revolution (Tams et al., 2014; Kohli & Grover, 2008). The role of employees and managers is essential to correctly manage this type of skill and can differentiate SMEs from large companies because people in SMEs deploy digital skills more effectively than in

large companies (Sousa & Rocha, 2019; Scuotto et al., 2021). On the other hand, the lack of access to technologies due to not having qualified employees is a factor that widens the digital divide with large companies (van Laar et al., 2017; Nguyen, 2009).

Among the capabilities that affect organizational processes in SMEs are the following: creating a digital mindset, establishing R+D alliances to achieve innovation ecosystems and developing generative detection capabilities, which means gathering information about market developments using technology (Warner & Wäger, 2019). Management skills are very relevant for the development of DT in SMEs, usually focusing on the use of IT elements, such as digital collaboration platforms (Soluk & Kammerlander, 2021), social media platforms, blogs and social media (Bouwman et al., 2018).

2.1.3 Types of digital strategy used by SMEs

The current trend is to merge digital technologies with strategic systems to generate added value for organizations (Kohli & Grover, 2008; Iafrate, 2018). Competition between companies is increasingly based on leveraging digital media, enabling the restructuring of company business models, leading to transformation (Bataineh et al., 2015; Kahre et al., 2017). Separating these two concepts (digital strategy and IT) can diminish a company's potential for synergies that take advantage of digital resources and create differential value (Mithas et al., 2013).

Digital strategies are being transformed into modular and multifunctional strategies, which allow for global business processes to be established. These include all the digital resources of the business into an organizational structure with the flat and flexible hierarchies needed to survive in the digital age (Kohli & Grover, 2008; Becker & Schmid, 2020). Recent research shows that digital strategy merges four dimensions of digital orientation: the reach of digital technology, digital capabilities, coordination of the digital ecosystem and digital architecture configuration. Finance is a very relevant aspect when implementing strategic changes that must be carried out in an objective-oriented manner (Pullen et al., 2009; Bidan et al., 2012).

Dynamic capabilities provide a series of competencies which are needed for strategic orientation capable of organizing digital resources when facing changing market conditions, such as unexpected consumer behaviors and disruptive competition (Yeow et al., 2018; Wiesböck et al., 2020; Wang et al., 2020). Technological orientation for the acceptance and use of technology is

also required for the employees and managers of the organization (C. Chen et al., 2017; Franco et al., 2021).

Finally, Vial, (2019), considers that to improve knowledge about the digital orientation of companies, there must be research to improve our understanding of the interactions between companies and their environment when using digital technologies.

2.1.4 Organizational performance in SMEs

Organizational performance plays a critical role in meeting the objectives and goals of companies in a disruptive environment (Richard et al., 2009). This requires a strategy aimed at successful DT to develop a wide range of technological resources and digital skills to respond to market needs (Rialti et al., 2019; Wang et al., 2020). It has been shown that successful DT-related initiatives lead to improved and sustainable performance (Dalenogare et al., 2018; Tortorella et al., 2020).

The digital capability of the organization to quickly respond to market needs is needed to understand the effect of DT on the performance of an organization. Teece,(2007) y Scuotto, Nicotra, et al.,(2021) show the importance of the individual human digital capabilities of workers and senior management and highlight the direct relationship these have on the performance of innovation and the results of the organization. The document also analyzes the ability of IT at an organizational level to drive business performance, motivated by the emergence of digital technologies, such as management applications, mobile platforms, big data, and social networks (Nwankpa & Datta, 2017; Wiesböck et al., 2020; Wang et al., 2020).
An extension of resource-based theory is knowledge-based vision, which establishes strategies for achieving organizational performance, encouraging knowledge sharing in companies through open innovation (Singh et al., 2021; Popa et al., 2017).

Performance is an indicator of the success or failure of organizations (Richard et al., 2009; Rehman et al., 2019). Approaches to performance measurement in SMEs are multidimensional and take into account all stakeholders in the organization. Performance quantification is closely linked to the degree to which organizations meet and exceed objectives, which can be a critical requirement for success (Kafetzopoulos, 2022; Simpson et al., 2012). As this is a complex concept, different types of measurement methods appear in the literature. Neely et al., (2000) establish two types of measurements, one for financial results and the other for the factors that

determine those financial results (quality, flexibility, use of innovation resources). Ali et al., (2018) measures the organizational performance of an organization by its ability to acquire and manage the resources with which it achieves its objectives.

2.2 Current status of DT in SMEs

Figure 1 shows the periods in which scientific production on DT in SMEs is concentrated.

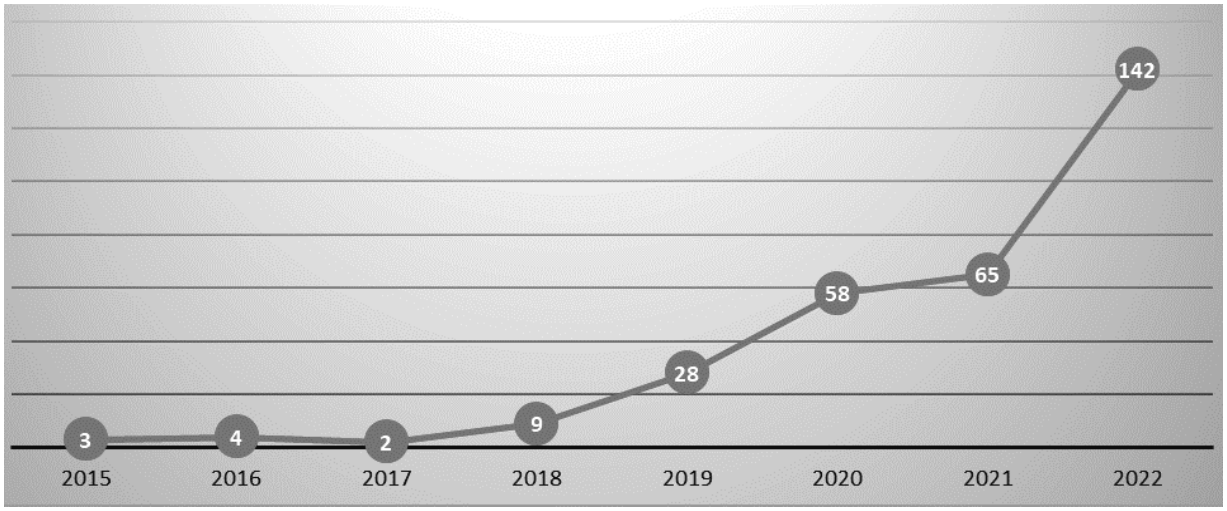

Figure 1. Annual Scientific Production

A selection of research on the systematic review of TD is shown below. The search used the WOS and Scopus analytical database to find studies with scientific impact about the economy and markets. (see table 1).

Table 1. DT-based studies using a bibliometric analysis

Authors	Articles	Area of research	Year	Topic
(Svadberg et al., 2019)	Beyond the Hype: A Bibliometric Analysis Deconstructing Research on Digitalization	Business & Economics	2019	DT is conceptualised into three strategic dimensions: value creation instruments, operational processes and social aspects).
(Ruiz-Real et al., 2020)	Artificial intelligence in business and economics research: trends and future.	Business & Economics	2020	Studies Artificial Intelligence in business organizations.
(Munim et al., 2020)	Big data and artificial intelligence in the maritime industry: a bibliometric review and future research directions	Social Sciences	2020	A study of the application of big data and Artificial Intelligence (AI) in the maritime industry.
(Pizzi et al., 2021)	Assessing the impacts of digital transformation on internal auditing: A bibliometric analysis	Social Sciences	2021	How DT affects management auditing: continuous auditing, fraud detection, data analytics and technological innovation.
(Chawla & Goyal, 2021)	Emerging trends in digital transformation: a bibliometric analysis	Business & Economics	2021	Multidisciplinary study of DT in the industrial sector concentrating on four areas of research (organizational, applied instruments, operational processes and social aspects).

(Cruz-Cárdenas et al., 2021)	COVID-19, consumer behavior, technology, and society: A literature review and bibliometric analysis	Business, Management and Accounting	2021	Studies how Covid-19 affected behavior in technological and digital formats.
(Sott et al., 2021)	Process modeling for smart factories: using science mapping to understand the strategic themes, main challenges and future themes	Business, Management and Accounting	2021	This identifies the relationships between the business process model and Industry 4.0 in smart factories.

There are numerous bibliometric publications that try to conceptualize TD in commerce and social activity in general. An example is the importance that some technological enablers deserve, such as Big Data, AI, social media, virtual reality, internet of things (IoT), etc. Research has been carried out on the penetration of DT in different types of sectors like agricultural, industrial, technological, construction, telecommunications and computing, etc. Scientific literature on the subject also contains a comprehensive analysis of the evolution of DT giving a complete review of the subject with bibliometric and network analysis techniques to give a complete overview of this topic for the strategic management of business organizations. The work of Svadberg et al., (2019) and Chawla & Goyal, (2021) provide an exhaustive overview of the structure and knowledge of DT as they show the relevant authors and research themes after examining the existing literature.

However, gaps have been detected in the literature reviews of the organizational factors for SMEs that have tried to manage DT when adapting to the disruptive markets in which they operate.

3. Methodology

This study used the four common stages of a systematic literature review (Durach et al., 2017) as shown in figure 2. The PRISMA methodological approach (Page et al., 2021) was used as it establishes flowchart review protocols for systematic reviews and meta-analyses (Kraus et al., 2022).

In the first stage, a systematic review of the literature about TD in companies was made using keyword searches on the Wos and Scopus databases. Of the 267 documents found, no revisions were prior to 2016 and the research limits could be defined. No document was found to have a definition of TD related to SME management.

In the second stage, bibliographic data collected from two databases (WOS and Scopus). These were selected for the following reasons, a) the data in WOS has a JCR quality index, b) the information covers a long period of time, and c) many citations can be downloaded

simultaneously (Abarca et al., 2020). Scopus can be considered a complementary database to WOS with approximately 20% more research coverage, a quality index of SJR and it also allows many references to be downloaded simultaneously (Hassan et al., 2019). The study searched for author, source and document metadata over the 2015-2022 time period. The search was limited to articles containing the keywords "digit* transfor*"OR “digital capabilit*” OR “digital technolog*” y “SME”. These keywords had to appear in the title, abstract, or metadata of the article. The results contained 1804 articles about DT in SMEs. An asterisk was used as a truncation symbol in the search.

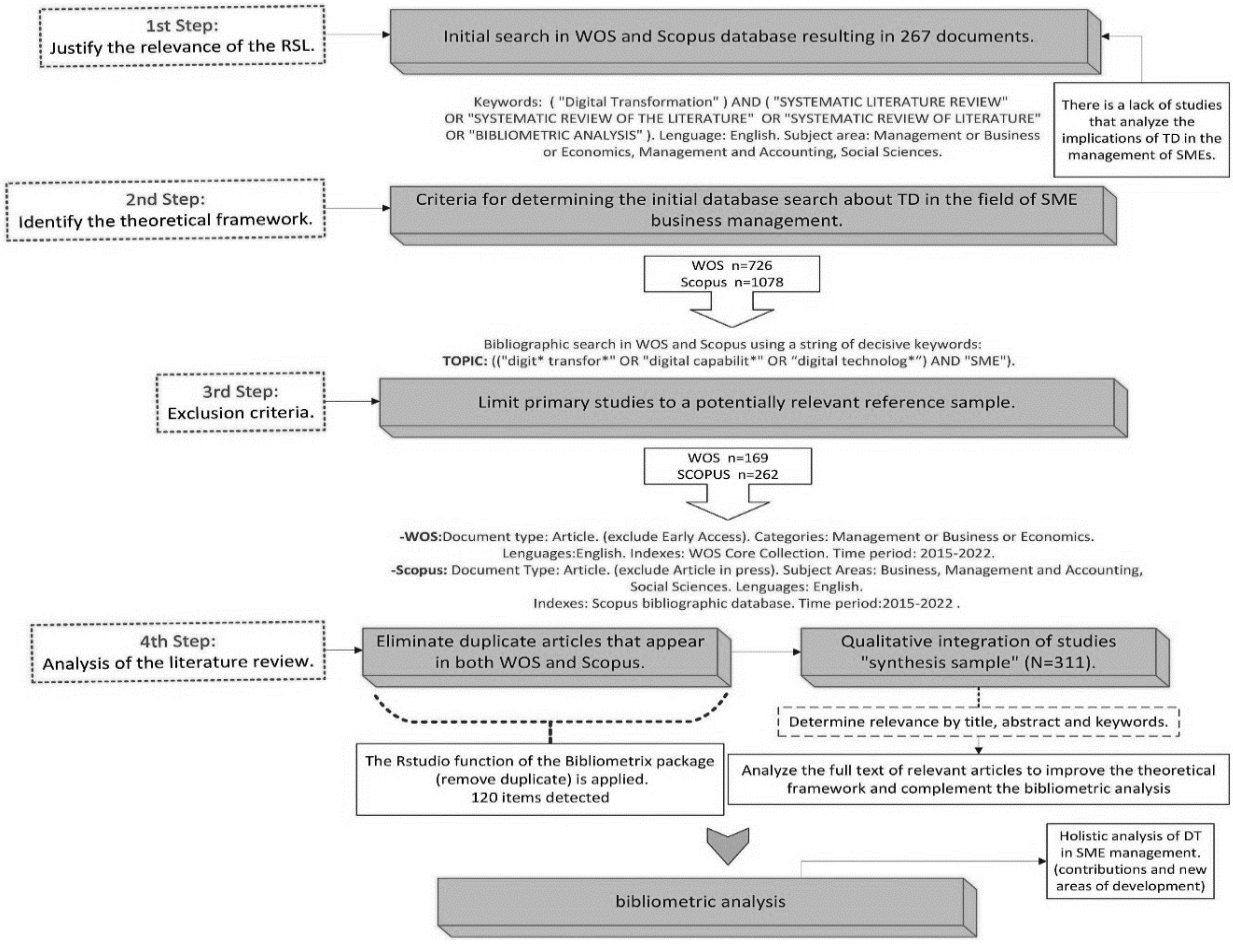

Figure 2. Procedure and justification of the selected data

The third stage established the exclusion rules for the selected documents, which were 1) the results of the research should only include articles from scientific journals which are considered certified knowledge as these publications have been reviewed and approved by other researchers (Ramos-Rodríguez & Ruíz-Navarro, 2004), 2) the results should only include studies published in English, as these are the most widespread worldwide, 3) the period considered is

2015-2022 as no documents prior to 2015 were found in the initial search. The search is limited to 2022 to only include complete years, 4) The selected documents must provide a clear relationship with the subject of DT processes in SMEs and the search is limited to areas closely related to the management of organizations, such as "Management or Business or Economics", "Business", "Management and Accounting" and "Social Sciences", and 5) the selected articles must be clearly and sufficiently described and explained along with the methodology used in each study. Once the filters had been applied, 169 WOS articles and 262 Scopus articles were validated.

In the fourth stage, a literature review was performed with a bibliometric analysis which used measurements taken with the Biblioshiny tool that was chosen because its superior features compared to other tools, such as SciMAT, VOSviewer, Citan, etc. (Moral-Muñoz et al., 2020). provides. The Bibliometrix version 4.0 software package using the R-language (Aria & Cuccurullo, 2017) provides a very visual web interface.

The files obtained from the WOS and Scopus database with the selection of the articles were exported in bibtex format and the two resulting files were combined into one. This file was used for the bibliometric analysis and must contain high-quality data and therefore duplicated elements must be detected and eliminated (Aria & Cuccurullo, 2017). This process was performed using the "mergeDBSource" routine of the Bibliometrix package executed in the statistical software Rstudio version 2023.06.0 Build 421. Once the duplicates (120 documents) had been discarded, the final sample contained 311 articles.

The literature review analyzes domain-centered hybrids (concept-discipline) conceptualizing DT in SME business management. The SRL was made using the Biblioshiny software and has two levels of analysis: one is based on metrics (resources, authors and documents) and the other on knowledge structure (conceptual and intellectual). In addition to the Bibliometric study, a complete analysis of the title, abstract and keywords of the most relevant articles was made by the three authors of this study. The complete texts of the articles considered to have the greatest impact in terms of citations (59 articles) were analyzed. Subsequently, the selected articles were compared and discussed by the authors. This content analysis is subjective in nature and depends on the evaluation of the researchers (see figure 3).

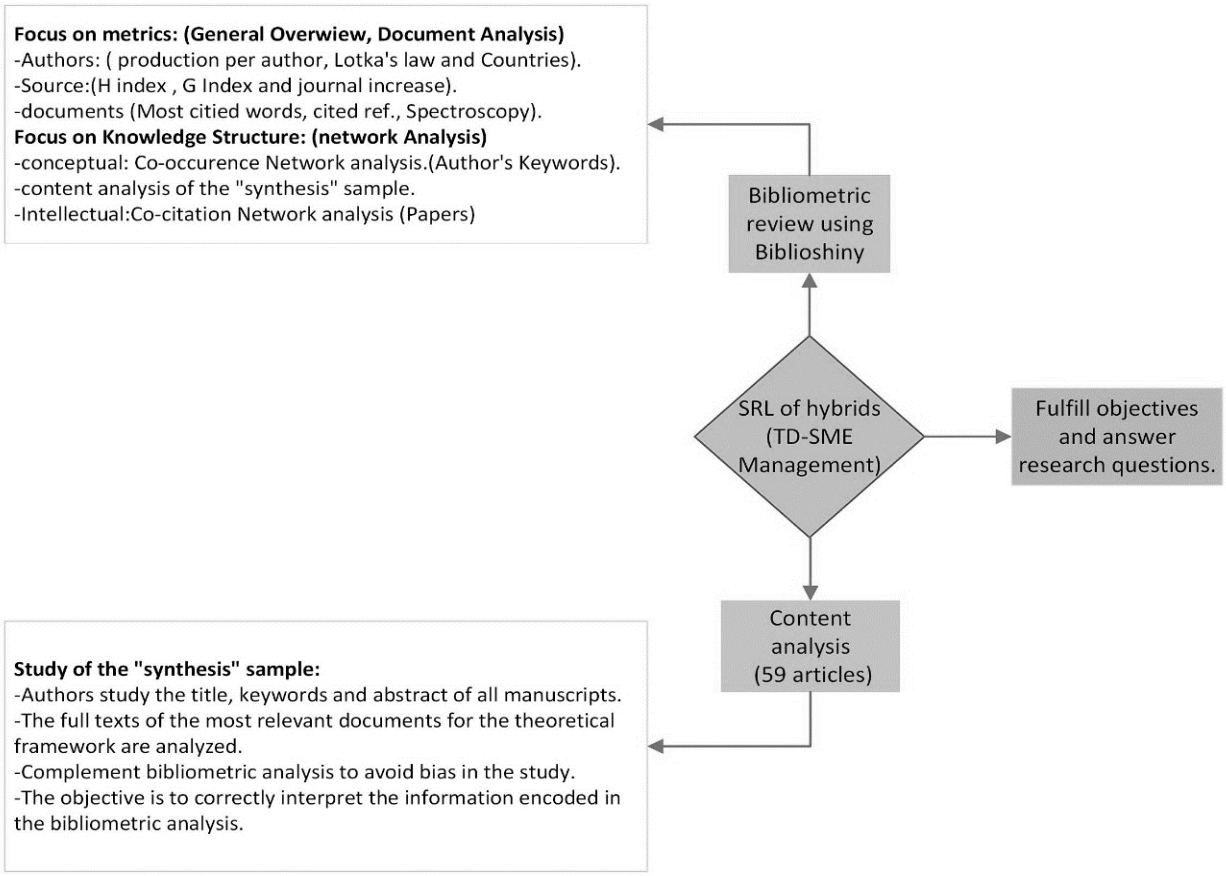

Figure 3. SRL methodology

4. Results

The scheme for the results proposed in Annex 2 shows the results. The first analysis is domain-focused and provides an overview of the number of sources, publications, citations, and types of documents to which the metadata refers. Next, the conceptual and intellectual structure, internal gaps and future research directions for the effects of DT on SME management are mapped. These results focus on citation analysis, co-citations and co-occurrence of authors' keywords. To minimize errors when interpreting the results, a synthesis of the analysis of the 59 full-text articles reviewed by the authors is shown and the main research streams are grouped by subject.

4.1. Metric Analysis

4.1.1. Reference Publication Year Spectroscopy (RPYS)

The SRL establishes an empirical base to find the main articles of the research after reducing the bias of the researcher (Tranfield et al., 2003). Therefore, the historical roots of the seminal documents on DT in SMEs are analyzed and represent the origins of the research fields and topics. These were found by considering the metadata of the references, including works not

indexed in Wos and Scopus. This analysis used Reference Publication Year Spectroscopy (RPSY) which is a quantitative method to identify the historical origins of research fields and topics. (Marx et al., 2014). The seminal documents can be considered the crucial impulse for new theories and applications of the subject (see figure 4).

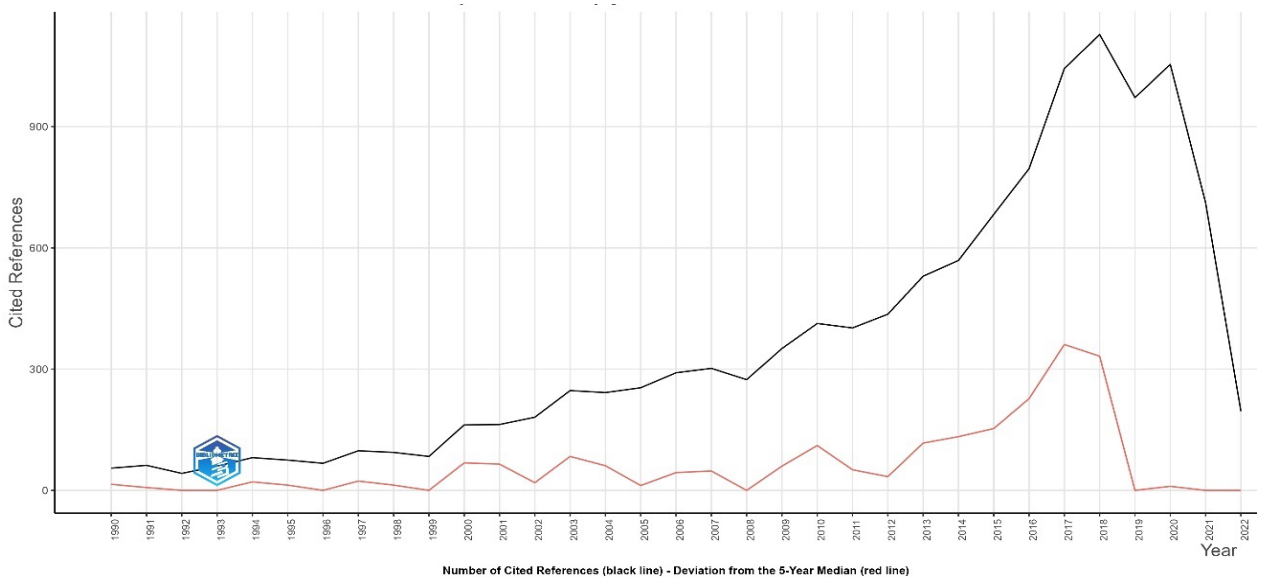

Figure 4. Reference publication year spectroscopy

This figure shows two lines with the black one showing the number of references cited (NRC) per year while the red one indicates the absolute deviation from the 5-year median, which is useful for finding the most cited historical publications. The greater the deviation, the more pronounced the peak of the red line and this shows the years of publication with the largest number of cited documents compared to other years.

The most relevant publications are those listed in table 2, which gives the year of publication in the first column, the title of the document in the second column and the description of the main topic in the last column.

Table 2. Seminal documents

Year	Seminal document	Main theme
2000	*Bharadwaj, A. S. (2000). A Resource-Based Perspective on Information Technology Capability and Firm Performance: An Empirical Investigation. MIS Quarterly, 24(1), 169-196.*	Resource-based theory and its relevance in fostering competitive SMEs.
2000	*Eisenhardt, K. M., & Martin, J. A. (2000). Dynamic capabilities: What are they? Strategic Management Journal, 21(10-11), 1105-1121.*	The resources and capabilities needed for a company to be competitive
2003	*Lewis, W., Agarwal, R., & Sambamurthy, vallabh. (2003). Sources of Influence on Beliefs about Information Technology Use: An Empirical Study of Knowledge Workers. MIS Quarterly, 27(4), 657.*	Examines the factors that influence individual beliefs about technology use.
2003	*Venkatesh, V., Morris, M. G., Davis, G. B., & Davis, F. D.*	Reviews the literature and gives a model of the

	(2003). User Acceptance of Information Technology: Toward a Unified View. MIS Quarterly, 27(3), 425. 0	acceptance of information technologies
2010	Teece, D. J. (2010). Business Models, Business Strategy and Innovation. *Long Range Planning*, *43*(2-3), 172-194.	Explore business models and their connections to business strategy and innovation management.
2010	*Chesbrough, H. (2010). Business Model Innovation: Opportunities and Barriers. Long Range Planning, 43(2-3), 354-363.*	Analyzes the obstacles and barriers to innovation when implementing business models in companies.
2013	*Bharadwaj, A., El Sawy, O. A., Pavlou, P. A., &Venkatraman, N. (2013). Digital Business Strategy: Toward a Next Generation of Insights. MIS Quarterly, 37(2), 471-482.*	Studies the process of merging business strategy (IT-based) and functional strategy into a digital business strategy
2013	Fitzgerald, M., Kruschwitz, N., Bonnet, D., & Welch, M. (2013). Embracing digital technology: A new strategic imperative. *MIT sloan management review*, *55*(2), 1.	DT is based on new technologies (social networks, mobiles, devices, etc.)
2014	Lasi, H., Fettke, P., Kemper, H.-G., Feld, T., & Hoffmann, M. (2014). Industry 4.0. *Business & Information Systems Engineering*, *6*(4), 239-242.	Defines Industry 4.0 based on digital production networks.
2015	Matt, C., Hess, T., & Benlian, A. (2015). Digital Transformation Strategies. *Business & Information Systems Engineering*, *57*(5), 339-343.	Global conceptual exploration of DT strategies.
2016	Hess, T., Matt, C., Benlian, A., & Wiesboeck, F. (2016). Options for Formulating a Digital Transformation Strategy. *Mis Quarterly Executive*, *15*(2), 123-139.	Establishes a guide for managers to implement a digital transformation strategy.
2017	Nambisan, S. (2017). Digital Entrepreneurship: Toward a Digital Technology Perspective of Entrepreneurship. Entrepreneurship Theory and Practice, 41(6), 1029-1055. https://doi.org/10.1111/etap.12254	Studies of the intersections between new technologies and digital business initiatives.
2017	Scuotto, V., Del Giudice, M., & Carayannis, E. G. (2017). The effect of social networking sites and absorptive capacity on SMES' innovation performance. *The Journal of Technology Transfer*, *42*(2), 409-424.	Studies the implications of innovation capacity for SMEs.
2018	Moeuf, A., Pellerin, R., Lamouri, S., Tamayo-Giraldo, S., & Barbaray, R. (2018). The industrial management of SMEs in the era of Industry 4.0. *International Journal of Production Research*, *56*(3), 1118-1136.	Analyzes the new paradigms that Industry 4.0 offers for the industrial management of SMEs.
2018	Müller, J. M., Buliga, O., & Voigt, K.-I. (2018). Fortune favors the prepared: How SMEs approach business model innovations in Industry 4.0. *Technological Forecasting and Social Change*, *132*, 2-17.	Investigates the changes that Industry 4.0 has made to the business models of SMEs.

Articles prior to 2000 are not considered because they are not relevant to studying DT in SMEs with current organizational processes.

From 2000 to 2014. Research focused on the technological resources of companies to find the competitive advantages generated and obtain improved performance by modifying the specific, non-substitutable and inimitable tangible and intangible resources of the company (A. S. Bharadwaj, 2000). The correct use of technology in SMEs is different in each context and mainly comes from the commitment of senior management to new technology and self-efficiency (Lewis et al., 2003; Venkatesh et al., 2003). The dynamic capabilities framework begins to be addressed by broadening the static perspective of the company's resource-based vision, focusing on intentional modifications of the resource base to adapt to the external environment and gain competitive advantages in changing conditions (Eisenhardt & Martin, 2000).

For the success of SMEs, business models and their strategies must be intimately connected with the management of innovation when implementing novel digital technology (mobile technological devices, embedded devices, computing, communication and connectivity) to achieve significant business improvements (customer experience, streamline operations, etc.) (Teece, 2010; A. Bharadwaj et al., 2013). The implementation of these business models generates barriers that can be successfully overcome with knowledge management for the use of new technologies (Chesbrough, 2010; Fitzgerald et al., 2013).

The industrial sector is the main driver of new IT-based business model implementation. These changes not only have technological implications for improvements in manufacturing systems, but also organizational ones. The approach of the industrial sector for the DT of its production processes has been called industry "4.0" (Lasi et al., 2014).

From 2015 to 2018. In this period, research was concerned with dimensioning DT strategies. They are seen to be interfunctional and must be aligned with other functional and operational strategies. The objective is to develop current business models with a digital orientation and evaluating these strategies from a business management perspective (Matt et al., 2015; Hess et al., 2016) since the nature of new digital technologies generate inherent uncertainty in business processes and results (Nambisan, 2017).

The importance of digital entrepreneurship is explained to try to integrate entrepreneurship with digital technology and try to achieve rapid adaptation to the digitalization of products and services in all industries (Scuotto et al., 2017)

Industry 4.0 triggers changes in the business models of industrial SMEs because of internal (managers and leaders of SMEs) and external (competitive pressure) aspects of the company. The three dimensions of high-degree digitalization of processes, intelligent manufacturing and connectivity between companies are analyzed (Moeuf et al., 2018; Müller et al., 2018)

During the following years, the seminal documents were mainly the articles analyzed in this study, and therefore, we cannot consider previous documents that analyze and conceptualize DT in SMEs.

4.1.2 General data of the bibliometric analysis

311 articles were obtained from 180 different sources, with an average of 21.32 citations per article in the period analyzed. There are 10,296 articles with 975 keywords referenced from the participation of 886 authors in this study. The trend of the sample in eight years of study is relevant and research is increasing.

Table 3.Main information about the study

Description	Results
MAIN INFORMATION ABOUT DATA	
Timespan	2015:2022
Sources (Journals, Books, etc)	180
Documents	311
Annual Growth Rate %	73.5
Document Average Age	2.14
Average citations per doc	21.32
References	10296
DOCUMENT CONTENTS	
Keywords Plus (ID)	796
Author's Keywords (DE)	975
AUTHORS	
Authors	886
Authors of single-authored docs	23
AUTHORS COLLABORATION	
Single-authored docs	23
Co-Authors per Doc	3.23
International co-authorships %	18.65
DOCUMENT TYPES	
article	311

4.1.3 Most cited and influential authors

Figure 5 shows the most relevant authors from their publications and the citations received. The two most relevant are seen to be Dr. Manlio Del Guidice, an affiliated professor at Sapienza Universitá di Roma and Dr. Veronica Scuotto affiliated professor at University of Naples Federico II.

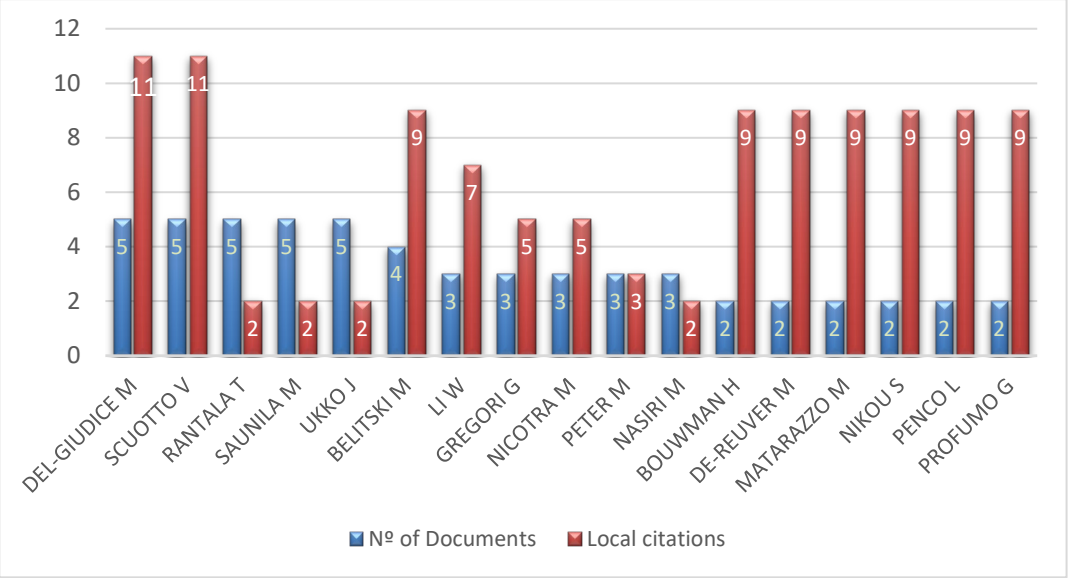

Figure 5. Most relevant Authors

There is a wide range of publications from 799 authors who have participated in 90.20% of the total scientific production on DT in SMEs, with most articles co-authored (see table 4).

Table 4. Scientific production according to Lotka's Law

Documents written	N. of Authors	Proportion of Authors
1	799	0.902
2	68	0.077
3	13	0.015
4	1	0.001
5	5	0.006

The above table is created by applying Lotka's law, which describes the frequency of publications per author in a field of research (Lotka, 1926). This law expresses that the number of works A_n corresponds to a number of authors A_1 and the number of works by a single author n^2. The formula is as follows:

$$An=\frac{A1}{n^2}$$

The production of researchers over time is limited and is distributed among many authors. The most active in the last five years have been Del Giudice, M.; Rantala,T; Saunila,M and Scuotto, V The publications have become more concentrated since 2019 (see figure 6).

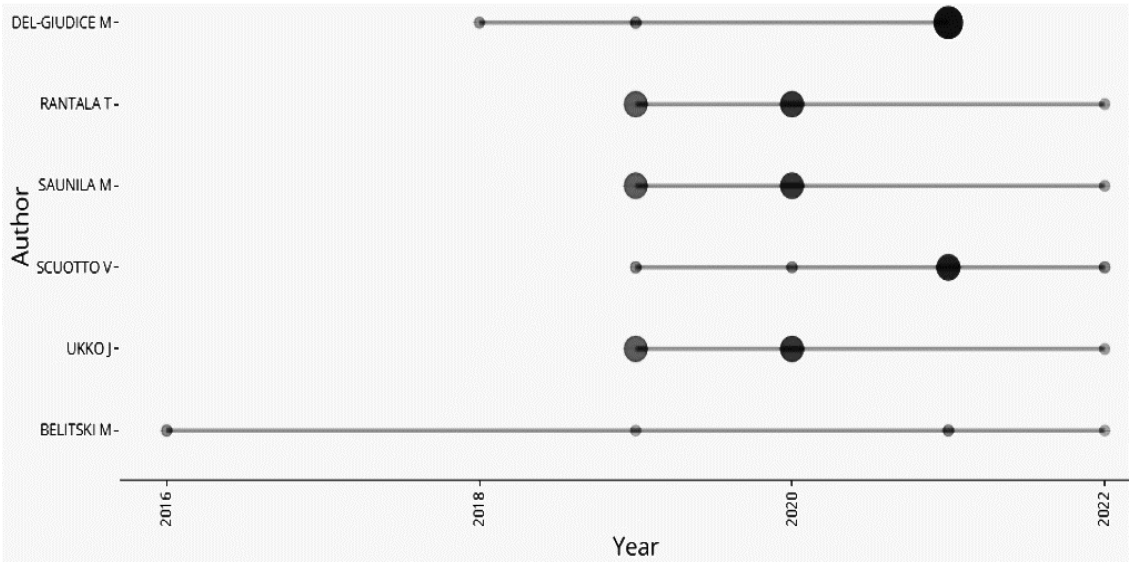

Figure 6. Top-Authors` Production over Time

Table 5 shows the organization of the authors of the articles according to the most productive countries. It is noted that there is a clear interest worldwide, with the most active countries being Italy with 99 articles, followed by Great Britain with 60 articles and China with 27 articles.

Table 5. production by countries

Region	Freq.
ITALY	99
UNITED KINGDOM	60
CHINA	27
GERMANY	20
USA	20
FINLAND	18
INDONESIA	16
SPAIN	16
CANADA	14
CZECH REPUBLIC	14
INDIA	14
MALAYSIA	14

The intensity of collaboration between countries in terms of co-authorship is shown below. Authors from the United Kingdom (29 articles published in co-authorship) and Italians (28 articles published in co-authorship) lead this metric.

Table 6. Worldwide collaboration between countries

From	To	Freq.	From2	To2	Freq.2
UNITED KINGDOM	AUSTRALIA	3	ITALY	CYPRUS	1
UNITED KINGDOM	AUSTRIA	1	ITALY	FRANCE	7
UNITED KINGDOM	BELGIUM	1	ITALY	INDIA	1
UNITED KINGDOM	CHINA	2	ITALY	IRAN	1
UNITED KINGDOM	DENMARK	2	ITALY	KAZAKHSTAN	1
UNITED KINGDOM	FINLAND	2	ITALY	MACEDONIA	1
UNITED KINGDOM	FRANCE	4	ITALY	MALAYSIA	1
UNITED KINGDOM	INDIA	1	ITALY	NORTH MACEDONIA	1
UNITED KINGDOM	JAPAN	1	ITALY	PORTUGAL	1
UNITED KINGDOM	KAZAKHSTAN	1	ITALY	RUSSIA	2
UNITED KINGDOM	KOREA	1	ITALY	SOUTH AFRICA	1
UNITED KINGDOM	LITHUANIA	1	ITALY	SPAIN	1
UNITED KINGDOM	LUXEMBOURG	1	ITALY	UNITED KINGDOM	6
UNITED KINGDOM	RUSSIA	2	ITALY	USA	3
UNITED KINGDOM	SLOVAKIA	1			
UNITED KINGDOM	SOUTH AFRICA	1			
UNITED KINGDOM	SPAIN	2			
UNITED KINGDOM	USA	2			
TOTAL		29	TOTAL		28

4.1.4 Analysis of the most relevant sources

The journals were organized by productivity and the scientific impact, which were calculated using the "h" and "g" indexes.

"Sustainability (Switzerland)" has the largest number of publications, with 38 and is followed by "Technological Forecasting and Social Change" and "Journal of Business Research", both with 11 publications. The same journals have the highest scientific impact because their "h" and "g" indexes are higher than the rest.

Table 7. Production and impact of journals

Sources	Articles	h_index	g_index
SUSTAINABILITY (SWITZERLAND)	38	12	20
TECHNOLOGICAL FORECASTING AND SOCIAL CHANGE	11	9	11
JOURNAL OF BUSINESS RESEARCH	11	7	11
IJISPM-INTERNATIONAL JOURNAL OF INFORMATION SYSTEMS AND PROJECT MANAGEMENT	5	3	5
INTERNATIONAL JOURNAL OF INNOVATION AND TECHNOLOGY MANAGEMENT	5	2	4
INTERNATIONAL JOURNAL OF INNOVATION MANAGEMENT	5	1	2
JOURNAL OF ASIAN FINANCE ECONOMICS AND BUSINESS	5	3	3
JOURNAL OF MANUFACTURING TECHNOLOGY MANAGEMENT	5	4	5
JOURNAL OF SMALL BUSINESS STRATEGY	4	2	4
JOURNAL OF STRATEGY AND MANAGEMENT	4	4	4
TECHNOLOGY INNOVATION MANAGEMENT REVIEW	4	4	4

The “h” index measures the quality and quantity of the resources. However, it doesn’t include the number of cited articles. The “g” index corrects this and are therefore two tools that complement each other.

The “g” index measures the overall performance of a set of articles, which is calculated from the citations a researcher has and these are organised in descending order (Egghe, 2006).

The “h” index is the balance between the set of publications and the citations received by these publications (Tol, 2009).

The trend of the most important journals shows a growing interest in research on the area since 2019, which shows that it is a novel subject.

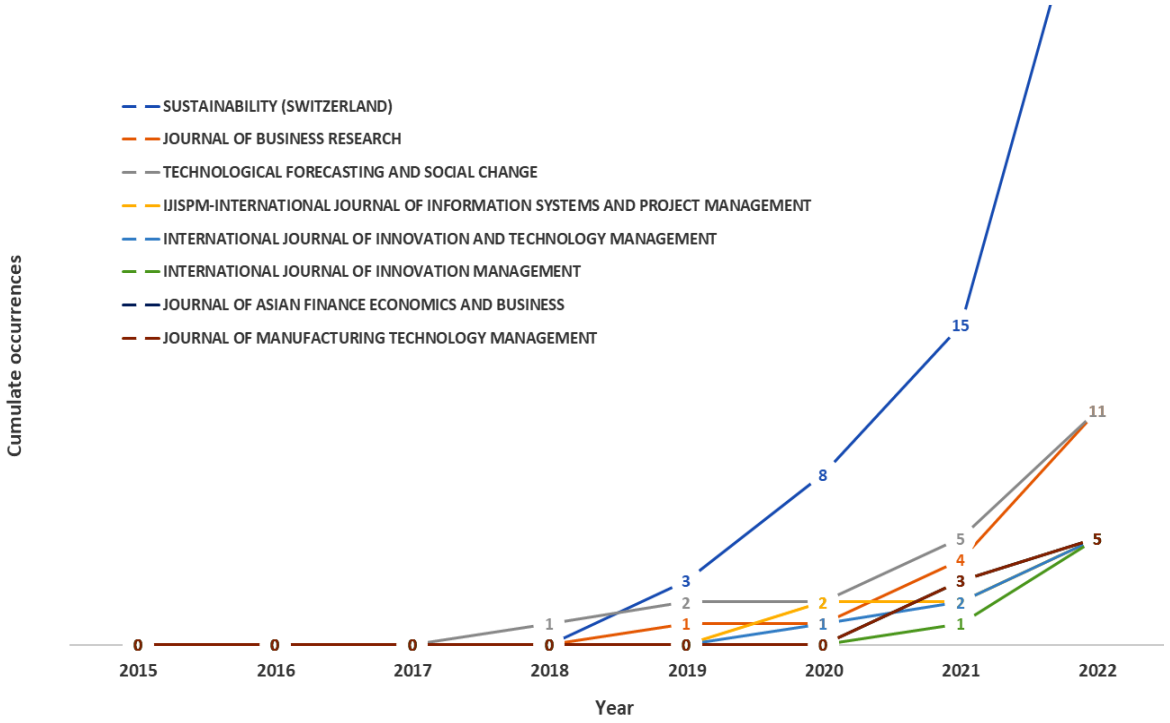

Figure 7. Source Growth

4.1.5 Document analysis

This analysis was made using the keywords for the study. Figure 8 identifies the words that appear most frequently in the dataset. The four words which appeared the most are "SMEs", "digital transformation", "digitalization" and "industry 4.0". These terms are the ones that most clearly represent the research framework. Keyword matching represents the knowledge structure of the literature on the subject (Cheng et al., 2018).

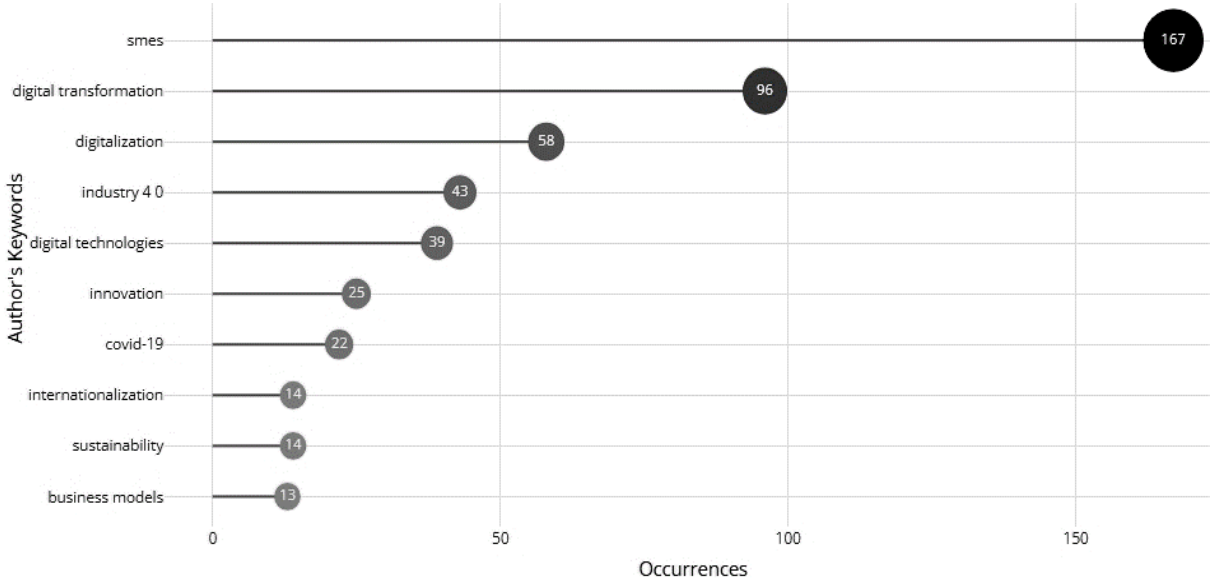

Figure 8. Most Frequent Words

As the calculation of keywords by frequency is not very exhaustive (Wen et al., 2016), the representation of the content of the article is improved by including the time evolution of the terms. Figure 9 helps to analyze the trend of keywords during the period analyzed and shows a substantial increase in the analysis of articles using the study as basic elements to find the conceptual framework of DT in SMEs.

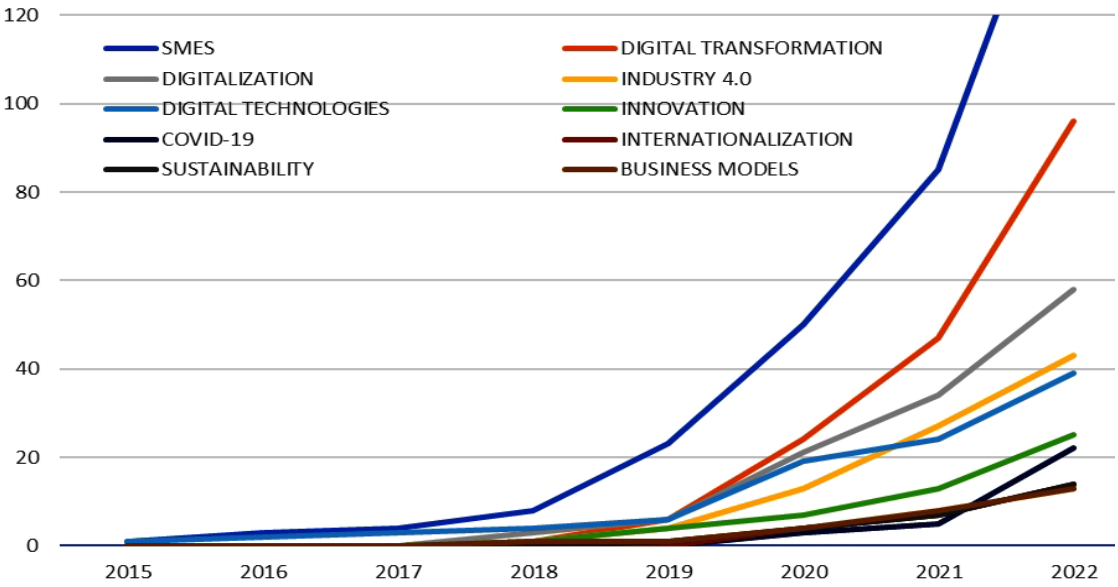

Figure 9. Word Growth

The following table shows the most globally cited articles from the entire bibliometrix database, which comprises 1,035 records and 44,588 references from 377 different sources (Lizano-Mora et al., 2021). There are three documents with a great impact in the field of global appointments:

Li, (2018) with 467 citations, followed by Coreynen et al., (2017) with 312 citations and in third place a Papadopoulos et al., (2020) with 298 citations. On deeper inspection, there are 41 articles that had no citation (13%), 151 articles that were cited between one and ten times (48.5%), and 59 articles that were cited more than 28 times (19%).

Table 8. Most globally cited articles

Paper	DOI	TC	TC per Year
LI L, 2018, TECHNOL FORECASTING AND SOCIAL CHANGE	10.1016/j.techfore.2017.05.028	467	77,83
COREYNEN W., ET. AL, 2017, INDUSTRIAL MARKETING MANAGEMENT	10.1016/j.indmarman.2016.04.012	312	44,57
PAPADOPOULOS T, ET. AL, 2020, INTERNATIONAL JOURNAL INFORMATION MANAGEMENT	10.1016/j.ijinfomgt.2020.102192	298	74,50
MATARAZZO M, ET. AL, 2021, JOURNAL OF BUSINESS RESEARCH	10.1016/j.jbusres.2020.10.033	199	66,33
PRIYONO A, ET. AL 2020, JOURNAL OF OPEN INNOV: TECHNOLOGY MARKET, COMPLEXITY	10.3390/joitmc6040104	191	47,75
BOUWMAN H, ET. AL 2019, TELECOMMUNICATIONS POLICY	10.1016/j.telpol.2019.101828	178	35,60
BOUWMAN H, ET.AL 2018, DIGIT POLICY, REGULATION AND GOVERNANCE	10.1108/DPRG-07-2017-0039	157	26,17
MÜLLER JM, ET. AL 2021, EUROPEAN MANAGEMENT JOURNAL	10.1016/j.emj.2020.01.002	138	46,00
STENTOFT J, ET. AL 2021, PRODUCTION PLANNING & CONTROL	10.1080/09537287.2020.1768318	122	40,67
Note: DOI: Digital Object Identifier, TC: Total Citation; TC per Year: Total Citation per year.			

4.2 Knowledge structure analysis

4.2.1 Study of the conceptual structure and the sample "synthesis"

A network diagram of co-occurrences of the study keywords used by the authors was used to understand the knowledge structure and research trends.

In co-occurrence analysis the size of the nodes represents the number of documents included in the node and the line between two nodes represents a link between two groups and means a co-occurrence of the keywords. The thickness of the line represents its thematic link (Y.-M. Guo et al., 2019).

The clusters represent the most linked and repeated keywords in posts. The red ones are those which were found the most and the main keywords are "smes", "digital transformation" and "digitalization". Secondly, the brown cluster appears with the following main keywords "digital technology" and "digital entrepreneurship". In third place, there is the orange cluster with "business model" and "social media" as the most relevant terms.

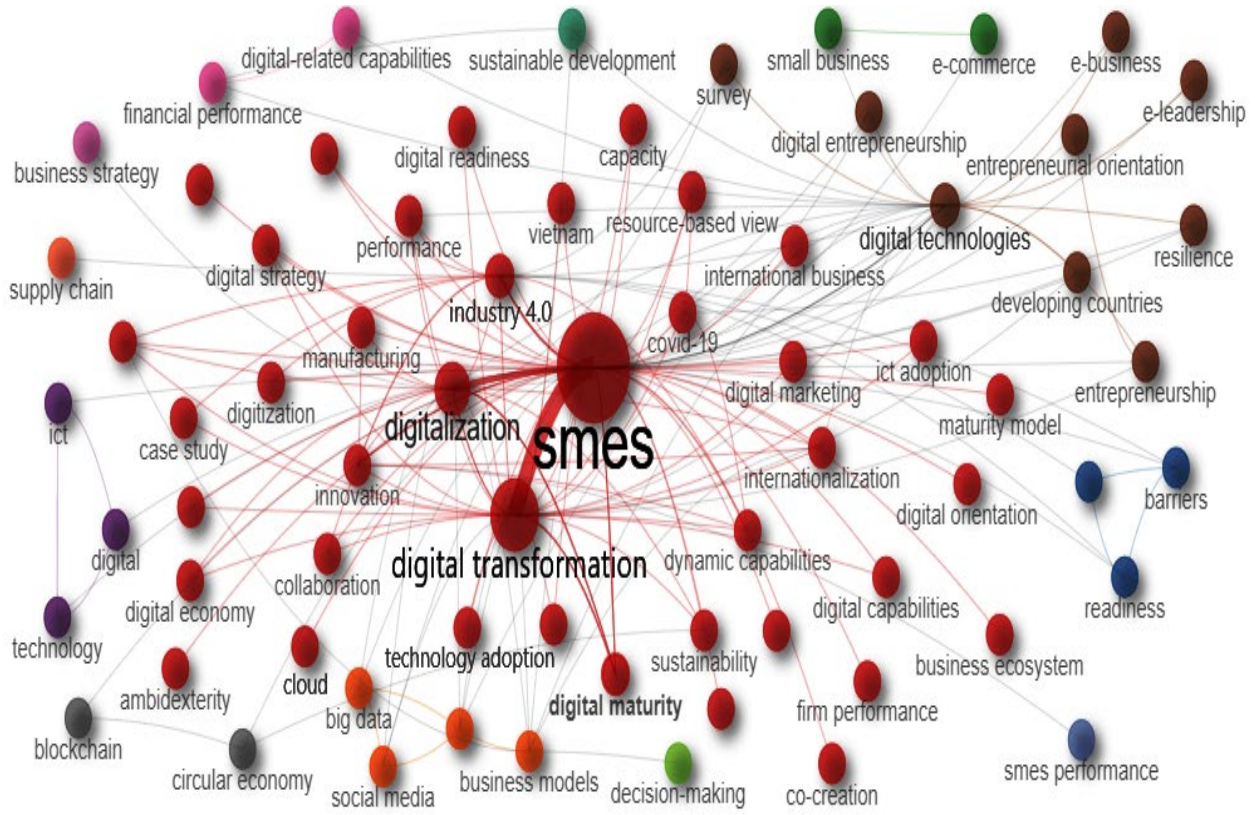

Figure 10. Study keyword co-occurrence network and clusters (2 number of Edges)

The cluster analysis found three groups of closely associated keywords. Each cluster was assigned a different color to display the topics contained by the displayed words. To label each cluster, the 59 most cited articles were selected, and the full text of each was analyzed. The results are shown in section 4.2.2. Three thematic areas were identified a. (Red cluster) "Process of digital transformation of SMEs", b. (brown cluster) "Digital Technologies" and c. (Orange Cluster) "Digital business models".

4.2.2 Research currents analyzed using the most relevant clusters

The content of the literature was analyzed to improve the understanding of TD in SMEs. The objective is to use this and the bibliometric analysis to identify and examine the main research paths of TD in SMEs.

The full-text literature analysis was done with a sample of 59 articles. The selection of articles was made using the results of the study in point 4.1.5 above on the most globally cited documents of the whole bibliographic database.

Table 9. Full list of reviewed and summarised works

Area of research	Flow of research	Research resource
DT components that originate the disruptive processes of SMEs.	a) Digital transformation process in SMEs.	
	- Organizational dynamic capabilities.	(North et al., 2019);(Elia et al., 2021); (Troise et al., 2022); (Foroudi et al., 2017); (Soluk & Kammerlander, 2021); (H. Guo et al., 2020); (Papadopoulos et al., 2020); (Dethine et al., 2020)
	-Individual dynamic capabilities.	(Garbellano & Da Veiga, 2019); (Fachrunnisa et al., 2020); (Saunila et al., 2018);(Zangiacomi et al., 2020)
	-Strategic response.	(Nwaiwu et al., 2020); (Ghobakhloo & Iranmanesh, 2021); (Müller et al., 2021); (Coreynen et al., 2017) (Ricci et al., 2021); (Bonfanti et al., 2018); ;(Becker & Schmid, 2020); (Peter et al., 2020);
	-Strategies based on knowledge management	(Castagna et al., 2020); (Crupi et al., 2020); (Klein & Todesco, 2021); (Audretsch & Belitski, 2021);
	-Strategies based on certain elements of technological innovation.	(Scuotto et al., 2019); Papadopoulos et al., 2020); (Del Giudice et al., 2021);(Quinton et al., 2018).
	-Organizational performance.	(Trașcă et al., 2019); (Bouwman et al., 2018); (Bouwman et al., 2019;(Nasiri et al., 2020);(Y.-Y. K. Chen et al., 2016); (Ramdani et al., 2022); (Ukko et al., 2019); (Teng et al., 2022)
	b) Digital technologies.	
	-ICT in an organizational context.	(Garzoni et al., 2020); (Dutta et al., 2020); ;(Relf-Eckstein et al., 2019); (Dalenogare et al., 2018; (L. Li, 2018); (Agostini & Nosella, 2019); (Del Giudice et al., 2019); (Soluk & Kammerlander, 2021); (Lutfi et al., 2022); (Mazzarol, 2015); ;(Sharma et al., 2020);(Moretto & Caniato, 2021);. (W. Li et al., 2016).
	-Internationalization.	(Cassetta et al., 2020);(Hervé et al., 2020); (Del Giudice et al., 2019) (Pergelova et al., 2019);(Denicolai et al., 2021)
	-ICT for emerging countries development.	(Akpan et al., 2022); (Chatterjee et al., 2021);
	c) Business models.	(Priyono et al., 2020); (Zhen et al., 2021); (Matarazzo et al., 2021); (Stentoft et al., 2021); (Gregurec et al., 2021);

Table 9 shows the main areas of research found in the clusters that appeared in the bibliometric search and gives a structured view of the research of the corresponding authors.

a) The digital transformation process in SMEs

This is the most relevant thematic area of this study. It uses the articles that analyze the adoption of DT in SMEs with an internal perspective of resources and theories of dynamic capabilities and how these favor the development of value creation strategies.

- *Organizational dynamic capabilities* Existing research is based on the innovative capacity of the resources of SMEs (North et al., 2019; Elia et al., 2021; Troise et al., 2022), of external relations and digital marketing capabilities with similar characteristics as the dynamic capabilities approach for studying the use of internet ICTs that facilitate interaction and relationship with customers (Foroudi et al., 2017). The global capabilities of organizations are studied, with special attention on digital technology skills, relational skills and innovation capacity. (Troise et al., 2022). Soluk & Kammerlander, (2021) consider dynamic capabilities a basic requirement for SMEs to successfully implement DT, as they are involved in the following phases, digitalization of products and services (ability to reorganize routines, ability to market new information, effective strategic decision-making and digitization of the business model (capacity for continuous renewal, strategic partnerships, employee learning capacity and brand management). Dethine et al., (2020) compares the capacity of electronic commerce (online transactions), electronic marketing (aimed at promotion and communication) and electronic business (modification of the internal organization of a company, as well as its supply chain) to digital facilitators that favor the internationalization of SMEs. Using dynamic capacities to overcome the global crisis caused by COVID is considered of the utmost importance (H. Guo et al., 2020; Papadopoulos et al., 2020).

-*Individual dynamic capabilities.* Individual capabilities are considered an essential strategic value for innovation and business growth. The most relevant individual capacity may be the human capital of the organization (Saunila et al., 2018). An important part of human capital is the role of the management team and their knowledge about implementing technology (Garbellano & Da Veiga, 2019) by using flexible leadership (Fachrunnisa et al., 2020). Human factors are emphasized when co-creating value with the capabilities of digital services as a driving force of SME employees. These capabilities allow employees to understand their customers better, improve the delivery of the service and respond to customer needs. (Saunila et al., 2018).

Zangiacomi et al., (2020) explains three managerial capabilities needed in the manufacturing value chain for Industry 4.0, which are the ability to see the advantages of DT, knowledge sharing and investment in the adoption of technology.

-*Strategic responses.* There is research on the integration of innovation strategies to redesign established business models to incorporate industry 4.0 (Nwaiwu et al., 2020) based on technological, environmental and organizational factors (Nwaiwu et al., 2020; Ghobakhloo & Iranmanesh, 2021). Müller et al.,(2021) claim that the aim of performing exploratory innovation strategies is to search for new ideas in organizations to report and resolve non-routine problems. This type of strategy is associated with efficiency. Other researchers argue that Industry 4.0 strategies are based on the ability of SMEs to recognize digital opportunities (digital design, digital manufacturing and digital servitization) in their industrial ecosystem. A wider view is required for the search for external knowledge, which positively influences the adoption of information and digital technologies (IoT, Big Data Analytics, simulation, etc.) (Coreynen et al., 2017; Ricci et al., 2021). Other studies maintain the global vision of the strategies that should be implemented in SMEs to increase the degree of digitalization and increase the efficiency of the tasks maintaining the global vision of the SMEs to increase digitalization and increase the efficiency of the tasks performed (Bonfanti et al., 2018; Becker & Schmid, 2020; Peter et al., 2020).

- Knowledge management is a basic strategic element of the response to rapid technological changes in SMEs (Castagna et al., 2020; Crupi et al., 2020; Klein & Todesco, 2021). Inter-organizational collaboration between company managers improve the internal operational capabilities of SMEs for projects to improve things like the collaboration on applications and IT infrastructures (Audretsch & Belitski, 2021).

- S*cientific research of ambidextral scientific capabilities is important for current knowledge*. The objective is to find a balance between practical research and technological exploitation (Scuotto et al., 2019; Papadopoulos et al., 2020; Del Giudice et al., 2021). There are authors who, in order to achieve DT in SMEs, use marketing strategies with digital technologies to respond to the push factors of the environment (regulatory pressures of a region, coercive pressures of suppliers and customers, and mimetic pressures), and to the internal attraction factors of the company that

generate knowledge and adaptation to the environment (integration of digital technology in the important functions of the organization with priority) (Quinton et al., 2018).

-Organizational performance. The objective of digital technology is to propose digital solutions to companies to improve their competitiveness and optimize company performance (productivity and exports) (Trașcă et al., 2019). There are studies that highlight the importance of adopting strategies and business models aimed at implementing new digital resources that generate organizational returns (Bouwman et al., 2018, 2019). As an example, the implementation and use of web portals, cloud computing, data analysis and social media platforms (Y.-Y. K. Chen et al., 2016). Other authors consider that the tools that generate the most organizational performance are the so-called smart technologies (smartphones, driverless cars, computers, etc.) (Nasiri et al., 2020). The digital innovation process in SMEs has four stages, which are intention, adoption, application and use. This process has an impact on the performance of the organization (Ramdani et al., 2022).

The success or failure of organizational performance can be evaluated in different ways. This study uses financial performance and return on investment (ROI) to measure this statistic (Ukko et al., 2019; Teng et al., 2022).

b) Digital technologies

The digital technologies used by industry 4.0 in the literature are considered the main driving force of SMEs in the industrial sector (Garzoni et al., 2020; Dutta et al., 2020) and are those which can influence machine design and factory problems (Relf-Eckstein et al., 2019). The most important technologies are, AI, the use of IoT in manufacturing, the use of digital production networks to create intelligent manufacturing systems, machines in CPS (cyber-physical systems), etc. (Dalenogare et al., 2018; L. Li, 2018). This industrial revolution is based on manufacturing systems with advanced technologies which require a very important financial effort from SMEs, and intense relationships with internal social capital (collaborative relationships between leaders and all work units of the organization) and external social capital (networks of relationships with which SMEs interact, such as ICT providers, other competing companies, research centers, consultants and intermediaries) (Agostini & Nosella, 2019).

In other sectors, the use of information technologies that offer solutions and influence the competitiveness of SMEs are virtual reality, augmented reality, new applications and digital platforms, IoT, cloud computing, Blockchain and ERP systems (Del Giudice et al., 2019; Soluk & Kammerlander, 2021). Lutfi et al., (2022) consider Big Data analytics as an important element of DT in SMEs. To correctly adopt it, the organizational disposition, the support of senior management and strong encouragement by public institutions are necessary. E-Leadership has the challenge of promoting an effective and productive alignment of the business strategy with the digital technology that is expected to improve the growth of SMEs (W. Li et al., 2016). Other studies link the technological innovation of SMEs with the electronic marketing communication tools which must be integrated into pre-sales and post-sales marketing activities to improve customer loyalty. The use of web 2.0, social media, CRM platforms, adoption of mobile applications and blogs are all important nowadays (Mazzarol, 2015; Sharma et al., 2020). Moretto & Caniato, (2021) suggest that e-commerce platforms are tools that improve the SME supply chain for Fintech activities.

Technological innovation has an impact on SMEs when it is integrated as an innovation for organizational processes and investments are made in digital skills (Cassetta et al., 2020; Hervé et al., 2020). Technological tools that promote relationships between SMEs have an impact on their international growth (spillover effect) (Del Giudice et al., 2019). AI, as a digitizing factor for SMEs has a positive influence on business internationalization (Pergelova et al., 2019; Denicolai et al., 2021).

Digital technologies also impact the markets of emerging countries (Africa and Asia) and SMEs face the challenge of adopting cutting-edge technologies that allow them to create a strategic business advantage. Innovation in the financial sector using FinTech technology causes an increase in the credit of SMEs and could improve their results. Examples include, web or internet banking, mobile money transactions, point of sale and mobile ATMs. Promoting Start-Up organizations and the use of technology in SMEs are two essential aspects of the industrial manufacturing processes called product and process innovation (Akpan et al., 2022). Other authors have studied the impact of different technology in SMEs. AI can be seen as a way to analyze large amounts of data and CRMs that manage customer relations (Chatterjee et al., 2021).

c) Digital business models

SMEs must change their business model to cope with changes in the environment by using digital technologies. The success of digital transformation depends on several factors, such as the digital capabilities in the company, the learning culture, its history of digital technology adoption and its ability incorporate innovation (Priyono et al., 2020). Zhen et al., (2021) states that in digital business models the organizational disposition or preparation mediates between digital capabilities, digital organization and digital innovation. Gregurec et al., (2021) consider that the business models implemented must be supported by digital technologies to guarantee the continuity and improvement of business activities focusing on customers and internal organizational capabilities. In another study on SMEs operating in traditional industries, Matarazzo et al., (2021) argue that the change in business models due to DT must have the goal of creating value for customers. These processes identify certain dynamic capabilities (the managers willingness to transform processes and learning from human resources to coordinate and integrate digital knowledge) needed for the effective use of certain digital tools (Social Networks, Big Data, QR codes and chatbots).

The literature analyzes the positive factors (solid strategy for innovation, owners involved in innovation, customer demands on delivery times and profitable solutions) and barriers (lack of knowledge of employees, need for greater resources to exploit technologies) that must be considered when making changes to digital business models (Stentoft et al., 2021).

4.2.3 Intellectual structure

The intellectual structure was found by analyzing co-citations of published references to demonstrate the association of topics and authors. The objective was to achieve a deeper idea of the theoretical implications of the 311 selected publications on DT with the most cited references as a basis for the analysis (figure 11).

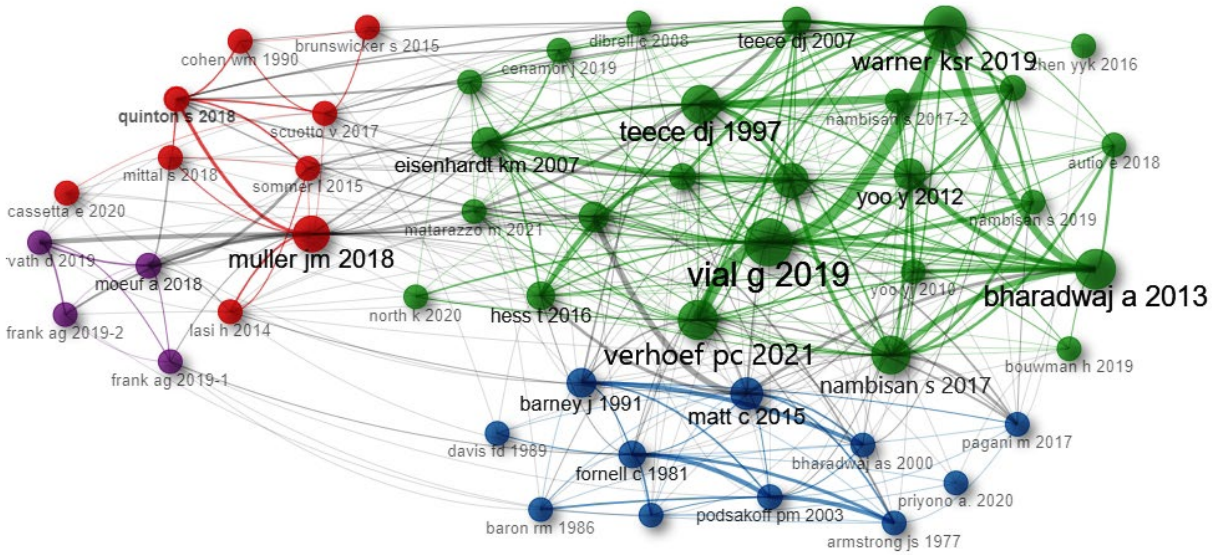

Figure 11. Network of co-cited authors

Each cluster in Figure 11 is a different color and are assigned to different groups of related items connected by arrows showing collaborative networks and cooperation strength. The bubble defines an article published by an author. The size of the bubble indicates the total number of citations of that author in other publications.

The four clusters show that research on DT has multidimensional origins. Some of the main references of the most cited authors on network analysis are "Vial, G. (2019). Understanding digital transformation: A review and a research agenda.", "Matt, C., Hess, T., & Benlian, A. (2015). Digital Transformation Strategies. Business & Information Systems Engineering", "Müller, J.M., Kiel, D. and Voigt, K.I. (2018), What drives the adoption of industry 4.0? The role of opportunities and challenges in the context of sustainability" and "Verhoef, P. C., Broekhuizen, T., Bart, Y., Bhattacharya, A., Dong, J. Q., Fabian, N., & Haenlein, M. (2021). Digital transformation: A multidisciplinary reflection and research agenda". These authors define DT holistically, so most co-citations are made from documents that are not part of the bibliometric analysis carried out. This means that the area of DT analyzed is currently important, but because it is a new topic, has not created a research corpus of co-citations sufficiently consolidated to show relevant collaboration networks.

5. Discussion

This bibliometric analysis examines the factors that determine the DT process for SME management and has identified certain aspects that deserve discussion, such as, the evolution of the metrics and the analysis of the intellectual structure that can give synthesized answers to questions (Q1), (Q2) and (Q3) and the analysis of the structure of conceptual knowledge indicates and expository framework for question (Q4).

A summary of the descriptive analysis carried out in the bibliometric analysis for questions Q1, Q2 and Q3 is given below.

- Scientific production on the subject has increased 73.58%, showing an incredible increase in the production of new articles (see table 1). The information on DT is gathered from seminal documents found in the spectroscopic analysis (see section 4.1.1). The fundamental articles concentrate on the need to adapt to disruptive markets by managing the resources and capabilities for DT in organizations (A. Bharadwaj et al., 2013; Eisenhardt & Martin, 2000). The research is centered on the use of new technologies (IoT, social, mobile, analytics, etc.) to provide innovation and entrepreneurship in economic sectors (Fitzgerald et al., 2013; Nambisan, 2017). New business models and reconfiguring traditional business models is encouraged (Chesbrough, 2010). A DT framework with a strategic global vision was found that included the use of technology, value creation, structural changes and obtaining financial resources to implement DT (Hess et al., 2016; Matt et al., 2015). DT in Industry 4.0 was then studied (Lasi et al., 2014; Moeuf et al., 2018).

- Authors, journals and countries. Being such a novel topic, there is a wide range of publications. Of the 886 authors selected in the bibliometric analysis, 90.20% (799) have written 1 document, 7.7% (68) 2 documents and 1.5% (13) 3 documents. The most relevant authors are Dr. Manlio Del Guidice and Dr. Veronica Scuotto with 5 publications and 11 citations for each author. Of the 180 journals studied, the ones that publish the most are “Sustainability (Switzerland)" with 38 publications and "Journal of Business Research" and "Technological Forecasting and Social Change" with 11 publications each. The other journals only have a few publications on the subject. The most cited documents are (L. Li, 2018) with 467 citations, (Coreynen et al., 2017) with 312 citations and (Papadopoulos et al., 2020) with 298 citations. The most productive countries are Italy with 99 publications and United

Kingdom with 60 publications. There is not much collaboration between countries around the world because this is an incipient field of research. The two countries that publish the most in co-authorship are United Kingdom with 29 articles and Italy with 28 articles.

- Advances in research. The intellectual structure was found by analyzing the citations and co-citations to obtain and consolidate knowledge about author networks. The subject analyzed is in an emerging field of interest, which means that it has not been extensively researched and collaboration networks are found from co-cited references of transversal DT issues.

A visual analysis of co-occurrence and a content analysis of the main publications were used to answer question Q4. This analytical process results in a knowledge structure that allows a theoretical framework of the business processes of SMEs to be established by considering technological innovation as a driver of DT (figure 12):

- Using a co-occurrence analysis, a thematic knowledge structure of the degree of semantic similarities between author keywords was identified. This was measured using a comparative evaluation of inter-clusters. Three clusters were defined as "Digital transformation process of SMEs", "digital technologies" and "business models". These thematic indicators offer a synergistic view of the management process for adapting an SME to DT.

- The DT of SMEs was investigated by studying the resources and dynamic capabilities (internal perspective). These DT enablers allow the company to create new products and processes which respond to changing market circumstances, generating structural changes and creating value as a result. Digital tools can be grouped into technological developments (AI, Big Data, Virtual Reality, advanced robotics, etc.) and improvements in communications (web 2.0, social networks, the cloud, blockchain, IoT, etc.). The role of capabilities should be considered as a mechanism that allows the company to participate in strategic implementation to enable DT. Therefore, they must be global, oriented to both organizational processes (digital technologies, relational capacity, digital marketing capacity and innovation capacity) and individuals (acceptance of technology by employees and managers). The strategies promote and identify dynamic capabilities with the aim of preparing a digital strategy that guarantees the success of DT in SMEs. Strategies to fully exploit the opportunities offered by technology should consider the following elements: the market (the intention to seek and understand

external information to identify new opportunities), business processes (using technology, creating new value, changing structurally and improving organizational performance) and learning (promote practices such as the adoption of emerging technologies, design innovative products, consider customers' needs and acquire new skills). Due to the structural changes required for successful DT, existing studies examine the impact of business models used for the architectural design of the mechanisms for the creation, delivery and improvement of the value of SMEs.

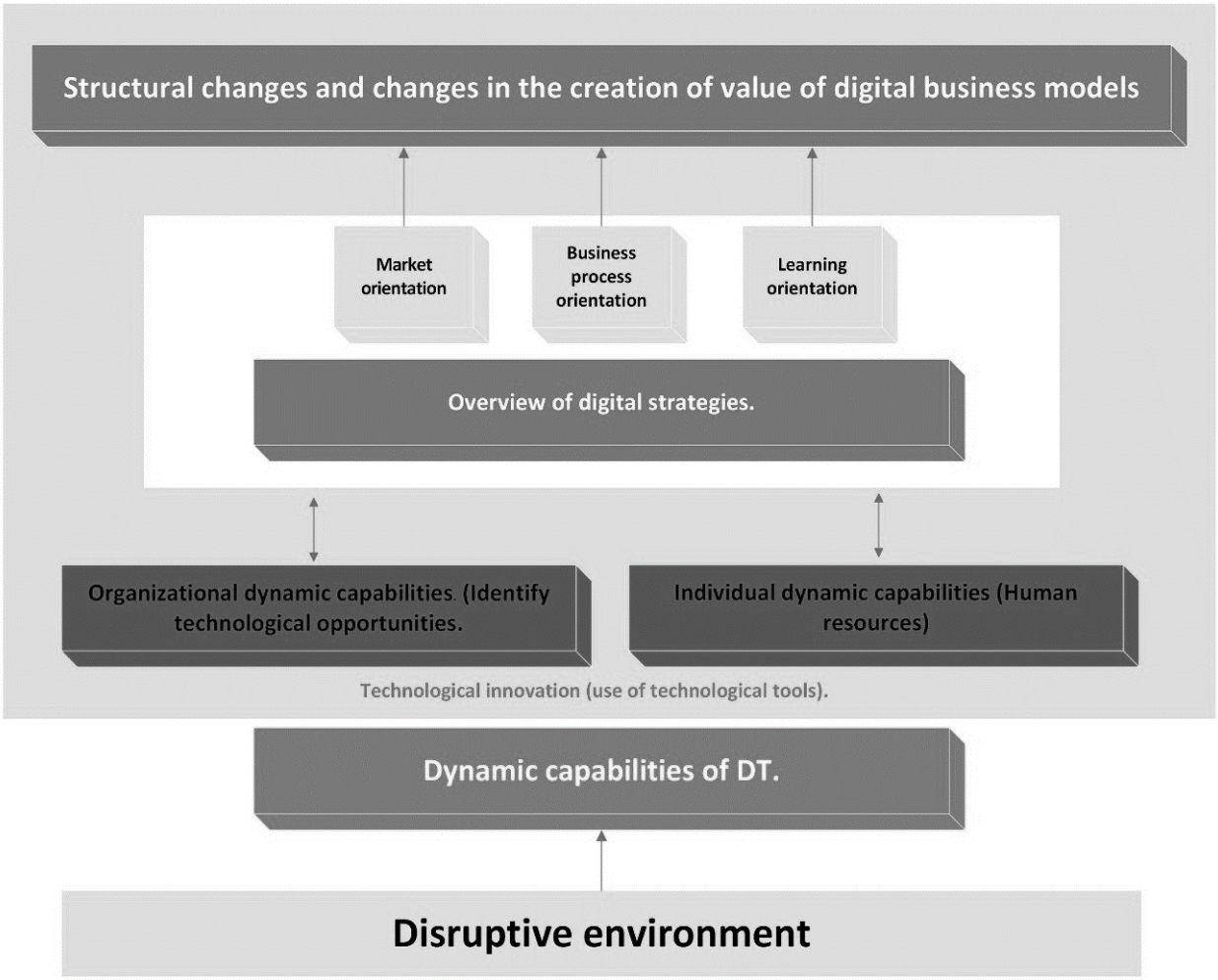

Figure 12. Conceptual framework of the implementation of DT in SME management

6. Conclusion

This article presents a comprehensive bibliometric review and a rigorous literature review of DT in SMEs and management. The scientific contribution is the information on the trends observed in the scientific production, seminal papers, author output, scientific collaboration, and source

dynamics. The findings of the different analytical phases give a research framework of the internal processes for DT in SMEs resulting from the impact of technological adoption.

The results make an important contribution to the literature and provide suggestions for actions and future research possibilities, answering the last question (Q5).

6.1 Practical and Theoretical implications

This study is theoretical and so can serve as a basis for promoting methodological advances in future studies of empirical models or mathematical research.

The results and conclusions of this study can help SME managers understand the scope of DT in business sectors and the need to implement digital processes in their organizations using generative, malleable and combinatory digital technology. They can also use the prestigious manuscripts identified in the bibliometric analysis to address the main obstacles when detecting and implementing the most determining factors for DT in SMEs.

6.2 Limitations and future scope for research

This bibliometric analysis is not without limitations. The objectives and nature of the filtering process used for the articles have a certain selection bias. For example, the analysis of the Wos and Scopus databases did not consider sources other than academic journals, nor conference proceedings, notes and commercial or informative journals. Secondly, the elaboration of a thematic framework by co-occurrence of keywords to analyze a multidimensional and complex phenomenon such as DT, detects certain connections, but may not capture others. There may be a lack of analytical depth. Finally, this study considers the organizational approach to DT of SMEs in the private sector and fails to capture the implications of DT in other areas of society, such as the freelance or public sectors.

This document, as far as we know, offers a systematic and transparent review that identifies a knowledge base of the use of DT in SMEs, and how this is integrated and managed in the organizational processes of mostly developed countries. We suggest examining the organizational changes brought about by digital technology in SMEs in emerging economies, which are growing at a faster rate than advanced economies and are increasingly integrated into global economies (Chatterjee et al., 2021). Other areas to study are, the impact of different

digital technologies, the role of individual digital skills (management of digital skills by employees and managers of the company) and IT (internet and e-commerce management for the internationalization of SMEs). Future research should analyze the organizational performance in SMEs at a global level and suggest new proactive action plans in the event of a possible global crisis. Finally, it would be interesting to study DT externally in B2C and B2B contexts, analyzing the need for new forms of collaboration with customers due to behavioral changes in the markets.

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CAPÍTULO 3. Improving KIBS performance using Digital Transformation. Study based on the theory of resources and capabilities

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Improving KIBS performance using Digital Transformation. Study based on the theory of resources and capabilities

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Abstracts. Existing literature defines Digital Transformation (DT) as the process by which digital technologies create changes in organizations in order to alter their value creation processes and affect their results. This research studies the central role of information technologies (IT), which the literature describes as inherently disruptive in the management of KIBS companies with digital capabilities. To test the formulated hypotheses, partial least squares structural equation modeling (PLS-SEM) technique is used with the following analysis of the gathered data in a survey of KIBS companies that are part of the professional group of administrative managers in Spain.

Objective. The aim of this research is to analyze the success of DT in the management and performance of organizations. To do so, the role of IT and its ability to integrate in organizations that provide professional services with high added value for their clients are investigated. These services require highly developed skills as they solve complex problems for the clients and this means that success depends on gathering knowledge from different sources (customers, public administrations, competitors). This study analyses the decisive and complementary role of IT in this process.

Design/methodology/approach. The analysis combines quantitative and qualitative methods. After questioning managers of Spanish KIBS companies about certain components of DT, the gathered data is subsequently processed with PLS-SEM to establish causal relationships.

findings. The results show that digital capability is the determinant of DT. It has a positive effect on the digital resources integrated in Kibs companies and on their organizational performances.

Originality/value. The development of digital technologies and the ability to manage them is one of the decisive factors that conceptualizes DT and improves organizational performance. This research contributes to the understanding of the need for managers of KIBS companies to follow strategies oriented towards the digitization of their organizations and for the collaborators to have a high level of IT training, especially in the use of cloud technology.

Keywords: digital capability, digital strategy, technologies, organizational performance.

Introduction

Digital transformation, as an essential element of the fourth industrial revolution, changes the way we understand organizations (Fachrunnisa et al., 2020). Adapting to these disruptive processes generates the need to learn a range of digital capabilities, which allow the use of a range of strategies promoting digitization and thus stimulating the culture of technological innovation. In this sense, knowledge-intensive professional services can channel the advantages of this technological revolution to create value in the relationships between customers and suppliers (Muller & Doloreux, 2007).

The digitization process in different industrial sectors has been studied in detail in the scientific literature, but there is an absence of scientific work in the service sector in general, and in particular in companies that offer knowledge-intensive services (KIBS) which are considered facilitators, coordinators and generators of innovation (He & Wong, 2009).

The service sector represents an important part of the GDP of each of the main OECD countries, with forecasts for increases over the coming years (Lin et al., 2013) and it plays a key role in boosting employment and increasing public welfare in these countries (Miles et al., 2017). The services sector contributed 72.80% of the GDP in the United Kingdom, 63.31% of the GDP in Germany and 67.7% of the GDP in Spain in 2020, having increased slightly over the previous fiscal year (*Statista*, 2022). KIBS should be considered as a service sector industry that uses high levels of technological capital and labor (Lin et al., 2013).

The Fourth Industrial Revolution is characterized by the complete automation and digitalization of organizations with the use of IT and information technologies in both production and services (Benešová et al., 2020). Companies that prioritize acquiring knowledge and using it effectively will be among the first to offer better, faster and less expensive solutions than their competitors (Metcalfe & Miles, 2000). Despite this, there is a large proportion, between 50 and 90%, of relevant research that shows failures in the analyzed innovation projects which are abandoned because they involve large investments or are put into practice but do not achieve the expected results (Abdolvand et al., 2008).

Scientific literature has put more emphasis on the innovation of products rather than the innovation of processes as a source of competitive gains (Gallouj & Savona, 2008), which generate changes and improvements in business processes (Horlacher & Hess, 2016; Lizano-Mora et al., 2021; Nwankpa & Roumani, 2016) with the pursuit of DT.

This study examines the factors of innovation management in companies which supply KIBS services. These factors are necessary in order to improve the companies' competitiveness and organizational performance. This has been researched less than the same topic in productive sectors ((Benešová et al., 2020). The challenge is to examine how the management of KIBS is affected by certain components of DT, such as, the digital capability, which top management must transmit to the rest of the organization, the strategies followed in the use of information technology, such as cloud computing, which make real "economies of scale" possible in the provision of services with the use of Internet, reducing costs and increasing scalability (Palos-Sánchez et al., 2017; Palos-Sanchez et al., 2019b) as well as the corporate use of digital tools and platforms (Concha et al., 2018). Finally, the possible generation of favorable organizational returns provided by a combination of these factors will be considered.

The target population of study are Spanish administrative managers/owners of SMEs throughout the national territory. The professional services they provide support the business processes of clients in the accounting and commercial areas, as well as providing standardized services by processing the administrative procedures of different public administration agencies on behalf of the clients. These companies have been selected due to their national importance.

The main research question is "What factors of digital transformation drive organizational performance in KIBS?."

This main question is further subdivided into the following sub-questions: How does the digital capability of KIBS mediate the relationship between digital business strategy and the digital technologies used? What is its effect on performance? and Does management measure the digital technology implemented and the organizational performance?

To answer the above research questions, this study applies structural equation modeling (SEM) to validate the correlation between the structures of the research model from a sample of 335 participants. The researchers expect the study to provide theoretical initiatives on organizational behavior and knowledge management in order to conceptually describe digital transformation, and give practical implications for improving firms' capabilities of innovation.

The rest of the document has the following structure. Section 2 presents the theoretical framework that develops the theory of resources and capabilities as the basic pillar of the study, followed by the definition of the digital strategies used, management support focusing on the transformational leader and organizational performance. Section 3 develops the conceptual framework and elaborates the hypotheses, modeling the concepts defined in the previous section to analyze behavior in the management of KIBS as activators of DT and also studies the implication on organizational performance. Section 4 describes the methodology used. Section 5 reports and discusses the results of the analysis while Section 6 presents the discussion and finally, Section 7 presents the conclusions.

2. Theoretical Framework

KIBS companies are key factors in a knowledge-driven society and contribute decisively to economic value (Consoli et al., 2015). They offer highly qualified services with high added value for which specialized knowledge, advanced technologies and innovative strategies are needed (Miles, 2005; Miozzo & Grimshaw, 2005). The two central characteristics of KIBS are knowledge and services, but unlike other activities in this sector, where the corporate purpose is centered on services, KIBS are mainly concerned with generating knowledge and the services are less important in their catalogue (Chung & Tseng, 2019).

Digital transformation in companies requires multidisciplinary changes in area like strategy, organization, information technology and the supply chain (Verhoef et al., 2021). With this multidisciplinary vision of resources, the company gains a competitive advantage and optimal

results from a suitable combination of valuable, scarce, inimitable and irreplaceable resources and capabilities. In this sense, one of the biggest barriers to successful transformation is the lack of human resources with the appropriate digital knowledge and skills (Nguyen et al., 2015).

KIBS companies play a central role in transforming knowledge bases and competencies in organizations by promoting the development of employees' skills (Strambach, 2008). In addition, the services offered are a useful source of knowledge for example the preparation of audit reports and tax reports, which support clients' business processes (Miles et al., 1995). The services provided solve different business problems for clients, such as legal and accountancy issues, along with the application of information technology, etc. with their expertise and by transforming and compiling knowledge (Scarso & Bolisani, 2012). Therefore, KIBS firms are innovative and motivate the transfer of knowledge and innovation in their clients by employing highly qualified personnel and the active use of professional knowledge characterizes these companies (Consoli et al., 2015).

This means that there is a need to study the processes carried out for innovation management in KIBS, using a theoretical approach based on resources and capabilities (Agarwal et al., 2010) analyze how DT-related components impact KIBS companies, and show that digital technologies create changes that trigger strategic responses from organizations which seek to alter methods of value creation while managing structural changes and organizational barriers, which affect the different positive and negative outcomes of the process (Vial, 2019). How well technology has been implemented in an organization is not the relevant point, but rather how the technology is managed (Lu & Ramamurthy, 2011). The technological capabilities and competencies are important resources for the innovation process (Renko et al., 2009). Digital technologies in KIBS companies play a central role in this scheme which the literature describes as inherently disruptive (Karimi & Walter, 2015), and the strategic response to technological innovation changes the way value is created (J. Huang et al., 2017). This change in the digital capability of the organizations allows the creation and production of new products and processes using the talent and expertise gained (Khin & Ho, 2019).

Based on the above, the following section explains the possible factors for this study.

2.1 Digital Capabilities and Technologies

The resource-based theory considering the tangible or intangible assets of a firm that generate a competitive advantage provided they are valuable, company-specific, non-substitutable and difficult to imitate by competitors (Bharadwaj, 2000) has been previously studied and reported in the scientific literature on the subject. Likewise, Teece, (2007) developed the theory of dynamic capabilities, which is the company's ability to integrate, build and reconfigure internal and external competencies to cope with disruptive environments. This phenomenon has received considerable attention from researchers in recent years to explain how firms can maintain a competitive advantage and achieve superior performance (Sousa-Zomer et al., 2020). The dynamic capabilities approach extends the static perspective of the resource-based view of the firm, as it focuses on the modifications made to the organization's resources to adapt to the changing external environment to ensure the survival of the company (Schilke et al., 2017).

Managing digital transformation can be challenging for KIBS, but companies must do it to effectively direct resources and capabilities (D. Liu et al., 2011). This means the dynamic capabilities approach is a suitable way of calculating the effects of information systems or capabilities in organizations (Contractor et al., 2017; Rialti et al., 2018) . In this theoretical field, dynamic capabilities can be considered as digital, which is understood as the organization's ability to create new services and processes which respond to disruptive factors in the market. Initially, organizations need sufficient levels of digital IT capabilities to enable them to handle digital technologies as a basis for innovations (Nwankpa & Datta, 2017).

Today's digital technologies are very flexible and accessible, which makes them useful tools for small and medium-sized enterprise (Goswami & Kumar, 2018; Škare & Soriano, 2021). Technological progress is underway not only in the industrial sector, but also in the service sector, empowering two types of emerging technology, the first originating from the development of information technology (AI, Big Data, augmented reality, advanced robotics) and the second caused by increased connectivity (mobile Internet, social networks, Internet of things, the cloud and blockchain) (Brynjolfsson & Mcfee, 2014). This technological disruption is also affecting the knowledge-intensive sector (Susskind, 2017), including KIBS companies. The combined effect of all these technologies is still unknown and although they are likely to have a considerable impact on professional services firms, so far there is not enough research to

substantiate such a claim (Breunig & Skjølsvik, 2017). The special interest in Big Data technology for the provision of innovate activities for professional service providers, based on knowledge management to create value and generate competitive advantages has been previously studied (Urbinati et al., 2019). Using the Internet of things, multiple devices with sensors can be connected to the Internet and used to optimize existing business processes and reduce the resources used (Du et al., 2016). Other emerging technologies used for DT and stimulate service innovation in organizations are artificial intelligence, virtual and augmented reality, and blockchain technology (Huang & Rust, 2018; K. Liu et al., 2018). Mobile and online platforms are proliferating to help service companies engage with their customers (Alhathal et al., 2019).

This study analyzes easily accessible digital tools because the KIBS in the study are all SMEs which cannot afford expensive, high-risk investments (Weill & Aral, 2006). The study focuses on digital technologies for cloud computing (Palos-Sánchez, 2017) and the use of professional services management software (CRM, ERP and APP), considered as support tools for the integration, connection and automation of business processes (Saura et al., 2019).

2.2 Digital strategy and the view of senior management on the transformational leader

The digital strategy in companies is a decisive factor in digital transformation (Evans, 2017). It stimulates the reform of business infrastructures and improves communication in companies (Westerman et al., 2014). In this transformative field, the literature highlights the importance of adequately managing the strategies for investment in technologies (Holotiuk & Beimborn, 2017; Nadeem et al., 2018).

The digital startegy is an organizational strategy which is designed and implemented to incorporate digital resources and generate a differential value (A. Bharadwaj et al., 2013). It should be considered as a strategy at organizational level rather than functional level using information technology, since the objective is to generate value for the company by including technology to restructure the business model (Chi et al., 2016; Kahre et al., 2017). The use of digital strategies has benefits for companies in terms of efficiency and operational performance, as they provide a superior customer experience (Setia et al., 2013; Yadav & Pavlou, 2020).

Therefore, the study analyzes the concept of digital strategy as a response to the competitive environment that is disrupted by DT, as a high-level phenomenon (Li et al., 2016), which requires a response from the organization.

The efforts made by top management to change the way a company is managed are an essential way to fulfill its objectives (Alhaqbani et al., 2016) The staff needs the support and commitment of top management when faced with strategic changes to provide them with guidelines and the appropriate management framework so that they can put the necessary time and effort into adopting the changes (Cole et al., 1993).

The support of management is essential to successfully achieve the digitization of an organization (Berghaus & Back, 2016; van Dierendonck & Sousa, 2016). The management must have adequate knowledge of information technology and also use a transformational leadership style to motivate employees by offering them a compelling vision of the future, meet their needs and transmit the knowledge needed for innovative solutions to business problems (Bass, 1990). This leadership style provides an organizational culture of creativity and innovation (García-Morales et al., 2012; Jung et al., 2008).

The leader plays a critical role in the successful adoption of digital technologies in increasingly disruptive organizational structures and increasingly collaborative business environments (Li et al., 2016).

2.3 Company performance

The performance of a KIBS company measures its success or failure and determines the achievement of the company objectives (Richard et al., 2009). Every organization aspires to obtain maximum performance and thus build a solid reputation in order to have a competitive and enduring presence in the market (AlMulhim, 2021).

Performance can be measured with financial and non-financial indicators because of its multifaceted nature due to the large number of stakeholders interested in knowing about it (Marchand et al., 2002). However, financial performance indicators (ROA or ROI) give a traditional and biased business view of organizational performance. To complement this when

assessing performance, (Gu & Jung, 2013) suggests the inclusion of the effects of non-financial aspects such as, quality, efficiency and innovativeness.

Previous studies used different indicators to measure organizational performance (Cania, 2014). (Mokhtar, 2017) considered four different categories of organizational performance, financial aspects, intellectual capital, tangible and intangible benefits and the company balance sheet. Other authors measured organizational performance from the ability to acquire and manage resources to achieve objectives (Ali et al., 2018). Eklof et al., (2020) proposed eleven indicators to measure the optimization of resources. These include rate of introduction and success of new products, return on investments, market share growth, customer satisfaction, etc. Human performance metrics, such as employee retention and motivation along with other aspects such as customer satisfaction, sales, profit margins, have also been used (AlMujaini et al., 2021).

Ultimately, performance shows the strengths and weaknesses of KIBS companies at the organizational and individual level.

3. Conceptual framework and development of hypotheses

The conceptual model in figure 1 shows the elements analyzed in the literature review. The hypotheses for this study link some elements of digital transformation to the performance of KIBS companies.

3.1 The impact of digital capability on technology and strategy

The most relevant independent variable in this study is digital capability, which is the capacity, talent and experience of a company in managing digital technologies and developing new products (Khin & Ho, 2019). The aim is to investigate how organizations acquire dynamic capabilities to enable them to undertake DT (Vial, 2019). Companies must use the positive effects of technological capabilities in the digital domain (Zhou & Wu, 2010), which requires the optimum level of capabilities of knowledgeable and talented professionals to correctly manage digital technologies ranging from the acquisition of digital technology to the development of new digital solutions. The following hypothesis is proposed using these ideas:

H1: Digital capability is positively related to digital cloud technology.

KIBS companies need to use digital or DT capabilities to implement their digital strategy, which involves not only identifying and taking advantage of the opportunities provided by digital technology (Warner & Wäger, 2019), but also having the ability to transform the company resource base (Agarwal & Helfat, 2009). The strategy identifies and promotes the capabilities of information technology and helps the company achieve a competitive position in the market (Schryen, 2013). To ensure the success of DT, KIBS companies have to prepare a digital strategy that suits them based on the following aspects, the use of digital technology, changes in the creation of value, structural changes and financial investment (Matt et al., 2015). The following hypothesis was proposed after considering the above:

H2: Digital capability positively affects digital strategy.

3.2 Effect of digital strategy and technology on the support for Digital Transformation by the company management

The leadership and support of top management is one of the most important factors for the successful implementation of information systems and changing the organizational culture (Vera & Crossan, 2004). Leaders influence the employees' perceptions of the benefits of digital technology and the positive results gained by adopting it. The manager is the determining factor for the success of ERP (Enterprise Resource Planning) adoption (Al-Mudimigh et al., 2001; Umble et al., 2003). The managers who perform these functions are transformational leaders (Akkermans & van Helden, 2002) and are the people who make up the management of the KIBS companies in this study.

Therefore, the leader's ability to properly align strategy and digital technology to leverage its potential and implementation is considered a critical challenge for companies(Li et al., 2016).

The following hypotheses are formulated with the above ideas:

H3: Digital strategy is positively associated with management support.

H4: Digital cloud technology is positively associated with management support.

3.3 Effect of digital capability, digital strategy and management support on organizational performance

One of the results of DT is organizational performance, which reflects the positive impact of digital technologies and the strategies used to change the methods of value creation in a company (Vial, 2019). The literature describes the relevance of integrating technologies into the business to obtain returns (Troise et al., 2022). This capability is called IT capability (Ravichandran, 2018) or digital capability (Proksch et al., 2021).

DT leaders need to ensure that there is a digital mindset in their organizations, and that the disruptions associated with the use of digital technology can be overcome(Benlian & Haffke, 2016; Hansen et al., 2011). Studies recognize that leadership style can influence the performance of the organization and the HR team (Abarca et al., 2020; Birasnav et al., 2011; Braun et al., 2013; Folgado-Fernández et al., 2020; Garro-Abarca et al., 2021). The management of KIBS companies must be seen as leaders and their commitment to supporting digitization is vital for success (Berghaus & Back, 2016; Schreckling & Steiger, 2017).

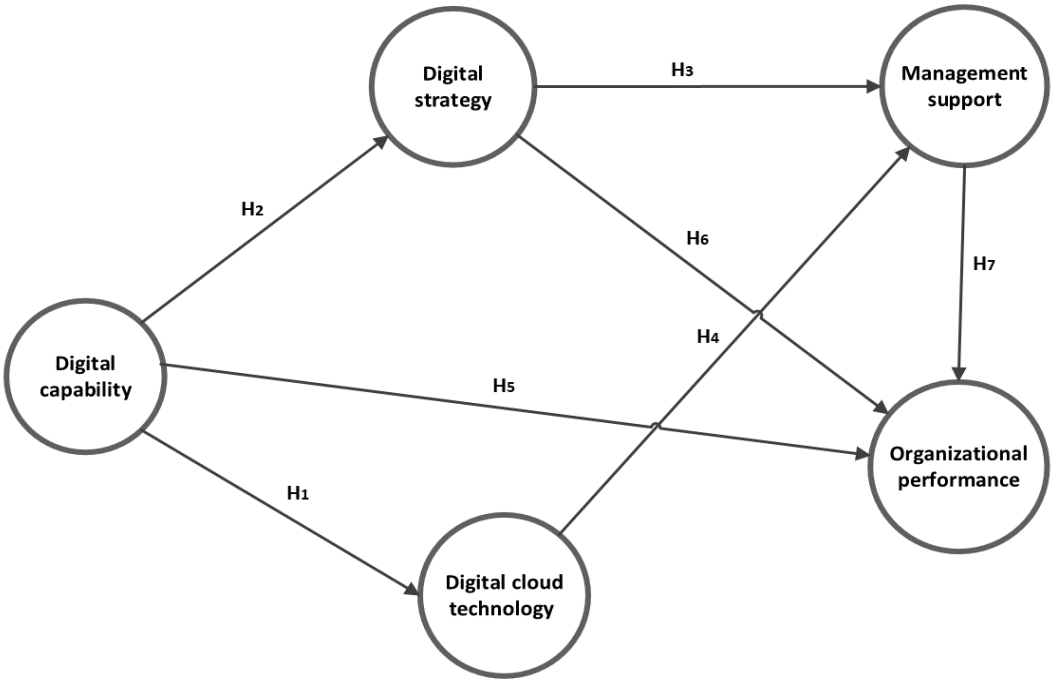
The theoretical framework above provides the basis of the following hypotheses:

H5: Digital capability is positively related to organizational performance.

H6: Digital strategy is positively related to organizational performance.

H7: Management support is related to organizational performance.

Figure 1. Theoretical model



Source(s). Authors own

4. Measurement method

This study used a quantitative research analysis of the results of a self-administered data collection questionnaire.

4.1 Data and sample selection

The data for this study was obtained from an online questionnaire survey designed and created for the managers of the KIBS companies. A pretest (MacKenzie et al., 2011), given to 45 managers, determined the validity, readability and usefulness of the measurement instruments. 618 SMEs received the final questionnaire by email, resulting in a valid sample of 335 companies, with the 54% response rate adequate for the subsequent analysis of the results (Babbie, 2007). The population of SMEs analyzed is drawn using the convenience sample technique.

The data was collected between September and November 2019 in five fortnightly campaigns. The closest professional association to the registered company manager sent an email with an introductory text from the General Secretary of the Administrative Managers Council and a brief description of the purpose of the study, including the link that gave access to the questionnaire.

The companies included in the survey have extensive experience and market penetration and most of them, 42.69%, are more than 25 years old SMEs with a turnover ranging from less than 50,000€ to 500,000€ (85.07%). The KIBS companies surveyed in this study had between 1 to 10 employees (85.38%) and were located in towns with more than 10,000 inhabitants (78.80%) (see appendix 1).

4.2 Measurements

The questionnaire included five constructs: digital capability, digital technology, digital strategy, management support and organizational performance. The questions were prepared after consulting various scientific articles dealing with the subject. They were grouped according to the latent variables of DT in order to show the innovation management processes used by KIBS companies. The questions had five possible answers on a Likert scale ranging from 1="totally disagree" to 5="totally agree".

The scales included measurements from previous literature to analyze the constructs so that the validity of the content of the survey could be guaranteed (see Appendix 2). When necessary, the scales were adapted to increase clarity and to fit the research context of certain components of DT such as digital resources and capabilities, digital strategies, support from leaders and organizational performance in a way that complied with standardized procedures (MacKenzie et al., 2011).

The consistency of the scales was validated by calculating the test-retest reliability using the Intraclass Correlation Coefficient (ICC). The analysis included using the two-way mixed effects model and absolute agreement, based on the mean of multiple measurements: eleven of the digital capability variables, three of the Cloud digital technology variables, ten of the digital strategies variables, three of the leader support variables and twelve of the organizational performance variables (Koo & Li, 2016). The statistical RStudio software version 2022.02.3+492 for Windows calculated the ICC in order to find the reliability. The statistical work package installed was install.packages ("psych"), which includes the ICC() function calculating the intraclass correlation as a measure of association when studying the reliability of indicators. This function allows for six ways of calculating ICC, depending on the experimental design chosen (Shrout & Fleiss, 1979) (see Appendix 3).

The ICC estimate was at a 95% confidence interval, showing an excellent level of reliability. The digital strategies and organizational performance constructs were above 90%, and the rest of the constructs had a good level of reliability with values between 75% and 90% (Koo & Li, 2016). These results show a high degree of correlation and agreement between the measurements and therefore the conclusions are valid (see Appendix 3).

The selected sample technique has a high internal validity with methodologically sound and trustworthy results (Andrade, 2021).

4.2.1 Digital capability

The analysis used nine indicators to measure the digital capability of the companies. Six of them (RA1, RA2, RA4, RA5, CD1 and CD2) show the variety of different information technology resources, and assess the capability and commitment of KIBS companies to using digital technology(Khin & Ho, 2019). Resource theory suggests evaluating the information technology capabilities of a company by comparing them with the company competitors (Wiesböck et al., 2020). Items CP2, TR1 and TR2 evaluate this aspect.

4.2.2 Digital technology

This construct measures the digital technologies adopted by the organization. The items evaluate the most relevant digital tools used in companies (Troise et al., 2022) highlighting the implementation of document and administrative/tax management software and the improvement of the digital processes in the organization by integrating ERP and CRM using remote access to cloud computing (Nair et al., 2019).

4.2.3 Digital strategy

This section examined the strategic alignment of the information technology used in the company. The selected indicators measure the company objectives for the digital transformation of key business processes (Ko et al., 2021; Wang et al., 2020).

4.2.4 Management support

The analysis measured the commitment of company management to technological innovation with three indicators (TMS1, TMS2 and TMS3). The objective was to measure a latent variable

that indicates the interest of management in making a strategic change in the organization's operations by using digitization (Ko et al., 2021). These measurement instruments assess whether the knowledge-oriented leadership perceives and effectively exploits innovation opportunities (Singh et al., 2021). A transformational leader who is dedicated to promoting the capacity for innovation in the organization can achieve this goal (Le & Lei, 2019).

4.2.5 Company performance

Organizational performance is the key dependent variable. It was measured subjectively as this is considered a valid proxy for objective measures (Tajeddini & Ratten, 2017). Its indicators reflect the perceptions of the administrative managers in the interviews with the questions about how effectively the companies will achieve their long-term goals. The questionnaire included questions about the managers' opinions of the performance of their company compared to the main competitors in the last three years using items adapted from the research by Rehman & Anwar, (2019) and Wang et al., (2020).

5. Analysis and Results

The research model was analyzed using empirical validation with partial least squares structural equations (PLS-SEM). This data analysis technique uses variance to test the model (Henseler et al., 2016).

The rationale behind the use of PLS is that all variables in the model are composite (Rigdon et al., 2017) and the objective was to investigate relationships between directly latent variables which act as constructs measured by the indicators (Hair, Sarstedt, et al., 2019). PLS-SEM analysis uses confirmatory research in order to understand the causal relationships between variables. It involves hypothesis testing of a particular research model maximizing the explained variance of the dependent variable and calculating the model fit indices (Henseler, 2018).

Researchers in the social sciences fields of Management (Velicia-Martin et al., 2021), Information Systems (Palos-Sanchez, Hernandez-Mogollon, et al., 2017), eco-friendliness (Sánchez et al., 2021), Hospitality (Hernandez-Rojas et al., 2021), apps (Palos-Sanchez, Correia, et al., 2019), m-Commerce (Velicia-Martin et al., 2022) and m-Health (Palos-Sanchez et al., 2021) use this type of analysis method.

The researchers used a two-phase PLS-SEM analysis to evaluate the causal model, firstly by evaluating the measurement model (external model) and secondly by evaluating the structural model (internal model) (Hair, Sarstedt, et al., 2019). This sequence ensures reliable and valid proxy measurements, which is a necessary condition when drawing conclusions about the relationships between the constructs (Roldán & Sánchez-Franco, 2012).

The researchers used the SmartPLS version 3.3.6 software package to analyze the data (Ringle et al., 2015). The PLS algorithm minimizes the residual variances of the dependent variables (Chin, 1998). The next step was a bootstrapping procedure to test the statistical significance of several of the PLS-SEM results, such as path coefficients, Cronbach's alpha, HTMT and R^2 values. The final stage was blindfolding which is a sample reuse technique to try to estimate the predictive relevance of the reflective dependent constructs (Chin, 1998).

5.1 Evaluation of the measurement model

The research model uses a B-mode composite construct (formative) and four A-mode composite constructs (reflective). The first results shown in the evaluation of the measurement model are the results of the estimation variable in formative mode. The next step of the research was a variance inflation factor (VIF) collinearity test based on the work by Diamantopoulos & Siguaw, (2006). The result was higher than 3.3, which indicates possible multicollinearity problems. The present model had a maximum VIF of 3 with the rest of the indicators scoring well below this amount. This indicates that the model used does not have multicollinearity problems (see appendix 4).

The Weights of the most relevant indicators of the digital competence training composite construct give information about the relative contribution to the construct of each indicator, and Loading establishes the correlation between the indicator and its construct (see appendix 4). The value of this measurement must have a significance level of at least 0.05 to be relevant, which is a necessary requirement and the bootstrapping process of resampling 5,000 samples must have p-values < 0.05 (Hair, Sarstedt, et al., 2019). Although there are four non-significant indicators (CD1, RA2, TR1 and TR2) that contribute little to the explained variance, the measurement model must include them because eliminating them would reduce the value of the explanation of the construct. Only two indicators of the construct (CP1, RA3) were removed because of high multicollinearity (Roberts & Thatcher, 2009).

The analysis method of composite A-mode (reflective) constructs by Hair, Risher, et al., (2019). provided the results for reliability and validity. This assessment of reliability and validity is not applicable to formative measures as they do not have to be correlated and are assumed to be error-free (Bagozzi, 1994). The individual reliability was sufficient as all the indicators of the constructs have external loadings (λ) greater than 0.707. Three items of the digital strategy construct (PLAN2, PLAN3 and PLAN7) and four items of organizational performance (BEN1, BEN3, BEN7 and BEN10) had loadings below 0.7 and were eliminated. The second step was to examine the reliability of the constructs. The analysis found the values of Cronbach's alpha, composite reliability and (rho-A) for the indices, all of them having values above 0.8, which means that the constructs have high internal consistency (Table 1). The next stage was to find the validity of the indicators with respect to the construct by calculating the value of the average variance extracted (AVE), which must exceed the threshold of 0.5 for convergent validity (see Table 1). The conclusion was that all constructs have discriminant validity, since the conditions for correlation criterion explained by Fornell & Larcker, (1981) and the Heterotrait-Monotrait (HTMT) indicators (Henseler et al., 2015) are met. The results are shown in Table 2.

Table 1. Construct reliability and convergent validity

Constructs	Cronbach's alpha	Rho-A*	Composite reliability	AVE
Management support	0.830	0.834	0.898	0.746
Digital strategy	0.921	0.924	0.937	0.680
Organizational performance	0.934	0.936	0.946	0.685
Digital cloud technology	0.854	0.861	0.912	0.775
Note*: Dijkstra-Henseler (ρA) → Rho-A				

Source(s): authors own

Table 2. Discriminant validity

Constructs	Management support	Digital capability	Digital strategy	Organizational performance	Digital cloud technology
Fornell & Larcker			***HTMT (*Heterotrait-Monotrait)**		
Management support	**0.864**		*0.495*	*0.634*	*0.334*
Digital capability	0.568	**n.a.**		*0.740*	*0.307*
Digital strategy	0.437	0.627	***0.824***		*0.333*
Organizational performance	0.563	0.769	0.688	**0.828**	
Digital cloud technology	0.284	0.348	0.272	0.299	**0.880**

Fornell & Larcker: The values shown on the diagonal elements in bold are the square roots of the AVE and are higher than the values outside the diagonal, which correspond to their correlations with the rest of the constructs, For satisfactory discriminant validity according to Fornell & Larcker, (1981).
HTMT. < a 0.85 all its elements present discriminant validity (Henseler et al., 2015).
n.a.-> non-availability.

Source(s): authors own

5.2 Evaluation of the structural model

The objective was to analyze the relationships of the unobservable variables. The PLS-SEM algorithm does this by maximizing the explained variance of the dependent variables or minimizing the residual variances, which are the error factors of each one.

The first calculation found the collinearity of the exogenous latent constructs with the endogenous latent variables. All the variables of the model have a VIF lower than 3, so there are no multicollinearity problems as they do not exceed the threshold suggested by Hair, Risher, et al., (2019). The next stage evaluated the algebraic sign, the size (see Figure 2) and the significance of the path coefficients. The final step used the indications of Hair, Sarstedt, et al., (2019) to make a bootstrapping technique with 5000 resamples to find the standard errors, confidence intervals and t-values (t-statistics) which were then used to evaluate the statistical significance of the hypothesized relationships (see Table 3). The Bootstrap test shows that all seven relationships in the model are significant and supported.

The values of R^2 indicate the variance explained of the dependent variable by the predictor variables (see Table 4). The endogenous variable "organizational performance" has an R^2 value of 67.63%, which shows the variance explained by three antecedent constructs (management support, 8.39%, digital capability, 37.30% and digital strategy, 21.95%). The R^2 values show a reasonable predictive significance for all the variables analyzed as they exceed the minimum threshold of 0.1 (Falk & Miller, 1992) with the dependent variable "organizational performance" having the highest predictive ability with a value of 0.6763 (Chin, 1998).

Table 3. Structural model results

Relationships	Path Coefficient	Confidence Interval		P-Value
		$5\%_{lower}$	$95\%_{Upper}$	
Management support -> Organizational performance	0.149** (2.517)	0.054	0.247	0.006
Digital capability -> Digital strategy	0.627*** (13.762)	0.530	0.688	0.000
Digital capability -> Organizational performance	0.485*** (7.807)	0.379	0.585	0.000
Digital capability -> Digital cloud technology	0.348*** (6.182)	0.241	0.429	0.000
Digital strategy -> Management support	0.389*** (6.658)	0.284	0.477	0.000
Digital strategy -> Organizational performance	0.319*** (4.218)	0.202	0.451	0.000
Digital cloud technology -> Management support	0.179*** (3.105)	0.080	0.271	0.001
Notes: t Values in parentheses: t(0.05, 4999) = 1.645 ; t(0.01, 4999) = 2.327; t(0.001, 4999) = 3.092. P*<0.05; P**<0,01, P***<0.001. All hypotheses are significant. Confidence Interval to the 90%, there is no change of sign and therefore the hypotheses are supported.				

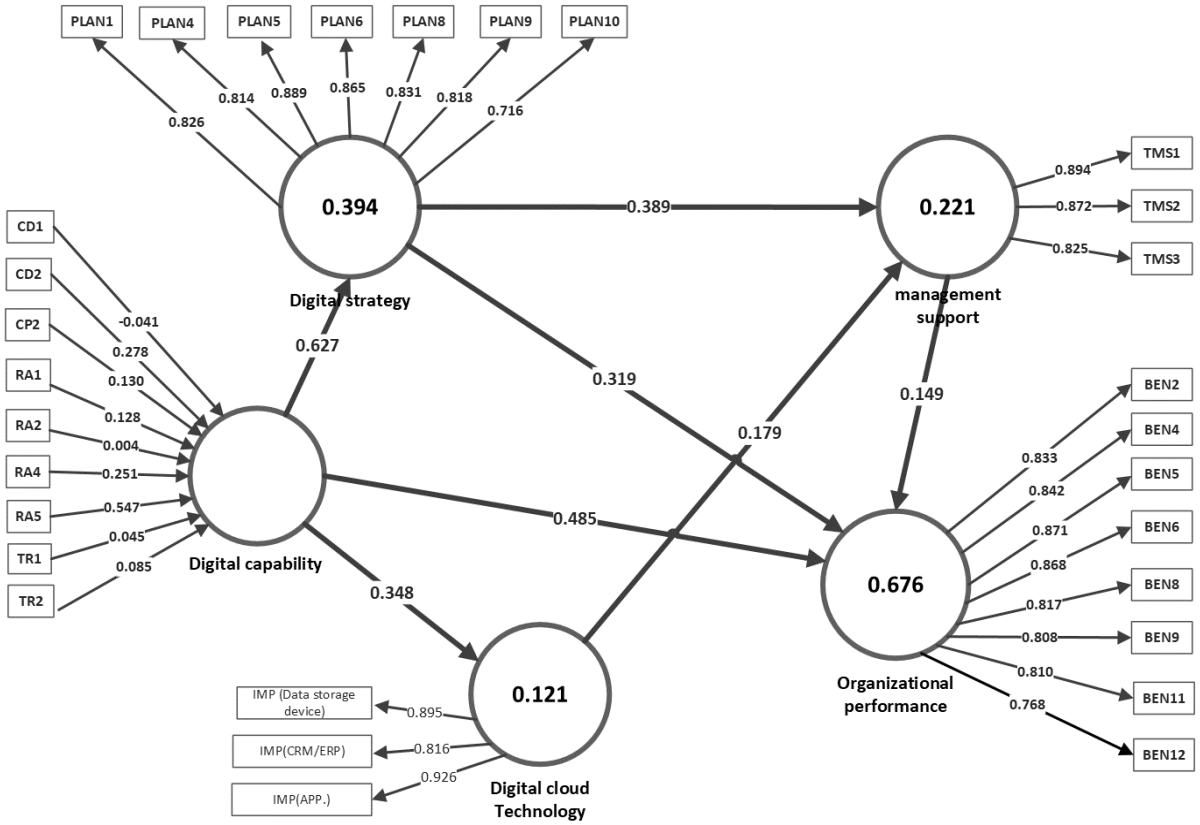
Source(s): authors own

Table 4. R^2 decomposition of the construct "Organizational performance"

Hypotheses	Path Coefficient	Correlation of indicators	R^2
Management support → Organizational performance	0.149	0.563	0.0839
Digital capability → Organizational performance	0.485	0.769	0.3730
Digital strategy → Organizational performance	0.319	0.688	0.2195
R^2 for the dependent construct "Organizational Performance".			**0.6763**

Source(s): authors own

Figure 2. Estimation model



Source(s): authors own

The predictive qualities of the model were evaluated last. Identifying the structural paths and statistically testing them found the predictive power of the out-of-sample structural paths (Danks et al., 2019). Using the indications of (Shmueli et al., 2019) the researchers could find the predictive power of the dependent variable Organizational Performance using SmartPLS version 3.3.6 software with the PLS-predictive option. The results are shown in Table 5.

Table 5. Indicator prediction summary

Indicator	PLS_SEM		LM	PLS_SEM-LM
	RMSE	*Q^2 predict	RMSE	RMSE
[BEN2: Access to new markets]	0.808	0.321	0.815	**-0.007**[a]
[BEN4: Improved communication]	0.679	0.406	0.682	**-0.003**[a]
[BEN5: New business lines]	0.750	0.409	0.745	0.005[b]
[BEN6: More productivity]	0.678	0.505	0.638	0.040[b]
[BEN8: New customers]	0.831	0.368	0.833	**-0.002**[a]
[BEN9: Time optimization]	0.714	0.417	0.712	0.002[b]
[BEN11: Effectiveness decisions]	0.781	0.348	0.787	**-0.006**[a]
[BEN12: Employee satisfaction]	0.778	0.287	0.781	**-0.003**[a]

Notes: 1º *Q^2 predict >0; all the indicators of the model studied have a Q^2 >0.
2º.RMSE: All values < 1 are symmetric according to Hair Jr et al., (2021)
3º. LM: shows the predictive capabilities of the indicators.
4º.PLS_SEM-LM<0 The results referenced with "a"should have a lower prediction error, In comparison with the LM outcomes

Source(s): authors own

The model in this study has a high predictive power since all the Q^2 indicators have positive values. The dependent variable Organizational Performance has a medium level of predictive power because the indicators that explain this construct show a highly predictive power, as seen for BEN2, BEN4, BEN8, BEN8, BEN11 and BEN12. This means that they are very useful in this model for their ability to explain new and unstudied data (Gregor, 2006). These results are effective in decision making (Shmueli et al., 2019), which, in this case, is for the management of KIBS companies using the selected DT components to generate improved organizational performance.

6. Discussion

6.1 Comparison with the scientific literature

This study examines how the components of DT affect organizational performance. Researchers used the resource and capability theory to test a theoretical framework explaining the effects of DT in the companies comprising the KIBS professional services sector using 335 interviews with Spanish administrative managers. The proposed model shows that there are different factors affecting the company DT. Digital capability is an important source of resources (cloud technology), skills and digital knowledge that can be integrated into the company to improve business processes and results.

The scientific literature includes previous studies of digital capability at an organizational level with the positive effect of digital capability in creating and fostering company performance shown in the study by Nwankpa & Roumani, (2016). In this case, digital capability was one of the driving forces of DT, although the direct impact of IT capability on performance may become less and less relevant over time. The study by Nwankpa & Datta, (2017) uses the same approach recognizing the importance of digital capability on organizational performance with provided Digital Business Intensity moderating it, as organizational performance cannot be defined simply by the ability to effectively exploit IT resources and assets. Other authors such as Khin & Ho, (2019) focus on technological innovation as a necessary construct to generate higher organizational performance and improving the ability to manage digital technology generates innovative digital solutions which indirectly affect organizational performance. Troise et al., (2022) considers IT capacity as a relevant precursor of organizational agility in the company, which has an indirect relevance on the improvement of the performance of organizations.

The strong influence that digital capability has on the evolution of the digital strategy of the company is a determining element of the model in this study showing that the new information technologies existing in the market must be used and exploited. Other findings also highlight the importance of changes generated by digital technologies in the strategic digital orientation of companies (Rupeika-Apoga et al., 2022). Technological changes cause changes in the ways a company creates added value (Becker & Schmid, 2020), improves customer service, increases customer loyalty and increases market share. These elements of digital strategy help explain the improvement in organizational performance. The study by Wang et al., (2020) includes the same variables and shows that an improvement in the IT strategy of a company allows digital business strategies to be effective in increasing the performance of companies. Sousa-Zomer et al., (2020) shows that the capacity of digital transformation, considered as the ability of a company to execute a digital strategy, helps to directly explain the heterogeneity of an organization's performance.

Another component considered as a necessary factor for the success of DT, which has a direct relationship with organizational performance in the model proposed in this study, is the commitment of management to technological innovation determined by strategic objectives (Ko et al., 2021). The management of KIBS companies should promote transformational leadership as it is the most effective way to stimulate knowledge sharing and innovative

behavior (Bednall et al., 2018). Managers play an important role in the development of business resources and capabilities, with different organizational results resulting from the appropriate combination of them (Badrinarayanan et al., 2019) and the importance of management decisions in influencing company restructuring can be seen in the research by (Khin & Ho, 2019). Leadership is an essential requirement of managerial action to achieve DT.

Previous studies of KIBS companies have analyzed the positive effect of IT use and digital management practices on business performance (Horváth & Szerb, 2018). Ribeiro-Navarrete et al., (2021) extended this study of KIBS to include digital tools and found that keeping social networks updated, along with intensive corporate use, has a positive impact on company performance.

6.2 Theoretical and practical implications

The present study expands on the results of previous research work and validates the theoretical arguments with fully supported hypotheses. To do this, (Teng et al., 2022) made a detailed analysis of digital technology as the main component of DT. In this study, the most relevant aspect found was the ability to select and integrate the most relevant digital technologies for the company from the wide variety that exists, and then adapt them to the business of individual KIBS companies.

The aim is to create new processes and products to respond to the changing needs of the market. Cloud computing is the main digital technology that these types of organizations choose using their professional knowledge and experience of a technical or functional domain (Palos-Sanchez, Baena-Luna, et al., 2019). The process is a digital capability or IT capability. This is the most relevant construct in the model and is considered the main explanatory variable. It infers the technological tools to implement and the approach to follow in order to develop an adequate digital strategy that improves the internal and external processes of the company. These include the use of technology (with new customer and data management software - ERP,CRM and professional management applications), the nature of the organizational structure (by decentralizing decisions and improving production efficiency with flatter and more flexible hierarchies) and value creation (with the implementation of the appropriate IT tools that create services which meet the changing needs of customers, increase customer loyalty and increase market share). It has been empirically proven that, in order to carry out the aforementioned

disruptive process, the company management must promote a digital culture that supports the development of digital strategies and also perform transformational leadership functions as they must know how to transmit and stimulate the exchange of knowledge and innovative behavior to all employees of the organization.

This article contributes to the existing literature on DT, especially the research concerned with digital capability and technological innovation. It emphasizes the importance of knowledge and development of the functions of IT tools so that existing resources and infrastructures are exploited to perform stable operations. IT must also be proactive and flexible in order to exploit new opportunities and apply new ideas to existing structures.

This study advances the knowledge for the current debate on the role of digital capability in organizational performance. If the integration of digital technologies in KIBS companies is carried out efficiently, digital capability is the variable that contributes most directly to increasing organizational performance.

This research has implications for managers of KIBS companies, as it shows the high potential of the ability of IT to implement and manage a DT process. Managers can benefit from IT management practices using the appropriate tools (ERP, CRM and management software) to gain more knowledge of customer behavior with the possibility of easily codifying and analyzing the data, which significantly influences innovation activities. The objective is to develop a strong internal capability to absorb knowledge from day-to-day interactions with customers by using IT effectively. This process leads to an improvement in the organizational performance of KIBS companies, as they become more effective in decision making with improved internal communication, generate greater employee satisfaction and reach new customers.

Moreover, implementing management strategies based on the adoption and use of technology will help companies in the new digital economy to close the production gap between SMEs and large companies by increasing their capacity and ability for innovation (Abu Hasan et al., 2022). These innovative processes create agile SMEs, with low-hierarchical and non-rigid structures, with managers open to innovation (Chan et al., 2019). If KIBS companies can achieve this level of agility in their organizations, they will be able to achieve higher profit margins compared to larger companies that have higher costs for the implemented innovative processes, because they have more complex, heavy and decentralized organizational structures (Neirotti et al., 2017).

The practical implications are also useful for policy makers since DT does not start by itself in the economic sector under study. The study shows the most relevant factors that trigger this process. The most important factor is the digital capability to adopt certain tools to implement DT, which favors organizational performance and has practical value for policy makers. These results can be applied to plan a DT process for SMEs in the professional services sector by enhancing the creation of more sustainable enterprises with cloud computing. The results of the study provide an insight into the processes that policy makers can implement to help SMEs become more competitive and sustainable. Creative solutions are provided for the strengthening and sophistication of SME business models in the service sector studied.

7. Conclusions

This paper analyzes the challenge of implementing DT in KIBS companies with a combination of two factors. The first is the adequate management of existing resources and the second is interconnecting and ordering digital capabilities. To do this, companies must investigate the existing technologies in the market and select those which are useful and implement them. The goal is to create new products and processes by using appropriate strategies and with a managerial style that encourages these changes to obtain optimal organizational performance.

KIBS companies that incorporate DT are able to align digital insights about customers with processes and technological investments that result in a strong internal capability to absorb insights from day-to-day interactions with customers and improve the customers' experience.

This study enriches the existing literature on KIBS companies because many researchers have analyzed innovation capability with customer-company knowledge sharing as one of the main functions and in this research the ability to innovate is considered as the knowledge and use of digital technologies.

Future research should continue to analyze other components of DT that drive the organizational performance of KIBS firms, such as technological culture or government policies that encourage digital transactions. The present study analyzes data from companies that are part of a single economic sector in Spain which may limit the conclusions drawn. It would be particularly useful to confirm the applicability of the results in companies operating in different markets to explore the direct relationship between digital capability and organizational performance.

Appendix 1. Sample characteristics

Age of Company	frequency	Percentage
From 1 to 3 years	39	11.64
From 3 to 5 years	27	8.06
From 5 to 10 years	35	10.45
From 10 to 15 years	25	7.46
From 15 to 25 years	66	19.70
More than 25 years	143	42.69
Volume of revenues		
Does not know/ Does not answer	15	4.47
Less than 50,000 €	98	29.25
From 50,000 to 100,000 €	85	25.37
From 100,000 to 500,000 €	102	30.45
From 500,000 to 1M €	16	4.78
From 1M to 3 M€	14	4.18
From 3M to 10 M€	2	0.60
More than 10 M€	3	0.90
Number of Employees		
None	12	3.57
1.- From 1 to 5 employees	231	68.96
2.- From 6 to 10 employees	55	16.42
3.- From 11 to 25 employees	27	8.06
4.- From 26 to 50 employees	5	1.49
5.- From 51 to 100 employees	3	0.90
7.- From 250 employees	2	0.60
Location		
Less than 1,000 inhabitants	6	1.79
From 1,000 to 5,000 inhabitants	27	8.07
From 5,001 to 10,000 inhabitants	38	11.34
From 10,001 to 50,000 inhabitants	87	25.97
From 50,001 to 100,000 inhabitants	51	15.22
More than 100,000 inhabitants	126	37.61
Total	**335**	**100.0**

Source(s): authors own

Appendix 2. Measurement Element

Construct	Items	Source
Digital capability (construct formative).	CD1. [The electronic mandate is a basic document for the administrative manager.]. Remote signature of any type of document.	(Wiesböck et al., 2020) (Khin & Ho, 2018)
	CD2. [The remote signature of documents has become an essential tool for the administrative manager.]. Remote signature of any type of document.	
	CP1: [Administrative agencies believes that digital transformation has an impact on being more competitive in its sector.	
	CP2: [Administrative agencies has begun its digital transformation under pressure from competitors, which have done so].	
	RA1: [The cloud enables you to manage business operations efficiently].	
	RA2: [The use of cloud services improves the quality of operations].	
	RA3: [Using the cloud allows you to perform specific tasks more quickly].	
	RA4: [Cloud usage offers new opportunities].	
	RA5: [Use of the cloud allows managers to increase business productivity].	
	TR1: [Administrative agencies knows how the benefits of digital transformation can be used to support operations].	
	TR2: [Within administrative agencies there are the skills needed to implement digital transformation].	
digital cloud technology (construct Reflective).	Degree of implementation of digital tools in administrative agencies:	(Troise et al., 2022)
	IMP: [cloud data storage device].	
	IMP: [Integral management software -CRM Cloud o ERP Cloud-].	
	IMP: [Professional management applications in the cloud].	
digital strategy. (construct Reflective).	[PLAN1: Efficiency improvement].	(Wang et al., 2020) (Hai, 2021)
	[PLAN2: Decentralize decisions].	
	[PLAN3: Reduce costs].	
	[PLAN4: Adaptation to New Technologies].	
	[PLAN5: Improve Customer Service].	
	[PLAN6: Increase customer loyalty].	
	[PLAN7: Increased productivity].	
	[PLAN8: Market share increase].	
	[PLAN9: Information management].	
	[PLAN10: Decentralizing decisions].	
management support. (construct Reflective).	[TMS1: Administrative agencies management admits to implementing digital transformation].	(Ko et al., 2021)
	[TMS2: Administrative agencies management leads and is involved in the process when it comes to digital transformation].	
	[TMS3: Administrative agencie's management is willing to assume the risks (financial and organizational) involved in the adoption of digital transformation].	
organizational performance. (construct Reflective).	[BEN1: Some of our competitors have already started to implement digital transformation].	(Nwankpa & Roumani, 2016) (Bouwman et al., 2019)
	[BEN2: Access to new markets].	
	[BEN3: Improved access to information].	
	[BEN4: Improved communication].	
	[BEN5: New business lines].	
	[BEN6: More productivity].	
	[BEN7: Customer knowledge].	
	[BEN8: New customers].	
	[BEN9: Time optimization].	
	[BEN10: Time flexibility].	
	[BEN11: Effectiveness decisions].	
	[BEN12: Employee satisfaction].	

Source(s): authors own

Appendix 3. ICC results according to RStudio

construct**:** Digital capability								
							95% Confidence Interval[3]	
	Type[1]	ICC[2]	F-Test	df1	df2	P-Value	lower bound	upper bound
Average_random_raters	ICC2k	0.82	6.5	334	3340	6.8e-191	0.81	0.83
Construct: digital cloud technology								
							95% Confidence Interval [3]	
	Type[1]	ICC[2]	F-Test	df1	df2	P-Value	lower bound	upper bound
Average_random_raters	ICC2K	0.85	6.9	334	668	1.1e-98	0.83	0.86
construct**:** digital strategy								
							95% Confidence Interval[3]	
	Type[1]	ICC[2]	F-Test	df1	df2	P-Value	lower bound	upper bound
Average_random_raters	ICC2K	0.92	16	334	3006	0	0.92	0.93
Construct: management support								
							95% Confidence Interval [3]	
	Type[1]	ICC[2]	F-Test	df1	df2	P-Value	lower bound	upper bound
Average_random_raters	ICC2K	0.79	5.5	334	668	1.7e-78	0.76	0.81
construct**:** organizational performance								
							95% Confidence Interval[3]	
	Type[1]	ICC[2]	F-Test	df1	df2	P-Value	lower bound	upper bound
	ICC2K	0.94	18	334	3674	0	0.94	0.94

[1]Type= CC2K is the two-way Mixed Effect Model convention using the mean value of K raters. Its calculation in RStudio is carried out by means of the following function: ICC(dataframe, missing = TRUE, alpha = 0.5, lmer = TRUE, check.keys = FALSE).

[2]CCI: Values between 0.75 and 0.9 indicate good reliability and values greater than 0.9 indicate excellent reliability. (Koo & Li, 2016)

[3] At 95% confidence all CCI values are between the lower and upper limits.

Source(s): authors own

Appendix 4. formative constructs

Construct: “Digital capability”					
Indicators	VIF	Weight	P values< 0.05*	Loadings	P values <0,05*
[RA1]	1.368	0.128	0.033	0.563	0.000
[RA2]	2.218	0.004	0.956	0.716	0.000
[RA4]	2.404	0.251	0.003	0.830	0.000
[RA5]	3.047	0.547	0.000	0.904	0.000
[CD1]	2.554	-0.041	0.624	0.377	0.000
[CD2]	2.646	0.278	0.001	0.497	0.000
[CP2]	1.069	0.130	0.007	0.323	0.000
[TR1]	2.003	0.045	0.558	0.486	0.000
[TR2]	1.891	0.085	0.258	0.413	0.000
P values is significant for <0.05					

Source(s): authors own

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CAPÍTULO 4. A study of the factors which influence digital transformation in Kibs companies

Referencia bibliográfica

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A study of the factors which influence Digital Transformation in Kibs companies

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Abstract: eighteen interviews were used in this research to inductively conceptualize the factors that influence digital transformation (DT) in Kibs companies that provide multidisciplinary Knowledge Intensive Business Services. Two main groups were identified: factors of DT and use in the new digital environment. Using the findings obtained, a comparison was made with the existing literature and the most relevant aspects of DT as a disruptive phenomenon which can generate intra-organizational competitive advantage are exposed.

Objective: To identify the factors of innovation-oriented organizational management, generated by the collaboration of the professional grouping of Kibs companies through the systematization of knowledge, which serve to conceptually delimit the DT phenomenon. Ultimately, it is expected to establish recommendations for this type of companies based on providing services with high knowledge value that strive to digitally transform their businesses.

Originality: the paper contributes to advancing the conceptual understanding of DT through the study of Kibs companies, which remain understudied. Likewise, there is no known study that analyzes the factors that give rise to DT in a professional grouping of small Kibs companies. It is clear that this union of small companies generates a strong internal capacity for knowledge absorption, through daily interactions with clients and public administrations, which favors the process of implementing certain technological and strategic components that are beneficial for the development of professional activity and increases the propensity to innovate.

Methodology: qualitative content was analysed using a grounded theory methodology including interviews with experts and the managers of the Kibs companies in the professional sector to obtain a solid basis that can be used to identify the most relevant factors of DT.

Findings/Results: as DT is a multidimensional phenomenon of individual companies, this study presents a conceptual framework for the term with the strategic requirements of the market, organizations, public institutions and technological infrastructures of the professional sector. By considering the disruptive factors of digital development in this macroenvironment, conclusions can be made about the basic principles and effects of DT.

Keywords: digital transformation, qualitative analysis, grounded theory, professional grouping, Kibs.

1 Introduction

Digital transformation (DT) is a phenomenon that tries to provide solutions to the profound changes that originate in society and in the production sector with the use of digital technologies (Majchrzak et al., 2016). Organizations must look for strategies to innovate with these technologies and accept all the implications of DT to obtain optimal operational performance (Hess et al., 2016, p. 123).

Scientific literature has focussed on DT because it is a concept with multiple meanings. Research has basically contributed to understanding different elements of this term, demonstrating that technology itself is only one aspect of the complex network that organizations must manage to be competitive in a digital world (Jia et al., 2018).

Services are a determining factor in developed economies and this has caused an increase in academic interest in this sector. It accounted for 70% of the added value of the sector in Japan, 73.10% in the European Union and 80.40% in the US in 2020 (OECD, 2021). Scientists consider that there is still a large amount to be learnt about service innovation (Frishammar et al., 2012), since technological progress does not only occur in industry but also in the service sector (Brynjolfsson & Mcfee, 2014). It is also affecting knowledge-intensive areas (Susskind, 2017) and, therefore, Kibs companies which develop and provide services by integrating the knowledge gained from different sources (Bolisani et al., 2016). These services are usually developed with

intense collaborative relationships between Kibs companies and their customers, which is one of their main characteristics (Chichkanov, 2021). Customers are considered collaborators when producing these services, as they are a very valuable source of external knowledge that enhances innovation (Scarso & Bolisani, 2012). To find the impact of the knowledge gained during the interactions with the Kibs customer, one the most dominant currents in the scientific literature about innovation, artificial intelligence, was studied (Dahlander & Gann, 2010). This approach is motivated by the increase in investment in Information and Communication Technology by organizations which aim to improve productivity and quality in response to customer needs, while trying to reduce operating costs (Scuotto et al., 2017).

Technology is also a relevant element in Kibs companies as studies show that there is a moderate positive relationship between the degree of technological innovation and the level of innovation (Carvalho & Sarkar, 2018). Value is created for customers and companies with different levels of maturity and acceptance in the market (Manyika et al., 2013). The technologies implemented in Kibs companies in the service sector have been grouped into two types in the scientific literature (Brynjolfsson & Mcfee, 2014). The first type includes the improvements produced by machines, including different technology such as artificial intelligence, big data, augmented reality and advanced robotics. The second type focusses on the increase in connectivity with technology such as mobile internet, social networks, Skype, internet of things, cloud computing and fog computing, as well as blockchain (Breunig & Skjølsvik, 2017, p. 4).

To implement technological innovation in Kibs companies in a digitalized environment and meet the demands of a rapidly changing market, organizations need professionals with leadership skills to react optimally to the changes adopted (Summa, 2016). In principle, the faster companies adapt, the more likely they are to gain an advantage over their competitors (Summa, 2016). Leadership and behaviour can be considered as one of the most important prerequisites of an increased capacity of innovation. Leadership is at the heart of promoting organisational innovation in a Kibs organisation.

The research gaps are centered on the divergence of results presented by the studies on the components of DT to be implemented in Kibs companies. This is due to the fact that there is a very heterogeneous set of companies in terms of size, operation and type of activity. Consequently, small service firms find it of little interest to pursue strategies for implementing

innovation processes (Vermeulen et al., 2005), and specifically professional service firms tend to consider innovation with a low priority (Brooks et al., 2018). In general, these types of firms prefer to adopt strategic cost-cutting measures for producing immediate results. Moreover, they seem to have limited competence in defining an enabling environment for process innovation and although they maintain close relationships with their customers they seem to have difficulties in translating this commitment into value (Ashok, 2018). Finally, the impact of DT on the absorption of knowledge related to the innovation process has not been investigated.

The DT phenomenon is going to be studied taking into account the macro-environment in which the professional grouping of Kibs and its relationship with governmental Institutions are involved. It is necessary to deepen the conceptualization of DT (Markus & Rowe, 2021) due to the lack of understanding of this concept, which affects multiple organizational levels (companies, markets, public institutions) and its scope requires various levels of analysis (Vial, 2019). In this research DT will be analysed by taking into account the macro-environment of Kibs and its relationship with government institutions. The following research questions were raised: What aspects of DT are incorporated in the Kibs companies of a professional sector? How does the professional group of Kibs companies respond to digital disruption in a competitive environment?

The document has the following structure. In the second section, the parts of DT that affect the business processes of Kibs and that correspond to the changes that occur in their business environment are identified in the theoretical framework. Three elements are taken into consideration: digital technologies, open innovation (OI) oriented business models and leadership. The third section describes the grounded theory methodology used in this research. Sections 4 and 5 present and discuss the most relevant results of the analysis and finally, section 6 explains the conclusions.

2. Literature review

The documents were selected using a systematic review of the literature with the aim of identifying the most relevant elements that define DT in the current business environment.

The selection process chose relevant scientific production from the documents contained in the Wos and Scopus databases and used the PRISMA methodology (Liberati et al., 2009) to find the

studies with the greatest scientific impact on the business management of SMEs. The different selection stages of the literature review were (Object, context of review and Selection of records by filtering with eligibility criteria).

The following search criteria were used to find the relevant papers for this investigation: 1st, texts published between 2000-2021, 2nd, only publications written in the English language, 3rd, the keywords appear in the title of the articles, in the abstract or in the metadata, 4th, the keywords appear in the title of the articles, in the abstract or in their metadata, and 5th, the search protocol for the different databases analyzed used the same keywords organized in search strings with the Boolean operator "and". These keywords were "digital transformation and SME's and Services", "digital transformation and kibs", "digital technology and SME's and services", "digital technology and Kibs", "open Innovation and SME's and services", "open Innovation and Kibs", "transformational leadership and SME's and services " and "transformational leadership and Kibs.

Three exclusion rules were applied to limit the content of the articles and documents. These were 1) Articles that are not research papers or literature reviews are discarded, 2). The selected manuscripts must have a direct relationship with the subject matter of the study, and 3) The selected articles must be clearly explained with the methodology proposing adequate ways of addressing the research topic and answering the research questions.

The results of the literature review attempt to limit the multidisciplinary nature of digital transformation to the operational processes and business models which Kibs companies use to achieve digitization. These are discussed below.

2.1 The DT process in Kibs companies

The concept of DT due to technological innovation poses important challenges for business organizations and researchers in terms of the identification and management of digital business models because business activity is interrupted as a radical renewal of technology takes place (Pang et al., 2019; Porter & Heppelmann, 2014; Warner & Wäger, 2019).

Digital transformation is a process that involves the adoption of transformational digital technologies which effect the functions, skills and strategies of the organization (Lucas, et al.,

2013). Digital technologies are adopted, such as business management software, new collaborative digital platforms, big data, cloud computing and hyperconnectivity, which lead to digitalization and changes in organizational processes and functions (Burke, 2011). This type of innovation at an organizational level is considered a way to generate competitive advantages for companies (Colino et al., 2014; Le & Lei, 2019; Liao et al., 2007). Open design in digital technologies creates new ways of collaborating and interacting in the ecosystems in which the companies operate (Hanelt et al., 2021). Kibs companies adapt better to organizational and flexible structures that favour continuous change and adaptability as companies and their competitors increasingly rely on outsourcing to external entities (Vial, 2019).

Strategies must be adopted for leadership and knowledge sharing so that companies can increase their capacity for innovation (Le & Lei, 2019; Ritala et al., 2018). However, to accelerate internal innovations Kibs companies must rely not only on their internal knowledge base, but also on external knowledge about the OI approach (Chesbrough et al., 2006; Martinez-Conesa et al., 2017), in which environmental factors, such as the characteristics of the country, the sector and the consumers are taken into account (Hanelt et al., 2021). This is due to the fact that customers have access to a large amount of information about the services available for the development of information technologies (Prahalad & Ramaswamy, 2004). Business relationships have also been affected by the emergence of social networks which provide a more complex interaction with customers for businesses as they must interact with many customers at the same time (Guo et al., 2020) taking into account that the customer is an important part of the final results of innovation (Belkahla & Triki, 2011).

(Lopez-Nicolas et al., 2020; Pergelova et al., 2019) detected that there is only a small number of empirical studies dealing with the effect of gender on the technologies which are implemented in SMEs. Furthermore, existing research on the use of digital technology by women is largely ignored (Dy et al., 2017), and the few studies found conclude that gender is not a driving factor of innovation in the Kibs companies studied (Mas-Tur & Ribeiro Soriano, 2014), nor is the gender of managers considered a relevant factor for the performance of the digitization of Kibs companies (Ribeiro-Navarrete et al., 2021).

2.2 Kibs business in the administrative management sector

Kibs companies offer highly qualified services that provide added value for customers, companies and individuals which means that they must have advanced technologies and innovative strategies in their organizations (Miles, 2005; Miozzo & Grimshaw, 2005). These services require expert knowledge, since they complement the production processes of a company and provide solutions to society while solving complex problems for clients (Ashok, 2018).

The Kibs business sector studied in this research is administrative management in Spain composed of R&D companies and administrative agencies that provide multidisciplinary professional services, although their main activity is providing tax and administrative services to satisfy government regulations.

R&D companies participate independently in innovative activities (Tseng et al., 2011) and provide the expertise and knowledge for developing technological innovation, fulfilling the three basic functions of Kibs innovation systems, firstly as facilitators of innovation when supporting companies in their innovation processes (implementing tax, administrative, accounting management software, etc.), then secondly as knowledge providers when transferring existing knowledge between the companies in the administrative management ecosystem (continuous training in the technological innovations applied) and thirdly as generators of innovation by playing a decisive role in the initiation and development of the services provided by the companies (implementing digital platforms that connect Public Administration Agencies with companies and allowing procedures to be used effectively and safely) (Gallouj, 2002; He & Wong, 2009).

Administrative Management Agencies provide many standardized services, although the Kibs sector is considered difficult to standardise as solutions must be personalized and customer-oriented (Bettencourt et al., 2002). The reality is that highly customized professional service packages can be provided with productization (Salmi et al., 2008). Standard blocks of professional services are used to provide a service with special characteristics. In the literature, different models for the process of service production have been reported in which the following phases have been identified, first review the strategic objectives of the customer to design the services required, second, evaluate the needs of the clients, the markets and competencies of the organization to create the service product and its modular structure and third, assemble the

service package (composed of different modules) as the content of the product, fourth, pricing and marketing plans for implementation of the service and, explain how the product is to be put into practice, and finally the fifth stage, monitoring and development of the services using different analyses, such as profitability-costs (Länkinen et al., 2006; Vaattovaara, 1999).

Kibs companies can provide highly personalized services, such as legal or commercial reports, or productised models, such as vehicle registration and tax presentation. Kibs companies can reuse existing knowledge and manage customer relationships to develop new services to obtain a competitive advantage (Salmi et al., 2008).

2.3 OI and implications of technology with special reference to digital platforms

One of the most important topics in the literature on innovation is OI, because companies can use it to access external sources to add value and obtain profits (Dahlander & Gann, 2010).

Different approaches are used in the literature to understand this concept (Chesbrough, 2003). Some authors consider that external knowledge and internal R&D are the most relevant factors of OI. Other authors consider OI as the use of resources that are part of the company (Tidd, 2014) and cannot be imitated by competitors to increase competitive advantage (Barney, 1991). There are studies that highlight the cooperation between the different contributors from four areas of OI, companies, individuals, private entities and public institutions. (Bengtsson et al., 2015; Chesbrough, 2003; Greco et al., 2016; Hossain & Anees-ur-Rehman, 2016; Tidd, 2014).

OI management in Kibs companies should focus on a knowledge-based vision, offering organizations strategies to achieve a competitive advantage by using professional workers to achieve optimal organizational results (Singh et al., 2021).

OI combines inbound and outbound innovation (Popa et al., 2017) to help Kibs companies meet customer needs and outperform market competition. Incoming OI initiates exploratory learning in order to discover and exploit the technical knowledge of external sources, such as consultants, public administration and professional organizations (Cheng & Shiu, 2015; Popa et al., 2017). Outgoing OI can be used to exploit the knowledge generated within the organization with licensing, patents or contractual agreements (Hung & Chou, 2013; Lichtenthaler, 2009) to improve organizational performance. OI therefore requires highly qualified and skilled human

resources and human capacities to cooperate, accept external sources of knowledge and offer their own knowledge for use by Kibs (Benešová et al., 2020).

The advent of digital technologies has considerably changed how organizations work (Wiesböck & Hess, 2020). Recent technological advances generate and manage massive amounts of data that were not available before (Björkdahl, 2020; Loebbecke & Picot, 2015) and organizations can now incorporate them into their business models using OI to manage all the relevant information for decision making (Dahlander et al., 2021). There are some organizations that already use this type of strategy, such as platform companies like Amazon, Google and Facebook (Cusumano et al., 2019) and also, some companies in the industrial sector (Sjödin et al., 2020), but other companies are still at an early stage and have to face important challenges. Among the most relevant challenge is adequate data management for the different services and needs, such as, the creation, capture and exchange of data in the company and with others (Björkdahl, 2020).

Open service innovation is increasingly based on data-driven business models (Dahlander et al entil., 2021). These are becoming increasingly important and OI is ubiquitous when interacting in an ecosystem in which different players cooperate (Chesbrough et al., 2014; Holgersson et al., 2018; Leten et al., 2013). Currently, OI does not just solve a particular problem with exterior help but requires new styles of organization for it to be implemented (Chesbrough, 2019; Giannopoulou et al., 2011).

One of the key organizational developments that transforms organizations in the way they capture and create value are digital platforms (Cusumano et al., 2019; Gawer & Cusumano, 2002; Hagiu & Wright, 2015; Parker et al., 2016). These are technologies developed by R&D companies which serve as the basis for other companies to create more complementary innovations (Gawer & Cusumano, 2014, p. 420). Transactions between participating companies create network effects by connecting previously unconnected groups (Gawer, 2014) and enabling R&D companies, who are the platform owners, to establish an effective innovative division of labour and provide standardized interfaces (software development kits) as well as intermediation mechanisms that bring together different users that support innovation to create value together (Adner, 2017).

2.4 Knowledge management: transformational leadership

Leaders are currently considered an important asset of companies for their direct relationship with the performance of the organization (Aragón-Correa et al., 2007). The literature describes different types of leadership, each of which has its own virtues and weaknesses, but transformational leadership brings many positive aspects to the company due to its contribution to innovation, organizational learning and the creative capacity of employees (de Jong & Den Hartog, 2007).

Transformational leadership was introduced by Burns in the 1980s (Jia et al., 2018). It is currently considered the most effective leadership style (Phong et al., 2018) because it affects the key elements of a company such as, knowledge management, human capital (Birasnav et al., 2011) and management and innovation performance (Jia et al., 2018; Nguyen et al., 2017).

Transformational leaders must use knowledge-based strategies to establish processes for the exchange of knowledge and experience between workers in Kibs companies. This allows the workers to acquire new skills and knowledge to achieve their objectives at a personal and organizational level (Liao et al., 2007; Lin, 2008).

The support of the leader is essential for a favourable climate of knowledge exchange among the employees of a company (H. Lin & Lee, 2004). The leader must attend to the intrinsic needs of workers and must therefore earn their trust and establish a model of conduct with collective goals which must prevail over individual ones (Armandi et al., 2003; Vera & Crossan, 2004). This type of leadership can develop and maintain a system of control that values and rewards creativity and innovation with appropriate performance measures and reward systems (Jung, 2001). This is more effective in disruptive environments as workers are able to cope with rapid changes in an uncertain environment (Nguyen et al., 2017). It has been shown in scientific studies that transformational leadership positively influences creativity and innovation (Khalili, 2016). These types of leaders can support innovation in companies by increasing the motivation and ability of the members to be creative and innovative (Jia et al., 2018), which is a very relevant feature for promoting organizational development in Kibs companies.

2.5 Negative Factors of technological Innovation

The use of technologies is a fundamental part of DT implementation. It is the basis of the digitization of many different social contexts and institutions (Wilkesmann & Wilkesmann, 2018). It generates competitive advantages for organizations (Yu et al., 2017), greater labor flexibility and more autonomy for workers (Symon & Pritchard, 2015). However, company managers may use technology to track workers' performance and behavior, which can cause problems when abusive control destroys motivation and work engagement (Sewell et al., 2012) as workers consider that monitoring affects their privacy.

Another growing concern in scientific literature is the social and ethical impact of the digital technologies (Winfield & Jirotka, 2018) which are being integrated into business organizations and society in general. Privacy violation is an area that has been studied on many occasions (Stahl & Wright, 2018) as many digital services rely on the data collected by technological tools to detect consumer behavior and using these tools can cause privacy infringements.

The implementation of technological innovation in public administration is crucial for the modernization of the public sector to meet the needs of the private sector and the general population (Lyudmila & Anzhela, 2022). Adopting technology is considered a challenge for the public sectors of many countries. The problem encountered by public administrations is that the implementation of new technologies requires institutional agreements to be approved by policy makers and this can delay the adoption process (Savoldelli et al., 2014; Conradie & Choenni, 2014). Other studies into digital administration have found obstacles for the implementation of technological tools due to a lack of confidence in technological devices (Twizeyimana & Andersson, 2019), the digital immaturity of the management of public institutions which, in turn, generates a greater workload and work stress (Kuhlmann & Heuberger, 2021), and the lack of security in the privacy and ownership of citizens' data (Mergel et al., 2016; Schwester, 2009). All of these require an adequate legal framework that clearly regulates the access and use of data and defines accountability.

3. Materials and methods

3.1 Research Design

The objective of this research is to find the conceptual bases on which DT is founded in a study of a professional group of Kibs companies. To do this, eighteen different experts form different areas of the sector were interviewed. A qualitative content analysis methodology was chosen as it is frequently applied in research and includes the transcription of verbal data from interviews (Schreier, 2012).

The success of this research technique is based on its ability to limit the data extracted in the interviews to the concepts that describe the research phenomena. A conceptual model or system (Hsieh & Shannon, 2005) of the type of questions used is created which is then used to validate the reliability of this scientific technique.

The conceptual structure used in this research, which is considered essential for the success of a qualitative study (Cepeda & Martin, 2005), is shown below.

Table 1. methodological phases of the research process

1.Planification:	✓ Qualitative Analysis: (Grounded Theory).
2.Data collection:	✓ Research participants.
	✓ Data collection.
3.Data analysis:	✓ Data Coding.
4.Discussion and conclusions:	✓ Considerations.
	✓ Critical Analysis.

Source: authors own

The research method uses a 4-stage repetitive process to find the components of the DT structure in administrative management companies, which is one particular area of the conceptual framework (Miles & Huberman, 1994). The company environment will be investigated in order to obtain first-hand knowledge and allow the researcher to answer the research questions.

3.2 Planning

A qualitative analysis using the grounded theory approach was used to collect and order the data obtained in interviews with the experts in a systematic way, building a formal theory based on social research (Glaser & Strauss, 2009). In this type of study, the researcher visualizes the data

using an interpretation of social reality and reconstructs the experiences and meanings of the experts interviewed (Charmaz, 2006).

This methodology was selected because it is considered effective when studying a novel field of research in detail. In this study case, researchers do not have any advance knowledge of hypotheses that could answer the research questions for the subject and are therefore constructing a conceptual framework based only on the research data (Glaser & Holton, 2004). Likewise, the theory found with the analysis of DT of Kibs companies of other professional sectors, considered a macroenvironment, has not been analysed before in the scientific literature.

3.3 Data collection

3.3.1 Research participants

The participants in this research were selected using intentional sampling, which is the most commonly used method for qualitative analysis (Elo et al., 2014). The interviewees were considered the most appropriate candidates to answer the research questions because they have the required expertise and knowledge about the subject being investigated.

The participants were professionals with extensive experience in the sector with different managerial functions in the professional associations of their region. Expert consultants, specialists in developing and implementing projects in the sector, were also included. This selection was broadened with the incorporation of a government official who works on managerial tasks in the special delegation of the tax office (AEAT) in Andalusia, Ceuta and Melilla and has been responsible for several technological projects for the digital transformation of the public administration. The varied nature of the elements that stimulate digital transformation has been taken into account along with the need to have data with the maximum level of traceability in qualitative research (Corbin & Strauss, 2014). Table 2 shows the details of the participants in the interview.

Table 2. Profiles of the participants

Participant	Interviewee
E1	Technical manager of a technological company in the services sector being studied.
E2	Manager of a technological company in the services sector being studied.
E3	Manager of a technological company in the services sector being studied.
E4	Project Director of the General Council for the service sector being studied.
E5	Professional with more than 20 years' experience. Responsible for a professional association and the projects and procedures of the General Council.
E6	Professional with more than 25 years' experience. Head of the territorial professional association and president of the General Council.
E7	Professional with more than 15 years' experience. Head of the territorial Professional Association and the executive committee of the General Council.
E8	Technical manager of a technological company in the services sector being studied.
E9	Professional with more than 25 years' experience. Head of the territorial professional association and secretary of the general council.
E10	Manager of a technological company in the services sector being studied.
E11	Manager of a technological company in the services sector being studied.
E12	Director of the General Council of the professional sector.
E13	Professional with more than 25 years' experience. Responsible for a territorial professional association and the executive committee of the general council.
E14	External consultant on procedures and quality of professional associations.
E15	Professional with more than 30 years' experience. Head of the territorial professional association and the executive committee of the general council.
E16	Professional with more than 15 years' experience. Member of the Governing Board of the territorial professional association.
E17	Professional with more than 15 years' experience. Member of the Governing Board of the territorial professional association.
E18	Affiliated Member. Specialist in electronic tax administration. Special Delegation of the tax office (A.E.A.T.) in Andalusia, Ceuta and Melilla.

Source: authors own

3.3.2 Interview development

Candidates were interviewed individually for between 40 and 60 minutes from June to September 2020 using a semi-structured questionnaire with open-ended questions ordered by complexity. These types of questions were chosen in order to facilitate the correct transcription of the interview data and a valid analysis following the rules of grounded theory (Glaser, 2002).

The collection of semi-structured data was chosen as the best research method in this case as it avoids bias in the interviews because the transcription is considered objective and is written without introducing any prejudices and respecting the privileges associated with using the information (Warr & Pyett, 1999).

The interviews were online using a video conferencing software application which recorded the interview after the interviewees gave their consent. Additional notes were taken in order to fully understand the interview and answers in context.

Table nº3. Interview guide (initial version)

Starting Questions		**From author**
a. What is Digital Transformation for you?	b. How does transformation differentiate from innovation?	(Sousa-Zomer et al., 2020)
Questions		
c. What are the main factors that motivate Kibs companies to seek this transformation?	d. What do Kibs companies want to achieve with this type of change?	(Ko et al., 2021)
e. What were the main steps taken in this transformation process?	f. What elements were a priority in your digital transformation process?	(Vey et al., 2017)
g. How important do you think it is to apply a digital maturity model to implement this type of transformation?	h. How would you define digital maturity and what kind of models do you know?	(Minonne et al., 2018) (Muñoz & Avila, 2019)
i. Do you think that a company should follow an existing model or create its own that suits its needs? What does this decision depend on?	j. Did your agency decide to use a model of digital maturity or create one?	(Dressler & Paunovic, 2020) (North et al., 2019)
k. What variables were used most in the transformation process?	l. Were there well-defined needs and/or objectives for transformation? What were they?	(Ferreira et al., 2019)
m. What were the main steps in the transformation process?	n. Which actions gave expected results and which ones didn't? Why?	(Greenwood et al., 2005)
o. How involved in the process were/are the management/property/managers of the consultancy?	p. Based on your company's digital transformation process, could you ensure that it has been successfully implemented?	(Nguyen et al., 2017) (Phong et al., 2018) (Jung et al., 2008)
q. How would you define success in the digital transformation of your agency?	r. Do you think that there are Spanish companies that have been successful in their digital transformation process? Which ones? Can you give one or two examples and explain why?	(Loonam et al., 2018) (Vial, 2019)

s. Do you think that the professional administrative management sector has to adapt a lot to this type of change?	t. How do you think an administrative agency can succeed by using digital transformation?	(Diller et al., 2020)
u. Do you consider that the following variables have had the most impact on the success of the digital transformation in your company? • Technology • Organization • Client • Strategy • Culture • Operations • People • Capabilities • Innovation	v. What obstacles and/or resistance frequently arise in this process? w. How have you been able to face these types of obstacles?	(Wiesböck & Hess, 2020) (Birasnav et al., 2011)
x. What lessons were learnt in the Digital Transformation process?	y. What achievements do you think were accomplished? z. What other achievements have not yet been accomplished and why?	(Kronblad, 2019)
aa. What comes next? What are the next steps after the first stage of the process? When does it end?	bb. Finally, how do you see the future of digital transformation in Spain? What do you think is necessary?	(Frey & Osborne, 2017)
Final question		
Are there any other comments you would like to make?		Closing question.

Source: authors own

The initial or opening questions were used to analyse the conceptual approach to DT by the interviewees. The following questions were used to investigate which components of DT have the most impact in this professional sector.

Once the interviews had been transcribed, the answers given by the participants were summarized in order to further analyse the data and identify the ideas and concepts until theoretical saturation is reached when nothing new can be identified in the data (Glaser & Strauss, 2009).

3.4 Data Analysis

The data gathered from the answers given by interviewees was analysed using MAXQDA 10 software, as it is a powerful computer program for qualitative data analysis.

First, the transcripts and notes of the interviews were analysed sentence by sentence to identify the most outstanding experiences of the participants and understand the most important concepts of the subject (Glaser, 1998).

Second, the key segments of the data were then selected to extract and encode the most important words, sentences and paragraphs. After identifying the key points of the context (memos) by separating DT into discrete concepts, codes are assigned to the results. The continuous analysis of similar data from the interviews made it necessary to partially modify the initial codes and create a new coding system. Firstly, grouping codes because they are linked to each other, as in "promotion" and "advisor" to become " DT promotion", as both terms express an intention to promote and advise on technological innovation. "Profitability" and "productivity", "profitability/productivity", "obtaining customers" and "maintaining customers" are unified into the code "obtaining and maintaining customers" as interviewees used these terms interchangeably to define the positive benefits for KIBS companies after the implementation of the technological processes of DT. New codes were created for terms that are connected although interviewees cited them independently. These new codes are: "reducing costs", "absence of leadership", "digital media" and "collaboration with government agencies". Table 4 shows the initial coding and the subsequent modifications that condense the information in the analytical notes (memos) after the interviews and reorganizes the concepts.

Table 4. New codes developed from the initial codes

Initial code	New code	Memo (short description)
Promotion. Advisor.	DT promotion.	The Manager aligns the business for technological innovation processes and transmits this idea to all agents.
Profitability. Productivity.	profitability/productivity.	The use of DT enablers generates higher productivity for organizations leading to increased profitability
obtaining customers. maintaining customers.	obtaining and maintaining customers.	DT will help gain new clients, increase the loyalty of existing ones and improve the image of the agencies
Reduction of working time. Savings.	Reducing cost: -Reduction of working time. -Savings.	Technological tools eliminate bureaucracy, red tape and staff travel. Digitizing means reducing business costs by improving management procedures, making them more efficient and competitive with online services
Lack of initiative. Lack of motivation of human resources. Habits and culture of the organization.	Absence of the leadership: -Lack of initiative. -Lack of motivation of human resources. -Habits and culture of the organization.	The agencies are forced to innovate by the market and Public Administration. It is difficult for them to leave their comfort zone. The lack of motivation of workers who do not understand that using technological tools is necessary for the continuity of the agencies. Digitalization is hindered by maintaining traditional production processes.
Artificial intelligence. Commitment to IT applications. Big data Analysis.	Digital media: - Artificial intelligence. - Commitment to IT applications.	Managers must implement digital artificial intelligence tools. Invest in and implement business management software, e.g. document management.

	- Big data Analysis.	The analysis of large amounts of data by any electronic device optimizes business processes
Technological tools of the professional associations.	collaboration with the agencies: -Technological tools.	Professional associations invest in the technological development of useful software for the profession.
Training Support of the professional associations.	-Training support.	Professional Associations provide technical training in DT for their members

Source: author´s own

The third step was selective coding. The constant comparison process identifies the complexity and diversity of the data (Glaser & Strauss, 2009, pp. 102-113). After completing the final conceptual coding, a further analysis of the interview notes (memos) reorganized and identified the categories and the concepts and the relationships between them (see appendix 1). No new elements could be identified from the interview notes after the data analysis and so the theoretical saturation was considered valid(Glaser, 2009). The objective was to reach this level of conceptual analysis by discovering the central categories that organize the remaining subcategories in order to determine the formal theory (Glaser, 2002).

Finally, the main categories were correlated with the results of a literature review to enrich the content of the categories detected in the inductive analysis.

3.5 Quality of the Grounded Theory

To ensure the quality of the research data, the evaluation criteria were based on credibility, transferability, dependability and confirmability as established by Guba & Lincoln, (1985) (see Table 5).

Table 5. Parameters used to ensure the quality of the grounded theory research

Criterion	
Credibility	Open-ended questions were asked to interviewees about general aspects of the subject and then other questions about particular aspects of their profession so that the interviewee gave a variety of answers. The non-verbal behaviour of the participants during the interview was also transcribed. The transcription of the interview was shown to the interviewee to verify that the findings were correctly reported and to validate the information given before proceeding with the data analysis.
Transferability	A wide range of experiences were reported since managers and expert personnel from different Spanish DT companies were interviewed, as well as a public official with a managerial DT position in the public administration who could give a complementary vision of the subject to experts from private corporations. As a result, the in-depth analysis is considered suitable for the research.

Dependability	A detailed literature review was made of the study topic in order to adapt the questions of the qualitative analysis to the needs detected in the scientific literature. The study plan and the analysis methods were established by two researchers with extensive research experience. In addition, several reviews were made to ensure the results were consistent.
Confirmability	The written interpretation of the results of the study were shown to the interviewed expert for verification.

Source: authors own

This study uses the results obtained in interviews, that is, from the interaction between the researcher and the interviewees. The results of this causality must be rigorously elaborated, and the research method must use the guidelines shown in the table above to guarantee the effectiveness and efficacy of this research. (Cepeda & Martin, 2005).

4. Results

The data gathered from the interviews was used to identify the basic categorical framework of the subject. 2 basic concepts, 7 main categories, 43 first-level subcategories and 10 second-level subcategories were identified.

The main categories were: the measures that benefit DT, the barriers to DT, the role of administrative agencies in DT, the role of professional associations in DT, the level of digital maturity, DT Learning and the future of DT. These properties will be used to explain the most relevant aspects of the conceptualization of the factors that determine DT in the service sector in the study and the approach of this professional group to the new digital environment (see table 6).

Table 6. Conceptual research model

Factors of DT collected in the qualitative analysis.				
Measures that benefit DT.	Barriers to DT.	Role of administrative agencies in DT.	Role of professional associations in DT.	Learning DT.
Factors that will determine DT in the new digital environment.				
Level of digital maturity.		The future of DT.		

Source: authors own

The results are presented using the code matrices (see Appendix 1) to design the conceptual structure. These were used to organise the main categories, subcategories and concepts discovered by categorization (Glaser, 2002). In the analysis process and with densification (Glaser & Strauss, 2009; Strauss, 1987) subcategories arise due to constant comparison, which seeks continuous validation. These are irrelevant when explaining the phenomenon studied because they do not have a significant

relationship with the main category. Although their conceptual relationships are represented graphically, the results are not commented on because they are not relevant when describing the main category.

4.1 Factors of DT in categories

This first main conceptualization is found after a content analysis of the interviews with the experts. Seven different categories have been used to explain the concept.

4.1.1 Measures That Benefit DT

11 subcategories were identified from the answers given by the experts interviewed. To conceptualize the category and study it, the original sample is reduced to 6 subcategories, considering the rest of the properties irrelevant.

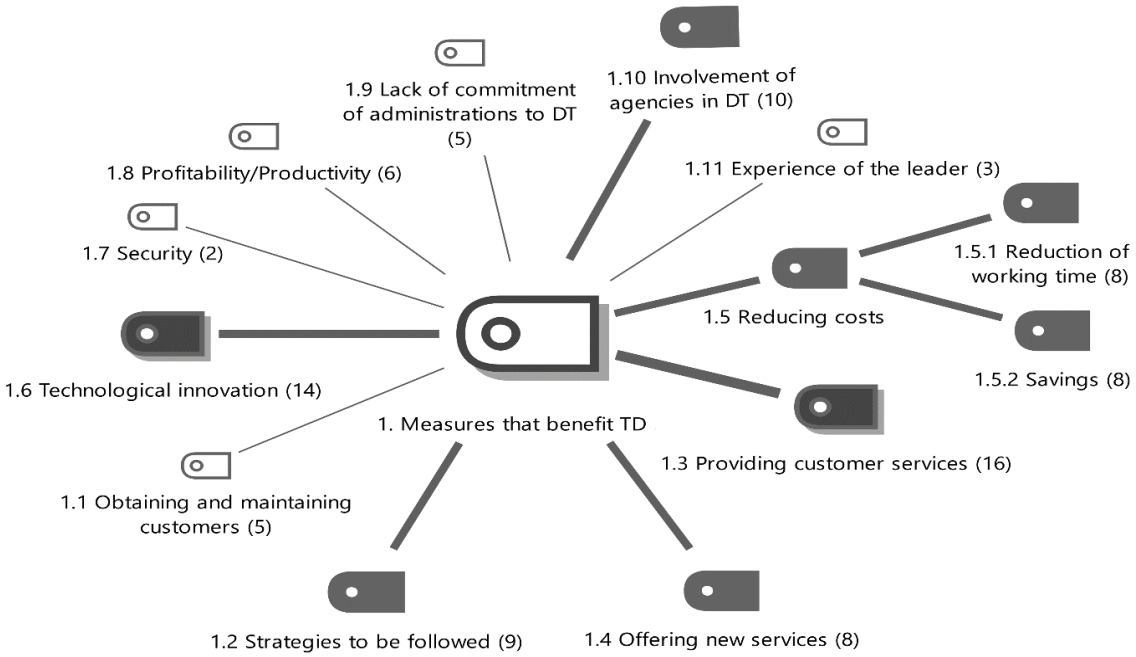
The subcategories that are considered most important and that favour DT are: technological innovation and facilitating customer service.

Technological innovation is necessary in order to succeed in this profession (E2, E3). Technology must be an integral part of the business solutions (E4). Technological innovation must be used to improve the solutions provided in an increasingly changing environment (E18). Innovation is necessary because it allows the client to interact efficiently with the public administration (E9, E11) in order to satisfactorily execute all the necessary governmental procedures (E1). DT is considered essential to facilitate customer service**,** and make the interaction between manager and client easier (E5, E16). The service is improved by automating processes (E14). Customers feel closer to the business (E3) and collaborative work and internal communication are encouraged (E13). In short, the use of technologies increases the quality of service and the speed of response with the client (E17).

Another property that was identified on many occasions was the involvement of administrative agencies with DT. This is based on the need to implement psychological elements of leadership to all members of organizations such as: motivation, conviction and need for change (E9, E13). The public administration is recognised as a necessary figure just as administrative agencies are considered necessary for DT (E6, E10). The Spanish General Directorate of Traffic (GDT) stands out as the public administration most involved in DT (E3).

The strategies to be followed must be oriented towards technological innovation (E7) with the implementation of management software to differentiate agencies from competitors (E2). The strategy must be based on the following elements: digital awareness, vectorization of the business and implementation of digital tools (E18).

Figure 1. Measures that benefit DT with the weightings of the properties



Source: authors own

Another outstanding aspect of code segmentation is the offer of new services that are similar to the one being developed, since customers must be offered innovative services with technological components (E8) due to the needs of the profession (E10) and thus clients' needs are satisfied with the tax/administrative services provided (E14). This digital approach reduces costs incurred by organizations and improves competitiveness. This first-level subcategory is further divided into two second-level subcategories, which are:

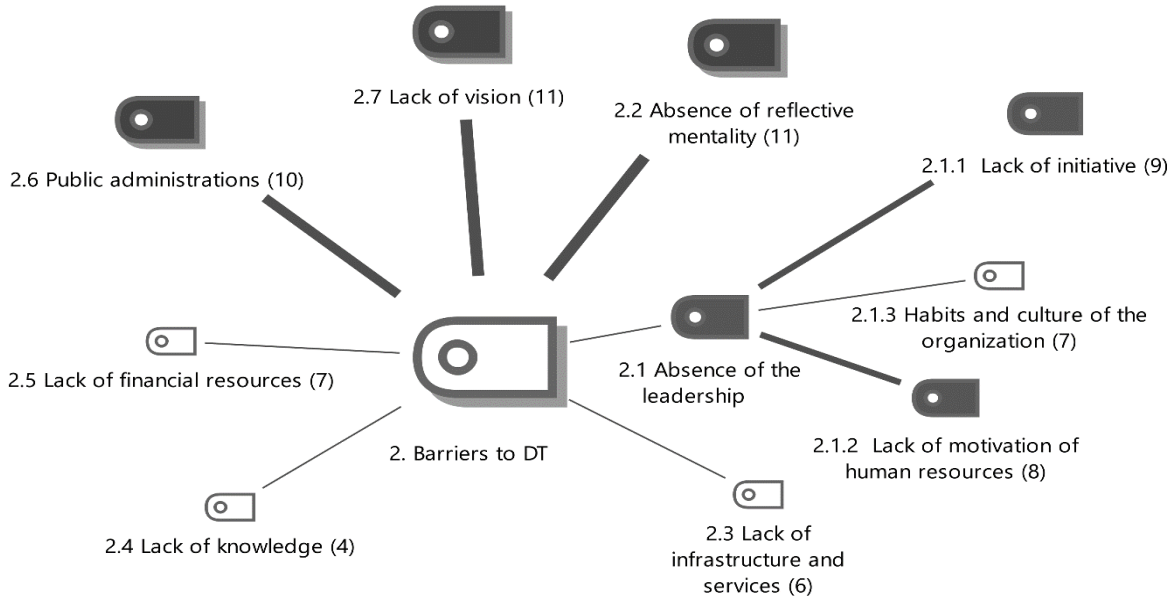
- The reduction in working time optimizes and reduces the cost of personnel employed in the organization (E5, E12), and also allows reconciliation of family life (E2).

- The savings generated by the improvement in processing administrative procedures (E1, E2) also mean there is a cost reduction in economic terms (E5, E12, E16, E18). There is less bureaucracy in administrative procedures such as vehicle registration, which means that taxes are collected earlier and the fees paid can be recovered more quickly (E8).

4.1.2 Barriers to DT

7 subcategories are identified that define the barriers to DT. Only the most relevant criteria will be shown, for the 4 subcategories.

Figure 2. Barriers to DT with the weightings of the properties



Source: authors own

This section deals with the negative aspects of the economic environment that prevent the implementation of a coherent DT. The most significant aspect is that participants are concerned about the absence of a reflective mentality, which causes members to resist leaving their comfort zone (E3), so a change of mentality is required by introducing new ways of working and technological investment (E1). This situation occurs because the average age of administrative managers is high and they have a traditional view of organizations (E14). Therefore, a move must be made from a reactive mentality, when decisions are made once events happen, to a proactive mentality that takes the initiatives and is in alignment with technological processes (E16).

Another of the barriers to DT is a lack of vision which means that production processes are not changed to digital ones (E1). Companies do not feel the need to invest in technology (E4) nor innovate because they are not sure that there will be added value for customers (E8) and because they have a rigid mentality and an aversion to change (E6).

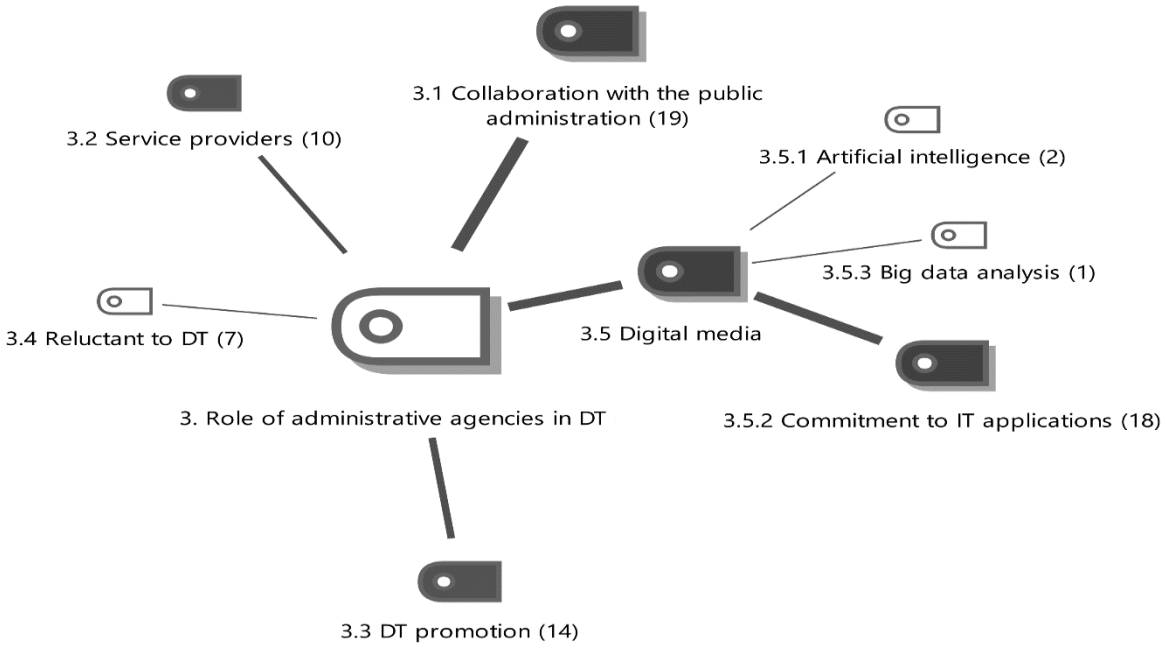
The experts pointed out that there are certain public administrations that are reluctant to incorporate DT (for example, the Civil Registry) (E4), because they do not have enough technology to face the change (E10) and because their processes are very bureaucratic (E12).

Especially important for barriers to DT are two second-level subcategories (lack of initiative and lack of motivation of human resources) which are caused by the absence of leadership. This is shown by the inability of the administrative manager to motivate members of the organization, which leads to a lack of initiatives for innovation in the sector (E4, E1). The years of previous experience of senior professionals in this sector mean that they do not lead DT and are unable to convey its importance (E8) as it is difficult for them to leave their comfort zone (E12). There are organizations that have difficulty entering the world of eGovernment (E18). This absence of leadership means that the human resources of the agency lack motivation (E2), their acceptance of traditional methods (E10) and their reluctance to see digital tools as essential for their business (E16).

4.1.3 The role of administrative agencies in DT

Five main subcategories were identified in the theoretical sampling, with 4 essential subcategories for the explanation of the properties of the main category.

Figure 3. Role of the Administrative Agencies in DT with the weightings of the properties



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The role of administrative agencies in DT is mainly due to their close relationship with the public administration (E7) since they have become facilitators of administrative relations between individuals and public administrations with a history of collaboration due to the agreements signed (E15). These existing alliances are imposed by law so this sector is privileged because there are an increasing number of procedures which can only be managed using electronic public administration (E18). The close collaboration with the GDT is an example of a paradigm of a public entity that has incorporated digitalization (E10).

Another very relevant role of administrative agencies in DT is the commitment to computer applications. This 2nd level subcategory refers to the importance that experts give to the need to invest in technological tools such as cloud-computing, mobility, social media, document management, etc (E18) and also emphasises the need to implement administrative management software (E15) like MobileGest, a mobile digital identity solution that allows the clients of consultancies to sign documents with full legal validity using a smartphone (E11, E13).

Professionals in this sector are providers of innovative services (E16) with technological components to satisfy the demands of customers (E3), especially for tax/administrative consulting (E4). Examples of this new type of services with technological components are the digital certificate (E11), applications such as MobileGest (E15) and technological e-commerce tools that are used to market and purchase services aligned with the new needs of clients (E18).

Organizations have a business perspective which includes technological innovation processes to promote DT (E3, E4). They have to provide useful projects like digital platforms that can interact with several administrations at the same time (E7). New telematic communication channels with the customer have to be created. The idea is to implement a new concept of the office (E15). DT is promoted by encouraging management to reengineer tax and administrative processes, systems analysis and verifying the effectiveness of technological tools and whether new software must be implemented (E17).

4.1.4 The role of professional associations in DT

5 subcategories were found in the model which are factors that explain the studied category. 3 subcategories were seen to be the most relevant to the explanation of the conceptual phenomenon.

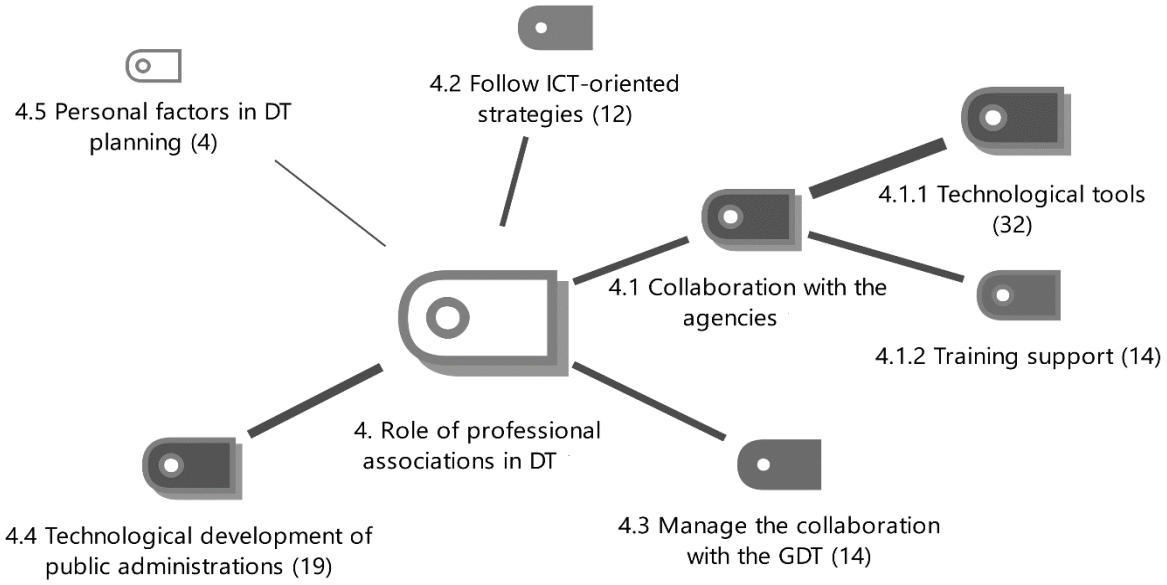
The most decisive aspect of the level of involvement of professional associations with DT was seen to be collaboration with consultancies due to their position in the market. Experts have identified two attributes that define this subcategory, technological tools and training support.

Professional associations help consultancies to implement efficient technological processes and develop technological tools with their R&D companies. Seville uses the Milenium Digital Platform for telematic registration of consultancies (E8). Another R&D company, SIGA produces computer tools and procedures that provide improvements for professionals in the sector especially in procedures with public administration for traffic (E16). It provides technological tools that optimize the administrative and tax procedures that manage vehicles (E3, E4). OEgam is an example of technological development with more than twenty million euros funding and a staff of eighty professionals. The Professional Association of Madrid launched this telematic platform to streamline and optimize procedures in different areas. A digital project called E-Mandato has also been launched to implement digital transformation of key processes of agencies such as the representation mandate (E6). The technological tool MobileGest (E1) is also an important development. Experts also commented on the evolution of office management software for payroll, invoicing, accounting, tax filing, etc (E2, E5) and the creation of a nationalities platform to streamline the procedures for granting Spanish nationality by residence (E4).

Professional associations also give training support to their members for the parts of DT that are considered most relevant (E4, E5). The training is for the new work procedures and protocols of advisors (E6) and the technological tools involved (E11, E18). Professionals in the sector can improve their efficiency after this training. There is a foundation in Catalonia that offers official master's degrees for the profession (E7).

Another subcategory is the technological impulse of the public administration that professional associations collaborate with, promoting internet connectivity, eradicating paper and reducing administrative work. The driving force of the profession is the public administration, which greatly influences technological activity in the sector (E14). Public administration is generally slower in integrating technological adaptation and relies on the more flexible professional sector to implement digital processes (E11).

Figure 4. Role of professional associations in DT with the weighting of the properties



Source: authors own

The most substantial collaboration with public administration is with the GDT (E5). This organisation has seen an improvement in the efficiency of its procedures with the introduction of DT (E11) and is considered to be at the forefront of DT in the profession. Efforts have been made to develop the digital platform and the document management system that are used to formalize the procedures of this administration (E16). The existing agreements with the GDT are historical and require all administrative procedures for circulation, registration, transfers and vehicles to be done with telematic procedures (E15).

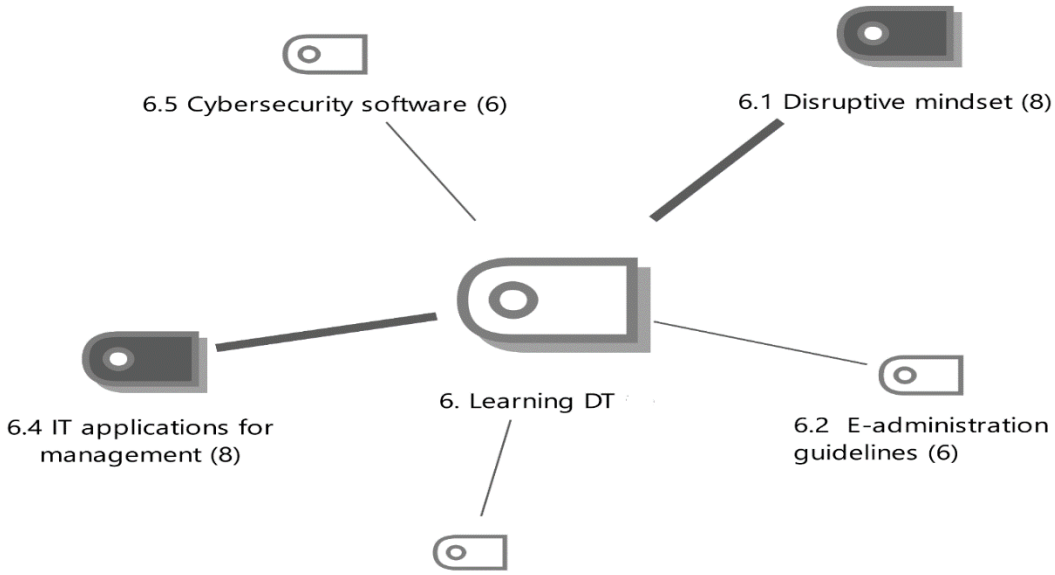
There is consensus among the participants interviewed that professional associations should follow ICT-oriented strategies. A technological plan must be followed which is suitable for the needs of the public administration department (E1) with a framework agreement and guidelines so that digital identity is ensured (E11). The strategies must be adapted to new technologies and tasks to streamline administrative procedures for individuals and companies (E6). Strategies must be found that adapt new technologies to help professionals by implementing understandable processes for the advisor and creating added value (E7). The aim is to create a plan for software, management and information security systems that standardizes processes and promotes ICT projects (E14).

4.1.5 DT Learning

The last category of the main concept was found to be linked to five subcategories with special attention paid to the two most conceptually relevant for the data analysis.

DT Learning is defined as the procedures and technological tools in which organizations in this sector have to be trained to adapt to DT. This category has a very strong relationship with two properties called disruptive mentality and computer applications for management.

Figure 5. DT Learning with the weighting of the properties



Source: authors own

In order to understand DT, professionals in this sector must change their traditional idea of administrative processes to include digital optimization (E4). Bureaucratic procedures must be changed for processes that generate technological innovation and allow instantaneous management of administrative files (E13). A disruptive mentality allows digital change by adopting new habits that include small modifications of behaviour in order to adjust the workers' mentality to the new paradigm. This should be done collaboratively as teamwork is important in the process (E18). Technological innovation will be accepted once the benefits of DT have been experienced (E1).

Computer applications for management must be learnt in order to fully understand the implications of DT. It is essential that this type of software is learnt as the applications are an important source of information and therefore, very useful for advisors (E7, E10). Dexterity in the use of computer equipment (desktop scanner, laptops ...) is another necessary requirement (E8). A series of platforms must be incorporated into the company so that professionals can interact with clients and in turn communicate the information to the public administration service (E13).

4.2 Factors of DT in the new digital environment

Another important consideration is the direction that DT should take in the future. In this analysis, two fundamental categories have been established for the actions of the interviewees and contribute to the formulation of the substantive theory.

4.2.1 Level of digital maturity

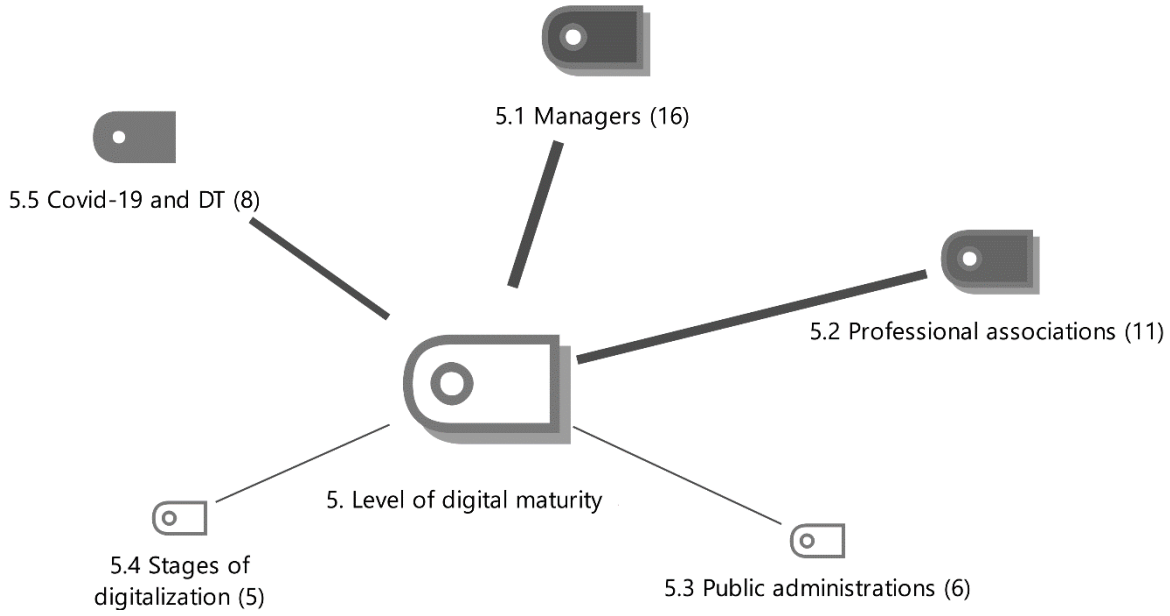
This is the degree of technological implementation existing in a profession, especially in administration agencies and professional associations. The effect of COVID on the level of maturity of organizations in this sector is studied.

Most of the interviewed experts consider that the level of digital maturity is medium-low (E1, E4, E7, E8). It is also evident that, although the level of digitalization is not optimal, this maturity is considered more advanced than for other professions such as lawyers, but less developed than in banking (E17). Experts generally consider that larger companies have the highest levels of digital maturity in this economic sector.

Professional associations show a high level of digital maturity compared to the sector studied and are the fundamental pillar of the digital development of administrative agencies (E4). These institutions are well positioned in digital maturity (E1) with a medium-high level (E6, E7, E17). Professional associations, followed by administrative agencies, have the highest level of digital maturity in the sector. (E17).

Another aspect of DT is the influence of the Coronavirus on the factors of digitalization (COVID 19 and DT). COVID has been seen to have played an important role in the DT of agencies (E18). It has accelerated the digitalization process and has triggered the process of transformation of new technological mechanisms to connect agencies, public administration and customers (E17). COVID is a factor that has activated digitalization (E4, E8, E13).

Figure 6. Level of Digital Maturity with the weightings of the properties



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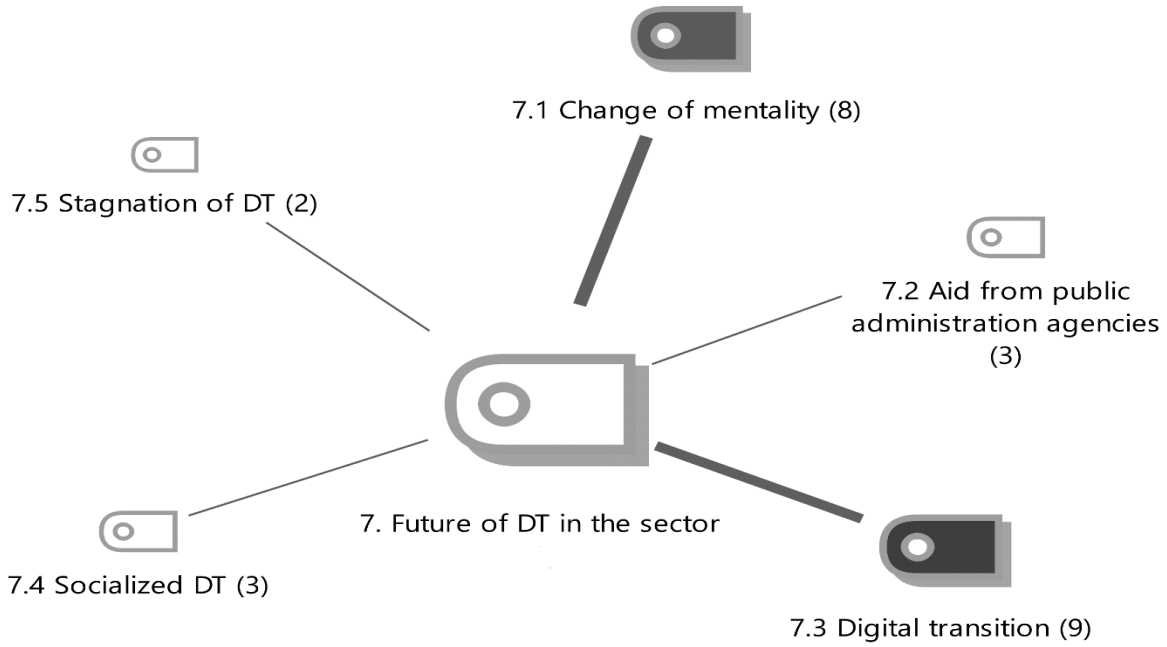
4.2.2 The future of DT in the sector

The future of the administrative managers sector is believed to depend on two essential elements, digital transition and change of mentality.

Digital transition is a current reality that professionals have to accept and use in order to generate high added value (E1). The sector is concerned with digitizing the administrative/tax procedures between the citizen and public administration agencies (E2). The future of this sector will include artificial intelligence as a new type of technological process (E7, E9) and big data will also be gradually incorporated (E9). These can improve the competitiveness of professional companies in the sector by enhancing digital processes in the organization and integrating ERP (Enterprise Resource Planning) with clients (E16).

Figure 7. Future of DT in the sector with the weighting of the properties



Source: authors own

A change of mentality is necessary so that professionals convince themselves that digitalization is the way to manage customers competitively and paper can be forgotten (E10). DT is an opportunity for change for advisors since this professional sector is based on legal aspects with little innovation (E4).

4.3 Weighting of theoretical concepts

The aim of a grounded theory is to reach the third level of conceptual analysis. The first level is the collection of data, the second is the generation of categories and the third level is discovering the central category that organizes the rest of the categories, from which a higher level is reached, the formal theory.

Seven categories were analysed and the most relevant, from the analysis of data using the segmentation process, were found to be the role of professional associations in DT and measures that benefit DT. The next most relevant were the role of administrative agencies in DT and Barriers to DT with similar weightings (see appendix 2). These are the most representative categories of the analysis and they are all connected to one of the main theoretical concepts, factors which will determine DT in the new digital environment (see appendix 3).

4.4 Comparison of the main categories found and the literature review

When analysing the main categories of the qualitative data gathered in the interviews, it was observed that the results show coincidences with the theoretical concepts obtained from the literature review associated with the subject (see table 7).

Table 7. Properties of DT from the qualitative analysis and associated with the scientific literature

Measures benefiting DT (Kibs companies).	**Authors**
Commitment to technological innovation.	(Brynjolfsson & Mcfee, 2014), (Bergek, et al., 2008);(Hekkert et al., 2007).
OI strategy that allows collaboration and creation of value for the professional sector.	(Zhang et al., 2017);(Luo et al., 2017); (Van De Vrande et al., 2009); (Singh et al., 2021);(Scuotto et al., 2017);
Digital platforms as a technological tool that transform organizations.	(Cusumano et al., 2019);(Dahlander et al., 2021).
The client, as the central axis of the companies, uses digital technology as it improves the company-client interaction.	(Muñoz & Avila, 2019); (Corver & Elkhuizen, 2014).
The behaviour of the leader due to psychological aspects.	(Diller et al., 2020); (Judge et al., 2002).
A transformational leader, who positively influences the company workers and favours innovation and creativity.	(Phong et al., 2018); (Khalili, 2016); (Lin & Lee, 2004).
Close collaboration with public administration agencies.	(OECD, 2016);(Troshani et al., 2018).
Digitalization is assigned an important role in the business strategy.	(Feher et al., 2017); (Vial, 2019).
Barriers to DT (Kibs companies).	**Authors**
Absence of Transformational Leadership.	(Judge & Bono, 2000) y (Bass, 1990).
Resistance by the organization.	(Von Leipzig et al., 2017);(Vey et al., 2017) y (Hai, 2021).
Working conditions of the employees.	(Erol et al., 2016) y (Shamim et al., 2016).
Technological deficiencies, mainly in data security and privacy.	(Newell & Marabelli, 2015)**.**

Source: authors own

DT is a concept with multiple aspects and points of view (Sugahara et al., 2017) and is frequently used by both researchers and practitioners.

5. Discussion

5.1 Comparison with other Studies

Two central questions about the present and future factors of DT in Kibs companies were studied in this research. In the literature there is research that analyzes the implementation of certain components of DT in law firms, but based on the cost-benefit effect. It is worth highlighting the study by Breunig & Skjølsvik, (2017) who consider only innovation as the central axis of DT, originating improvements in communications and marketing of the services provided by organizations. Hongdao et al., (2019) analyze digital technologies to facilitate accessibility with their customers. Other studies consider a business opportunity the implementation of certain technological tools to reach more customers, thus we highlight Campbell, (2012) that through software such as Legal Zoom optimizes the provision of legal services. Williams et al., (2015) and Brivot et al., (2014) highlight the business opportunity generated by creating web platforms to reach real virtual law firms such as Trademarkia, or to direct innovation to real

technological systems for knowledge management such as KMS (Knowledge Management System), offering more standardized services.

Leadership style and personality have been studied in the literature in the context of digitalization as elements affecting the digital maturity of tax consultancies in Germany (Diller et al., 2020).

Innovation management through OI has been treated by researchers as a system of exchange and collaboration in the development of Kibs companies (Allahar, 2019; Van De Vrande et al., 2009).

In the literature we can highlight studies that through an inductive analysis explore the technological changes of Kibs firms. In this sense, Durczak et al., (2022) through an exploration based on grounded theory show the obstacles presented by lawyers towards digital innovation. Brooks et al., (2018), through the constant comparative method as a grounded theory approach, highlights the importance of implementing artificial intelligence in the legal services sector due to the needs to innovate due to the arrival of new data-driven technologies, detecting cultural and structural barriers that hinder its implementation. Leckel et al., (2020) study certain public initiatives of regional networks, which facilitate collaborative innovation through dissemination and promotion mechanisms to implement OI strategies among SMEs. In order to obtain a deep understanding of their research they understand that the most appropriate research method to analyze this reality is through grounded theory.

Previous studies have analysed certain elements of DT (organizational strategies, technological tools, psychological factors that determine the behaviour of the leader and OI) as inherent disruptive sources in organizations. In our case, the conceptual contribution that is made is not only about companies, but is based on a broader social context which is a complete professional sector. In addition, there are no known scientific contributions that analyze the three factors studied (technological tools, leadership and OI) as essential elements of the DT of Kibs companies.

6. Conclusions

This study evaluates the critical factors that conceptually define DT for the professional sector of Kibs companies. The research uses the grounded theory methodological approach. The objective of this methodology is not to conceptually define DT, but to establish its most relevant components using substantive data collected from interviews and a literature review.

The results of the interviews underline the heterogeneity of the processes that make up DT. A double conceptual classification is made. First, all the elements that construct the factors of DT

are grouped together and then, the level of digitization in the sector is defined (a non-relevant concept due to the low frequency of responses from the interviewees).

The factors needed to generate DT are the most interesting pieces of information in this analysis. Unlike previous studies, this research has been able to identify the most relevant of all the factors studied in order to define the concept of DT. The positive approach shown by the respondents when empirically defining DT should be noted. The category "measures that benefit DT" is explored in depth, using the empirical development of technological innovation that generates better customer interaction, customer loyalty and a reduction in organizational costs. Another important element of the inductive analysis is the "role of professional associations in DT". In this category some new concepts are explored such as collaboration with the agencies, manage the collaboration with the GDT and technological development of public administrations. It is mainly concerned with the technological development and digital training of Kibs companies which are part of the professional sector and creating synergies and promoting e-Government with value networks. These are the indicators that generate DT at the organizational level in the macro-environment studied and are associated with the theoretical process of OI.

Other results show that the coded information for the components “digital media”, “IT applications for management and cybersecurity software”, which are then grouped into the categories of "role of administrative agencies in DT" and "learning DT" partially overlap, thus developing the same theoretical concept for digital technology which is a necessary factor for DT.

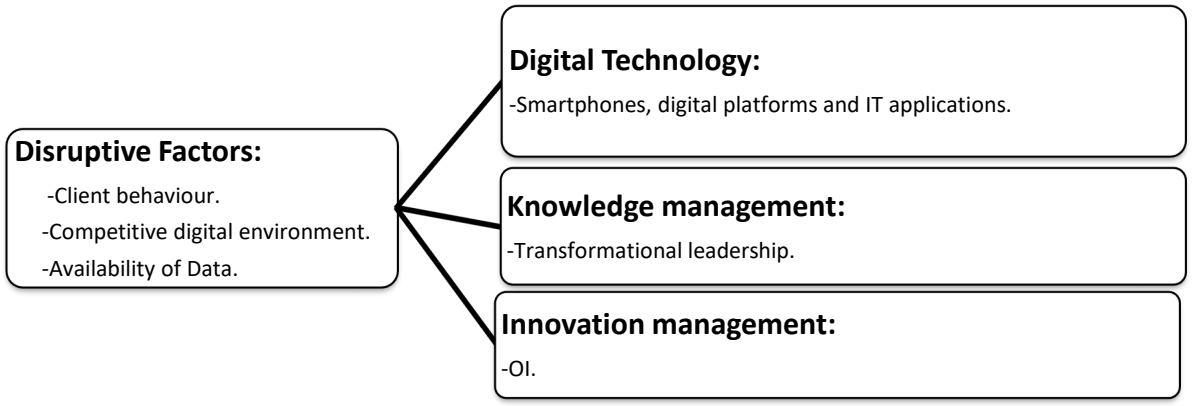
Finally, the theoretical contribution related to transformational leadership is broadly developed by several subcategories. First, there are those that reflect a positive conceptual view of DT. Three subcategories are selected (experience of the leader, disruptive mindset and leadership: role of professional associations) that provide overlapping ideas in the meaning developed by this concept, highlighting the benefits of properly managing DT through a leader who motivates and convinces his or her organization of the need to digitize. Secondly, and as an additional contribution to leadership, but with negative connotations in the conceptual delimitation of DT, other codes appear in this study called: absence of the leadership, absence of reflective mentality and lack of vision, which are shown in the category "barriers to DT", and in its inductive

development is associated with the difficulties that arise in the implementation of DT in an organization; if they do not follow strategies oriented towards transformational leadership.

6.1 Theoretical Implications

This study shows that the digital transformation changes in this professional sector are a combination of digital technology, transformational leadership and OI (see figure 8). These factors are relevant for the new competitive environments of this service sector. One of these is the need to implement a transformational leadership style to generate a direct, positive effect on organizational innovation and provoke an increase in performance (Jung et al., 2008). With this leadership style, knowledge management is created (Lindsey, 2002) involving all members of the company in digital processes.

Figure 8. Factors needed for successful DT



Source: authors own

6.2 Practical Implications

The results of this research can be useful for managers of an SME or micro-SME which provides consulting services as a part of a professional group. The study highlights the transcendental aspects of DT development at the intra-organizational level. In line with the proposed conceptual development, the strategic and managerial requirements must foster the creation of networks connecting small-sized companies in the same professional sector. It is important to generate highly competitive technological infrastructures which would otherwise not be implemented due to the high financial and design costs which these companies could not support individually.

Policy makers can take advantage of the implications obtained in this study and assume a leadership role to promote the comprehensive development of e-Government. Strategic

positioning by governments can be an opportunity to improve the flow of information and the with companies. The objective is to increase the agility and reduce the bureaucracy of the functions of some public administrations. In order to do this public funding is needed, along with a complete communications network with professional groups so that information about the innovation processes can be exchanged.

Finally, another suggestion is to use a big data technological enabler, because the results show that this technological tool should be implemented more effectively. Using this type of service will help to achieve a well-managed transition to DT since the sector has a large amount of data available and should be able to diagnose and integrate information using this tool.

6.3 Limitations and future research

Once the general factors that influence DT in this professional group are analysed, the study could be expanded to investigate more factors that might limit or prevent OI, such as analysing the ethical and legal requirements of the transfer of data ownership that might be an obstacle to collaboration between Kibs companies. Another area that should be investigated is the possible abuse of power caused by the compulsory use of technological platforms because there are no other alternatives available for clients to carry out certain administrative procedures, such as vehicle registration plates. This is a very relevant topic because an increasing number of traditional industries, like the automotive one, are facing similar issues (Björkdahl, 2020).

Another interesting aspect for investigation is how Kibs companies that use R&D services invest internal resources. The qualitative organization of companies, the motivation and rewards for workers and the challenges for managers could be analysed regarding them as stimulants of innovation and identifying the possible, resulting effects generated in the sector.

The limitations of this research include the fact that the conclusions of the grounded theory analysis are based on data that comes from limited interviews with experts who were selected non-randomly so that it cannot be claimed that their conclusions are universal.

A similar limitation is that the literature analysed in the study has been selected by the authors of this work. This subjectivity can be seen as a limitation of the research because the

systematization and impartiality of the analysis of scientific contents has been transgressed (Bigné, 1999).

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Appendix 1. Matrix of Codes used in qualitative analysis of experts

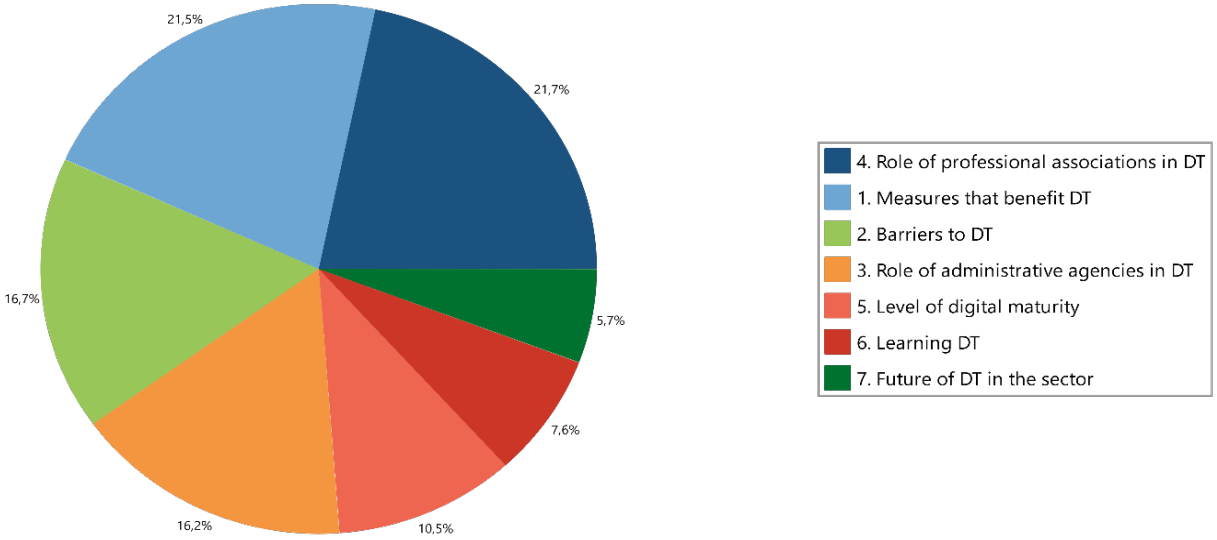
Sistema de códigos	E1	E2	E3	E4	E5	E6	E7	E8	E9	E10	E11	E12	E13	E14	E15	E16	E17	E18	SUMA
1. Measures that benefit DT																			0
1.1 Obtaining and maintaining customers	3				1									1					5
1.2 Estrategies to be followed		1				1	1				1			1	1		1	2	9
1.3 Providing customer services	2	1	3	1	1		1		1		1		1	1		1	1	1	16
1.4 Offering new services		1				1		1		1		1		1		1		1	8
1.5 Reducing costs																			0
1.5.1 Reduction of working time	2	1			1			2				1						1	8
1.5.2 Savings	1	1		1	1			1				1				1		1	8
1.6 Technological innovation	1	1		1		1	1	2	1		1	1	1		1		1	1	14
1.7 Security								1										1	2
1.8 Profitability/Productivity	1	2					1	1				1							6
1.9 Lack of commitment of administrations to DT				1			1		1		1				1				5
1.10 Involvement of agencies in DT			2			1			1	2			1		1		1	1	10
1.11 Experience of the leader						1			1	1									3
2. Barriers to DT																			0
2.1 Absence of the leadership																			0
2.1.1 Lack of initiative	2	1		1				1				1	1					2	9
2.1.2 Lack of motivation of human resources	2	1			2					1						1		1	8
2.1.3 Habits and culture of the organization		1			1	1		2									2		7
2.2 Absence of reflective mentality	3		1	1				1		2			1	1		1			11
2.3 Lack of infrastructure and services								1	1	1		2						1	6
2.4 Lack of knowledge	2														1		1		4
2.5 Lack of financial resources	1	1			2	1				1							1		7
2.6 Public administrations				2						2	1	1	2		1		1		10
2.7 Lack of vision	3			1		1		1	1					1		1		2	11
3. Role of administrative agencies in DT																			0
3.1 Collaboration with the public administration			2	1		1	1		1	2	3		2		2	1	2	1	19
3.2 Service providers		1	1	2						1	2				1	1		1	10
3.3 DT promotion	1	2	1	2	1		2		1				2		1		1		14
3.4 Reluctant to DT	2	1												2		1	1		7
3.5 Digital media																			0
3.5.1 Artificial intelligence		1				1													2
3.5.2 Commitment to IT applications		2	2	1	2	1			3	1	2		1		1	1		1	18
3.5.3 Big data analysis																		1	1

Appendix 1. Matrix of codes used in qualitative analysis of experts

Sistema de códigos	E1	E2	E3	E4	E5	E6	E7	E8	E9	E10	E11	E12	E13	E14	E15	E16	E17	E18	SUMA
4. Role of professional associations in DT																			0
4.1 Collaboration with the agencies																			0
4.1.1 Technological tools	4	6	1	2	1	3	4	2	2	2	1	1	1	1		1			32
4.1.2 Training support		1		1	1	1	2	3		1	1				1	1		1	14
4.2 Follow ICT-oriented strategies	1	1		2	1	2	1				1			1		1	1		12
4.3 Manage the collaboration with the GDT		3	1	1	1	1		2			1	1			2	1			14
4.4 Technological development of public administrations	2	2		1	1	2				1	3	1	1	1	3		1		19
4.5 Personal factors in DT planning									4										4
5. Level of digital maturity																			0
5.1 Managers	2			1	1	1	2	2	1	2		1	1			1	1		16
5.2 Professional associations	2			1		1	1		1			1	1	1			2		11
5.3 Public administrations	1			1				2				1	1						6
5.4 Stages of digitalization		1	1			1			1									1	5
5.5 Covid-19 and DT	1	1	1	1				1					1				1	1	8
6. Learning DT																			0
6.1 Disruptive mindset	1		1	1	1						1		1				1	1	8
6.2 E-administration guidelines		1				1			1	1								2	6
6.3 Leadership: role of professional associations	1			1							2		1						5
6.4 IT applications for management			1				1	1		1			1		1	1	1		8
6.5 Cybersecurity software	1	1	1		1									1				1	6
7. Future of DT in the sector																			0
7.1 Change of mentality	2			2						2								2	8
7.2 Aid from public administration agencies		2	1																3
7.3 Digital transition	1	1	2			2	1		1							1			9
7.4 Socialized DT											2		1						3
7.5 Stagnation of DT												2							2
SUMA	45	39	22	30	20	26	20	27	23	25	24	17	22	13	18	17	21	28	437

Source: authors own

Appendix 2. Relevance of the categories by segmentation of the analysed data



Source: authors own

Appendix 3. Word Cloud organised by the frequency of codes related to the Determinants of DT collected in the qualitative analysis

Source: authors own

CAPÍTULO 5.Análisis de los resultados globales, discusión y conclusiones

1. Principales hallazgos de los artículos publicados

Los resultados de la investigación sostienen que la TD en las pymes, para adaptarse al entorno competitivo en el que operan, deben analizarse desde dos enfoques: uno basado en la innovación tecnológica a través del uso de herramientas digitales y otro centrado en la gestión empresarial.

Se muestra especial interés por la innovación tecnológica en las pymes debido a su gran flexibilidad de adaptación a los nuevos recursos tecnológicos (Teng et al., 2022; Fletcher & Griffiths, 2020). Hay que destacar la naturaleza de las tecnologías digitales por ser los verdaderos impulsores de la TD, en este sentido destacamos las tecnologías relacionadas con las redes sociales (Li et al., 2018; Samsudeen et al., 2021), con la analítica de big data (Urbinati et al., 2019; Guenther et al., 2017), IoT (Arnold et al., 2016; Richter et al., 2017), dispositivos móviles (Pousttchi et al., 2015; Palos-Sanchez et al., 2019), cloud computing (Du et al., 2016; Hassan et al., 2020), nuevas aplicaciones informáticas y plataformas digitales (Tiwana et al., 2010; Sedera et al., 2016). Así mismo, las tecnologías digitales originan la disrupción en los mercados en los que operan las empresas (Mithas et al., 2013; Karimi & Walter, 2015), reducen las barreras de entrada respondiendo a la competencia cada vez más digitalizada, y origina que las organizaciones sean ágiles digitalmente y tengan la capacidad de detectar y aprovechar las oportunidades del mercado en el que opera (Woodard et al., 2013; Chakravarty et al., 2013; Lee et al., 2015). La innovación abierta es una corriente sobre la innovación que ha suscitado gran interés, fomentando el intercambio de conocimientos entre las empresas (Singh et al., 2021; Popa et al., 2017).

Las capacidades dinámicas se proponen como base teórica para examinar la naturaleza disruptiva de la TD en las pymes. En este sentido, la literatura científica denomina a la capacidad dinámica como digital o de TD, y estudia la innovación de las pymes y su adaptación a los cambios de su entorno a través de la identificación o reorientación de las tecnologías digitales, y en su caso de la movilización de otras tecnologías nuevas. El objetivo es conocer las motivaciones de los clientes, abordar sus necesidades y crear un valor personalizado al cliente (Westerman et al., 2012; Goerzig & Bauernhansl, 2018; Khin & Ho, 2019; Matarazzo et al., 2021). Las capacidades dinámicas se basan en fenómenos de nivel inferior centrados en las habilidades individuales (factor humano de las pymes) y en los procesos organizativos (mentalidad digital,

establecer alianzas de I+D para conseguir ecosistemas de innovación, capacidad de gestión centrándose en determinadas tecnologías: p.ej. plataformas digitales de colaboración).

Las pymes deben seguir estrategias centradas en una gestión hacia la tecnología de la innovación (Holotiuk & Beimborn, 2017; Nadeem et al., 2018). Se buscan estrategias digitales que den respuesta al entorno competitivo, y para ello hay que implantar estrategias modulares y multifuncionales, que inciden sobre los procesos organizativos globales con una estructura organizativa plana y flexible, que abarca todos los recursos digitales de las pymes necesarios para sobrevivir en la era digital (Banker et al., 2006; Kohli & Grover, 2008; Becker & Schmid, 2020). Los cambios estratégicos se deben llevar a cabo en función de los objetivos establecidos, para no sobre dimensionar las necesidades económicas al tener recursos financieros limitados (Pullen et al., 2009; Bidan et al., 2012).

El rendimiento de las pymes es un indicador que cuantifica el éxito o fracaso de las organizaciones (Richard et al., 2009) y evalúa sus puntos fuertes y débiles. Su medición utiliza diferentes indicadores, ya que se tienen en cuenta a todas las partes interesadas en la organización. Encontramos indicadores basados en los resultados financieros (Ali et al., 2018), en el éxito de nuevos productos, en el rendimiento de las inversiones, en el crecimiento de la cuota de mercado, en la satisfacción de los clientes, etc. (Eklof et al., 2020), y como último ejemplo se pueden destacar mediciones sobre el rendimiento humano (motivación de los empleados).

Mediante el análisis del cuerpo teórico mostrado a través de pruebas bibliométricas, se elabora como resultado un marco conceptual sobre la implantación de la TD en la gestión de las pymes.

Figura nº3. Propuesta teórica de la gestión de las pymes en el ámbito de la TD

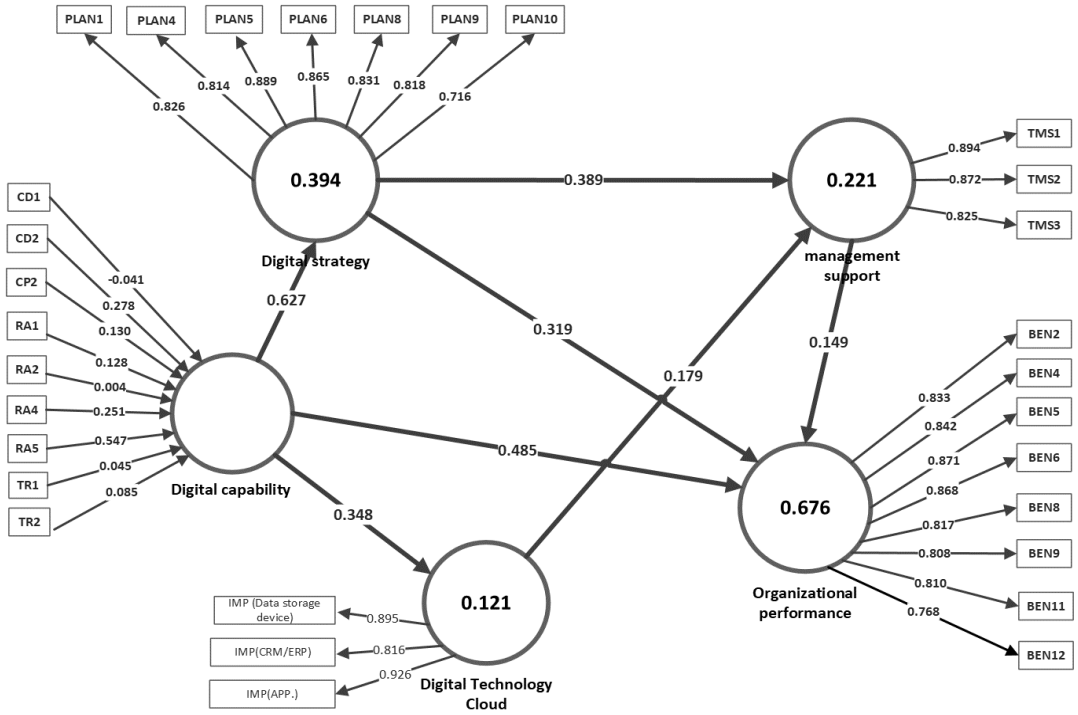
Fuente: elaboración propia

Esta propuesta teórica se analiza desde una perspectiva interna de las pymes. Los habilitadores fundamentales de la TD se centran en las capacidades dinámicas que permiten a la empresa detectar el entorno disruptivo, y crear nuevos productos y procesos orientados al desarrollo tecnológico de las herramientas digitales (big data, realidad virtual, robótica avanzada, Inteligencia Artificial, web 2.0, redes sociales, IoT, etc.). Las capacidades dinámicas se basan en los aspectos organizativos e individuales, y ayudan a la implantación de estrategias de carácter global para posibilitar el éxito de la TD. Su orientación debe basarse en el mercado, los procesos empresariales y el aprendizaje que impactan directamente en los modelos de negocio que diseñan los componentes de creación, entrega y captura de valor de las pymes.

Sobre este esquema teórico, se va a probar empíricamente si este modelo basado en la gestión de los procesos organizativos es replicable a la realidad empresarial de las pymes. Para ello, en

primer lugar, se efectúa un estudio de empresas Kibs españolas[9], testando el modelo teórico propuesto mediante análisis estadístico PLS-SEM, en el que se analiza el papel central de las tecnologías y las capacidades digitales como vías de creación de valor en la gestión de las organizaciones. También, se va a mostrar cómo afectan a los resultados empresariales este proceso organizativo.

Figura nº4. Representación gráfica modelo estructural



Fuente: elaboración propia

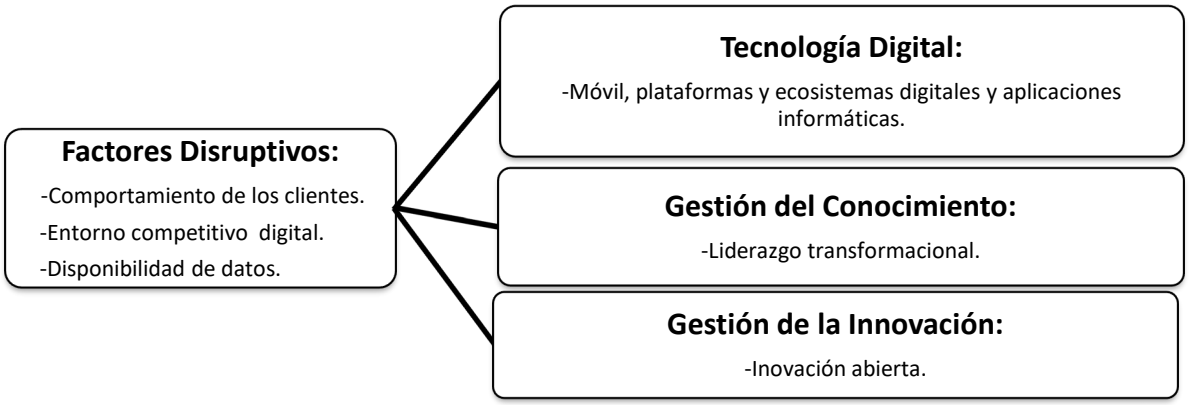
Se evalúa el modelo causal a través del software SmartPLS 3.3.6 (Ringle et al., 2015), que ofrece una serie de criterios estadísticos para realizar un análisis sistemático e integrador del modelo de medida y estructural. Los resultados muestran que la capacidad digital impulsa la TD, al ayudar e integrar los recursos digitales en las empresas Kibs para ofrecer un rendimiento superior. Esta investigación pone de relieve la importancia de seguir las mejores prácticas estratégicas de gestión en el proceso de la TD para las empresas Kibs. Para ello, es necesario el uso de tecnología cloud y de herramientas adecuadas de gestión de servicios profesionales (por ejemplo, CRM, ERP, software de gestión documental y administrativo/fiscal). Este proceso proporciona más conocimientos sobre sus clientes e impulsa la innovación.

[9] La muestra se compone mayoritariamente de micro pymes: volumen de negocio entre 50.000 y 500.000 (85.07%) con un número de empleados de 1 a 10 (85.04%).

En segundo lugar, se presentan los resultados de un análisis exploratorio de los factores que desencadena la TD en el macroentorno en el que interviene la agrupación profesional de empresas Kibs españolas. Se exploran sus principales impulsores y barreras, así como el proceso de gestión de los servicios que ofertan a sus clientes. Se utilizó un diseño de investigación exploratorio e inductivo, a través de un método de investigación cualitativo basado en la teoría fundamentada, y consistente en 18 entrevistas de propietarios de gestorías administrativas, consultores de las empresas de I+D y un funcionario público de la AEAT experto en digitalización. La investigación se centra en el impacto de la TD en sus procesos internos y externos. Los resultados revelan que el sector profesional de empresas Kibs a nivel organizativo se gestiona de forma muy socializada, de tal forma que las empresas de I+D elaboran actividades innovadoras (Tseng et al., 2011), y apoyan a las gestorías administrativas en el conocimiento y desarrollo de dicha innovación tecnológica (desarrollo de plataformas digitales colaborativas, de aplicaciones informáticas de gestión, app., etc.). Esto permite a las gestorías administrativas desarrollar competencias especializadas, para ayudar a sus clientes a resolver problemas complejos usando conocimientos procedentes de diversas fuentes (clientes, competidores y organismos gubernamentales), y prestar servicios más eficientes y competitivos.

Los factores más relevantes que se han acotado en el análisis inductivo, y que muestran la gestión efectiva de la agrupación profesional de empresas Kibs en un entorno disruptivo son: la tecnología digital, el liderazgo transformacional y la innovación abierta.

Figura nº5. Elementos de la TD que gestionan los procesos organizativos de la agrupación de empresas Kibs



Fuente: elaboración propia

Para dar respuesta a los nuevos mercados digitales por parte de las empresas Kibs de tamaño pequeño, se necesitan unos esfuerzos financieros, de diseño y de ejecución de la tecnología digital que no pueden asumir estas empresas. Por ello, basándonos en el paradigma de la Innovación abierta consistente en una innovación entrante y saliente (Chesbrough et al., 2006), se crean redes intra organizacionales que establecen flujos de conocimiento que van a desarrollar los procesos de innovación. Para crear este ecosistema es necesario desarrollar tecnología digital con un fuerte impacto en el acceso generalizado de sus clientes. El desarrollo de todo este proceso se debe llevar a cabo con un estilo de liderazgo transformacional (Jia et al., 2018), basado en la gestión e intercambio del conocimiento que permite adquirir nuevas habilidades y alcanzar los objetivos a nivel personal y organizativo (Lin, 2008; Liao et al., 2007).

2. Discusión

Las tres publicaciones que se analizan en esta tesis doctoral adoptan diversas perspectivas teóricas, basadas en el proceso de adopción de la TD organizativa, junto a una amplia gama de metodologías.

Mediante el análisis teórico bibliométrico se incorpora la operatividad sistemática en la revisión de la literatura, y nos permite detectar una gran cantidad de artículos basados en analizar los procesos de implantación y gestión de la TD en las pymes. Este estudio adoptó un enfoque orientado a mostrar la evolución de las métricas y a descubrir la estructura de la actividad científica de la TD organizativa en las pymes. Cabe destacar que su evolución conceptual empieza a tener interés científico a partir del año 2015 con una tasa de crecimiento del 73.58%, lo que muestra la increíble producción de nuevos artículos en fechas recientes. El punto de inflexión lo establece la publicación de Vial, (2019) que efectúa una amplia revisión de la literatura y construye un marco de la TD adaptado al fenómeno disruptivo que se origina actualmente en las organizaciones, pero con una visión muy holística del término. A partir de aquí, encontramos relevantes publicaciones relacionadas con la perspectiva multidisciplinar sobre la TD en las empresas (Chawla & Goyal, 2021; Verhoef et al., 2021). Otras investigaciones tales como Wiesböck & Hess, (2020) y Sousa-Zomer et al., (2020) desarrollan un marco investigador más concreto, la primera publicación estudia la tecnología sobre las innovaciones digitales y su integración en las organizaciones. Y la segunda avanza en la comprensión del fenómeno de la TD,

al revelar el papel de los componentes primarios que subyacen a las capacidades dinámicas digitales.

Se considera un tema novedoso con gran dispersión en sus publicaciones, debido a que, de toda la producción científica analizada a través de la metodología bibliométrica formada por 886 autores, el 90.20% de ellos (799) han escrito 1 documento. De los 180 recursos que aparecen en este análisis; las revistas que más publican son: "Sustainability (Switzerland)" con 38 publicaciones ,"Journal of Business Research" y "Technological Forecasting and Social Change" con 11 publicaciones, mostrando el resto de las revistas una producción poco representativa de la muestra total. La intensidad de colaboración entre autores y países de todo el mundo es escasa por ser un campo de investigación incipiente. Los países que más publican en régimen de coautoría son Reino Unido (29 artículos) e Italia (28 artículos).

La clasificación temática se ha centrado en fragmentar la TD con el objetivo de aclarar los condicionantes que fundamentan el fenómeno del cambio organizativo de las pymes. Para ello, las investigaciones analizadas se agrupan en cuatro temáticas: las capacidades digitales, la tecnología digital, las estrategias y los modelos de negocio, que permiten a las pymes adaptarse a los diseños organizativos flexibles con una orientación continua al entorno. Es decir, la TD genera estos patrones de comportamiento a los que se tienen que acoplar las pymes.

Mostrados los resultados de investigación en el ámbito teórico, y con el objetivo de tener una visión más profunda y matizada de la gestión de la TD en las pymes, se obtienen nuevos hallazgos empíricos estudiando el universo del sector profesional de servicios con conocimientos intensivos, necesarios para aportar soluciones al desarrollo del proceso productivo de sus clientes.

El primer enfoque explora, a través de un modelo estructural testado mediante PLS-SEM, los retos a los que se enfrentan las empresas Kibs para implantar estrategias orientadas a la TD para crear valor, y el impacto que se genera en el rendimiento organizativo.

Los factores internos organizativos que explican el efecto de la TD en el rendimiento se analizan a través de la teoría de los recursos y las capacidades. En concreto, esta corriente científica estudia la TD a través de las capacidades digitales. El objetivo es lograr una ventaja competitiva con unos recursos y habilidades específicos de la empresa que son difíciles de imitar por la

competencia (A. S. Bharadwaj, 2000; Liang & You, 2009). Se necesita crear una capacidad de tecnología de la información en toda la empresa, combinando la infraestructura tecnológica (basadas en la tecnología cloud), las habilidades humanas (capacidad de gestionar la organización de las tecnologías de la información) y los intangibles que se habilitan junto a otros recursos de la empresa (postura proactiva de los gerentes/propietarios de las gestorías ante la tecnología de la información) (Wade & Hulland, 2004; Nwankpa & Datta, 2017).

La estrategia digital empresarial es uno de los conceptos más destacados en los negocios y se centra en la alineación o fusión de la gestión estratégica y la tecnología de la información (Holotiuk & Beimborn, 2017; Nadeem et al., 2018). La tendencia científica apuesta por fusionar las tecnologías digitales en los sistemas estratégicos para poder generar valor añadido por parte de las organizaciones (Kohli & Grover, 2008; Iafrate, 2018). La competencia entre las empresas se basa cada vez más en aprovechar los medios digitales, posibilitando la reestructuración del modelo de negocio de las empresas, lo que conduce a la transformación (Bataineh et al., 2015; Kahre et al., 2017). En nuestro modelo se muestra una gran influencia de la capacidad digital en el desarrollo estratégico que ayuda a explicar la mejora en el rendimiento organizativo.

El correcto uso tecnológico en las pymes se basa en los contextos individuales, principalmente en el compromiso de la alta dirección con la nueva tecnología y la auto eficiencia (Lewis et al., 2003; Venkatesh et al., 2003), que en el modelo muestra una relación directa con el rendimiento organizativo. El liderazgo se sitúa en una posición central en la promoción de la innovación organizativa dentro de la empresa. El estilo de liderazgo de los gerentes son aspectos determinantes en el contexto de la organización, el cual deber orientarse hacia un liderazgo transformacional por su orientación a la innovación, el aprendizaje organizativo y la capacidad creativa de los empleados (de Jong & Den Hartog, 2007).

El segundo enfoque trata de proporcionar una imagen detallada del fenómeno examinado, al no existir investigaciones anteriores sobre el impacto de la TD en la gestión de una agrupación profesional con diversidad de actores. Además, para avanzar en la comprensión de la TD en las empresas Kibs, se necesita una metodología que permita explorar el fenómeno e interceptar sus aspectos conceptuales en el macroentorno en el que intervienen. Hay que examinar de forma exhaustiva sus áreas de influencia que afectan a los múltiples niveles organizativos (tipos de empresas Kibs, mercados e instituciones públicas), y los impactos que la gestión de la innovación

con la implantación de tecnologías digitales provoca en el desarrollo de los recursos organizativos y en la mejora de los servicios; basados en la absorción de conocimientos. Por estas razones, y por la naturaleza de los objetivos del estudio, empleamos una metodología de investigación cualitativa, exploratoria e inductiva (Gioia et al., 2013).

Los conceptos formales que impulsan la TD en el entorno de las empresas Kibs se basan en gestionar una innovación tecnológica orientada hacia una innovación abierta, y la necesidad de implementar estos cambios a través del liderazgo transformacional.

Se apuestan por nuevos dispositivos informáticos (gestión documental, cloud computing, social media, plataformas digitales, etc.) que mejoran la interacción con los clientes por la automatización de sus procesos, y facilita el acceso al servicio, mostrando el proveedor de servicios una imagen de cercanía. Esta orientación hacia la digitalización origina una optimización en costes, por el ahorro que se genera en la mejora de los procesos de prestación de servicios y por la disminución del tiempo de trabajo. En este ámbito, concretamente relacionado con los servicios profesionales jurídicos, encontramos otros estudios que consideran únicamente a la innovación como eje central de la TD, mediante la implantación de determinadas herramientas tecnológicas para acceder a más clientes (Breunig & Skjølsvik, 2017; Hongdao et al., 2019). A modo de ejemplo encontramos Legal Zoom que es un programa informático que optimiza la prestación de servicios jurídicos (Campbell, 2012), y plataformas web como Trademarkia que se utiliza para contactar con bufetes de abogados virtuales (Williams et al., 2015).

Los Expertos han identificado como pilar básico para obtener éxito en el proceso de TD la necesidad de implantar un estilo de liderazgo transformacional, el cual está muy vinculado a la personalidad del líder. Se categorizó como un aspecto favorable para la TD en el que directivos y gestores tienen que adoptarlo y transmitirlo a todo su entorno productivo. Así mismo, también se conceptualizaron sus aspectos negativos basados en la ausencia de este estilo de liderazgo, y que supone una barrera de entrada a la TD. El propietario/gerente debe tener una mentalidad que fomente la inversión en los procesos orientados a lo digital y motive a toda la organización hacia la innovación tecnológica, proporcionando formación a los trabajadores. La personalidad de este estilo de liderazgo se ha estudiado como factor que afecta a la madurez digital de las consultorías fiscales alemanas (Diller et al., 2020).

El desarrollo de la innovación tecnológica abierta ha sido investigado como sistema de intercambio y colaboración en el desarrollo de empresas Kibs (Allahar, 2019; Van De Vrande et al., 2009). Los resultados en este estudio son similares pero aplicados a un macroentorno, ya que la gestión de la innovación abierta se efectúa en la actividad profesional con fuentes externas a las propias gestorías administrativas, de tal forma que este sector invierte recursos en crear empresas de I+D independientes para el desarrollo digital, con el objetivo de complementar a la deficiente I+D interna que tienen propiamente las gestorías administrativas. Esta externalización de la I+D tiene como aspecto positivo que aprovecha todas las sinergias de la profesión, debido al ejercicio de su actividad y la cercanía que tiene con la administración pública para desarrollar potentes herramientas tecnológicas, tales como software de gestión con diversas funcionalidades (procesos contables y fiscales, elaboración de trámites administrativos, gestión de vehículos, etc.) y plataformas colaborativas digitales, destacando los siguientes proyectos comerciales: EOgAM, E-MANDATO y MobileGest. Con estos procesos de gestión del conocimiento se mejora la innovación interna y se aumenta el rendimiento empresarial.

3. Conclusions

This thesis addresses a very relevant research topic, since it is based on the organizational processes of SMEs with a significant production weight in world economies, and especially Kibs as providers of highly qualified services with high added value (Ashok, 2018). These services require highly developed knowledge and need to implement business models oriented towards digital transformation (DT) in their organizations through advanced technologies and innovative strategies (Miles, 2005; Miozzo & Grimshaw, 2005).

First, the main contributions made by the literature on DT processes to be implemented in SMEs are shown, which are necessary to be competitive in current markets. The digitization processes of SMEs that focus on observing and analyzing trends in scientific production are explored. In addition, a research framework is developed on the internal DT process in SMEs, based on the impact of technological adoption that serves as a reference for subsequent empirical research.

Secondly, a multilevel framework is adopted that considers the intraorganizational and interorganizational dimensions and the service offer focused on a specific professional sector of Kibs companies. Through data collected in interviews and surveys, the factors that trigger

organizational DT are constructed. An analysis of the drivers, barriers and major emerging organizational tensions is carried out.

In particular, this doctoral thesis reveals a series of key patterns. The first is based on showing the opportunities and challenges of Kibs companies in combining certain components of DT. However, the path to follow for decision making and actions to follow must be in constant evolution since the DT context is very complex. The second pattern is the accurate search for this combination of factors that allows obtaining optimal performance. This leads us to look for a digitization of the production process based on open innovation and digital technology, aimed at operating in networks through digital platforms and increasingly involving more actors, such as owners/consultants, digital technology providers, customers and public administrations involved in the professional clustering of Kibs companies. The third pattern is a gradual change in the boundaries of the organizational process that leads us to selective digitization, in such a way that only the interaction processes generated in the DT of companies are analyzed from an internal perspective; based on resources and dynamic capabilities.

Its results show the heterogeneity of the processes that make up DT. In the qualitative analysis, DT is delimited by means of the constant comparison method of the information shown by the interviewees. The technological innovation concept is explored in depth within the category "measures that benefit DT" that generates a better interaction with the client to retain them and a reduction in organizational costs originates. Within innovation, digital technology is considered a necessary factor in DT, and is studied extensively in inductive analysis through components: digital support, management computer applications and cybersecurity software, and in turn grouped into categories: “role of the Administrative Agencies in DT" and "DT learning". Another highly observed element within innovation is the theoretical process that determines Open Innovation that appears reflected in different components of the category: “role of the Administrative Agencies in DT”, such as collaboration with administrative agencies and managing technological collaboration with public administrations. This category deals with technological development through an open innovation process and digital training of Kibs companies, in such a way that they create synergies with electronic public administration based on value networks. Finally, the transformational leader reflects positive factors conceptually shown by three subcategories (experience of the leader, disruptive mindset and leadership: role of professional associations), highlighting the role of a leader who should guide their organization towards

digitization. Negative connotations are also shown through the category "barriers to DT", showing the difficulties that arise if strategies oriented towards transformational leadership are not followed.

As a complement to the qualitative analysis, the universe of study is limited solely to Kibs companies, and the organizational management process oriented towards a knowledge and use-based strategy of the proposed technologies (ERP, CRM and management software) is explored. To optimize this process, it is necessary to adequately manage the existing resources in organizations, articulating a series of capabilities that allow for better interaction with their clients to acquire more knowledge about their behaviors and thus adapt the provision of services to their needs. This process infers in the technological tools to be implemented and in the approach to follow to develop an adequate digital strategy, which improves internal (use of certain technologies and decentralization of the organizational structure) and external (value creation) processes. of the company, and thus improve its organizational performance. This digital management process can only be carried out through management that supports the development of digital strategies and that exercises transformational leadership functions.

4. theoretical contributions

This study contributes to the existing knowledge in the analysed discipline by verifying the existence of global studies that consolidate the multidimensional nature of TD. Additionally, gaps have been identified in the development of more specific publications on this subject based on SMEs. We have explored the factors that condition the processes of implementing TD in SMEs. We have identified the elements that are most important for generating value in the organizational sphere. The following theoretical arguments have been evaluated: technological innovation, digital capabilities, digital strategies, transformational leadership, and organizational performance, through empirically supported hypotheses. The study is crucial because it provides a deeper understanding of the conceptual balance of TD in the SME domain in order to shed light on the most relevant components that companies need to consider in their complex TD process.

This study provides an academic contribution by exploring the relationship between the TD phenomenon and the organisational management of KIBS companies, focusing on a professional sector that affects multiple organisational levels, including companies, markets and public

institutions. The European economy has a growing business segment that relies on knowledge generation and the provision of services as its main productive factor. This approach is innovative not only for studying the impact of TD on the knowledge absorbed in Kibs firms as an organizational unit but also for examining broader social contexts such as the professional sector that constitutes the ecosystem of these SMEs.

The findings reveal four fundamental points. Firstly, due to its multidimensional nature, it is not possible to determine a single conceptualisation of TD. Therefore, the aim of this research is not to define TD but to establish its most relevant components through the data collected in real settings, the methodological analyses carried out, and the systematic review of the literature. Secondly, this study considers technological innovation as the primary component of TD. To achieve this, we conduct a detailed analysis of readily available digital technologies. As the kibs analysed are all SMEs and cannot afford costly investments, we conceptualise this process as a digital strategy based on open innovation and the dynamic organisational capacity of information technology. As the kibs analysed are all SMEs and cannot afford costly investments, we conceptualise this process as a digital strategy based on open innovation and the dynamic organisational capacity of information technology. The aim is to investigate the current understanding at the intra-organisational level, as these companies operate within an ecosystem where they collaborate in a network through digital platforms and offer standardised interfaces (software development kits), as well as intermediation mechanisms that connect a variety of users who promote innovation. It is important to be able to select and integrate the most relevant technologies in each of the Kibs companies and adapt them to their professional needs. In particular, it highlights the ability to implement certain resources based on cloud technology (ERP, CRM and professional management software) that are integrated into organisations and improve business processes and results. Thirdly, a commitment to business management oriented towards the development of digital strategies must be made by management. This requires implementing a transformational leadership style as the most effective way to develop knowledge management, involving all employees in the organization in the development of innovative behaviors. Leadership is considered a necessary area of management action to complete the TD. Fourthly, this study enhances the comprehension of organisational performance as a crucial factor for TD. It demonstrates the level of success in achieving the objectives and goals of Kibs in a disruptive environment. To accomplish this, the integration of

digital technologies in business management must be executed efficiently, using digital skills that respond to market needs.

5. practical contributions

The findings of this doctoral thesis may be valuable in practice for small business owners who provide professional services. They can use these findings to identify and utilise aspects of business management related to digital capabilities and the studied technologies, which will aid in implementing efficient processes in their organisation. This is particularly relevant for two reasons:

1º. The implementation of technological tools such as ERP, CRM, management software, and digital platforms can create positive synergies. This is due to the exchange of ideas in the detection of user behavior in the operating environment, which includes suppliers, competitors, and customers. Such synergies can significantly influence innovation activities and lead to improved organizational performance. In addition, company managers should foster an entrepreneurial culture with fewer hierarchical barriers and provide more training for employees in the use of digital tools. This will increase the organisation's capacity for innovation and promote the creation of agile SMEs with managers who are open to innovation.

2º. The adoption of digital strategies reduces organisational costs, leading to improved management practices (elimination of bureaucracy, unnecessary paperwork and reduction of working hours) and increased competitiveness in the new digital economy, achieving higher profit margins.

The study's findings can assist governments in properly planning the implementation process of TD in SMEs that offer professional services. The government should provide incentives and subsidies to small businesses for staff and manager training courses. This will enhance knowledge and skills, and encourage the adoption of sustainable technological tools, such as cloud computing, which can improve organizational performance. This practical approach can help policy makers create a more competitive and sustainable productive fabric.

6. Limitations and future scope for research

Although this thesis shows its results through a qualitative and quantitative methodology, our analysis was based on data obtained solely from companies that are part of an economic sector in Spain, which may limit the conclusions drawn. It would be useful to confirm the results obtained in other companies in the same sector operating in markets in other countries.

For future research, the organizational changes originated by DT factors can be analyzed, such as the diffusion of technological tools that originate in SMEs in emerging economies. This research is suggested because this doctoral thesis shows a theoretical and empirical knowledge base of the use of DT in SMEs in developed countries. Finally, it would be interesting to study DT externally (B2B and B2C), analyzing the behaviors of SME customers in the disruptive markets in which they operate, and studying the need to create new forms of collaboration.

Although this thesis presents its results using both qualitative and quantitative methodologies, the analysis was based solely on data obtained from companies within a specific economic sector in Spain. This limitation may restrict the conclusions that can be drawn. It would be beneficial to confirm these results by examining companies in the same sector operating in other countries.. A limitation of the theoretical framework is that it focuses only on TD at the organisational level in SMEs within the private sector and does not consider the impact of TD at other levels of society, such as at the individual level or in the public sector. As a result of this narrow focus, there may be a lack of analytical depth in the examination of the multidimensional phenomenon of TD.

Future research could analyse the organisational changes resulting from TD factors, such as the diffusion of technological tools, originating in SMEs in emerging economies. This research is recommended because the doctoral thesis demonstrates a theoretical and empirical understanding of the use of TD in SMEs in developed countries exclusively. It would be worthwhile to investigate TD at the external level, specifically in the B2B and B2C contexts. This would involve analysing the behaviour of SME customers in the disruptive markets in which TD operates and exploring the need for new forms of collaboration. The study of connections in the area of TD leading to high performance can be expanded by analyzing the influence of contingent factors such as the age and gender of the manager, as well as the size of the company. Finally, this thesis discusses TD factors with a positive connotation. However, it would be interesting to

extend this study by analysing the negative effects that may limit or impede open innovation. This could be motivated by ethical and legal requirements that need to be met in the transfer of data ownership in professional business macro-environments, such as the association of administrative managers, lawyers, or economists in Spain.

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