TESIS DOCTORAL

Un enfoque generacional en el estudio del comportamiento emprendedor: Preparando una aplicación empírica al estudio de la intención y el comportamiento emprendedor de la Generación *Z*

Lidia E. Santana Hernández

Dirección: Dra. Rosa M. Batista-Canino

2023

ULPGC
Universidad de Las Palmas de Gran Canaria

Departamento de Economía y Dirección de Empresas

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Las Palmas de Gran Canaria, junio 2023

UNIVERSIDAD DE LAS PALMAS DE GRAN CANARIA

ESCUELA DE DOCTORADO

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Autora

LIDIA E. SANTANA HERNÁNDEZ

Directora

DRA. Dª ROSA M. BATISTA CANINO

D/Dª Beatriz Tovar de la Fe COORDINADOR/A DEL PROGRAMA DE DOCTORADO Turismo, Economía y Gestión. DE LA UNIVERSIDAD DE LAS PALMAS DE GRAN CANARIA

INFORMA,

que la Comisión Académica del Programa de Doctorado, en su sesión de fecha ..... tomó el acuerdo de dar el consentimiento para su tramitación, a la tesis doctoral titulada "**Un enfoque generacional en el estudio del comportamiento emprendedor: Preparando una aplicación empírica al estudio de la intención y el comportamiento emprendedor de la generación Z"** presentada por el/la doctorando/a D/Dª. Lidia Ester Santana Hernández y dirigida por el/la Doctor/a Rosa María Batista Canino

Y para que así conste, y a efectos de lo previsto en el Artº 11 del Reglamento de Estudios de Doctorado (BOULPGC 04/03/2019) de la Universidad de Las Palmas de Gran Canaria, firmo la presente en Las Palmas de Gran Canaria, a...de junio de dos mil veintitrés

A todos los seres de luz que me rodean

For all beings of light around me

Agradecimientos

"A veces, no conseguir lo que uno quiere, es un maravilloso golpe de suerte"
Dalai Lama

Esta frase ha sido una inspiración para mí. Mi camino ha estado plagado de maravillosos golpes de suerte. El primer golpe de suerte, mi marido Juan y mis hijas, Mandy y Claudia, que me han acompañado día a día en este apasionante proyecto. El segundo, mi hermana Ana que conoce mi tesis mejor que yo. El tercer golpe de suerte han sido cuatro docentes e investigadores de esta Universidad a los que quiero agradecer su ayuda para llegar hasta aquí. A mi Javier Navarro, mi amigo, que ha sabido escuchar pacientemente durante años. A Silvia Sosa, que me ayuda cada día de trabajo sin saberlo, con su alegría y buena disposición. A mi directora emocional, Pino Medina, que ha aportado a esta tesis su conocimiento, y más importante si cabe, ha cuidado de mí. A Juan Luis Navarro, un amigo que ha dedicado horas a enseñarme otra forma de entender el mundo de los datos, cuya valiosa experiencia se refleja en este trabajo. Mi cuarto golpe de suerte ha sido contar con el apoyo de mi profesor y Director del Departamento, Leonardo Romero, y de su equipo, que me han acogido como una más desde el minuto uno.

Hay mentes que te atrapan, aquellas que sin querer se convierten en tus maestras y ponen a prueba tu conocimiento. Rosa Batista, mi directora, representa todo eso para mí. Me ha permitido aprender junto a ella, mientras me iba mostrando lo apasionante que es la investigación, especialmente en Emprendimiento. Por ello, le estaré eternamente agradecida, pues ha dedicado muchas horas robadas de su tiempo para que yo estuviera donde estoy ahora. Ella es, sin lugar a duda *¡Mi gran golpe de suerte!*

Ha habido momentos en los que me he sentido abrumada en esta carrera contrarreloj. Publicar, sin duda, es uno de los mayores retos que se presentan en un proyecto de este calibre. Sin embargo, muchas personas maravillosas me han acompañado durante estos años, así que el éxito estaba asegurado. Por esto, les agradezco a todas ellas, mis amigas del alma, que hayan sido pacientes conmigo, en mis momentos bajos o cuando no estaba presente. A mis padres, a los que les debo gran parte de lo que soy. Todos y cada uno de ustedes me han mostrado que un verdadero maestro no te asombra con su luz, te ayuda a ver la que tienes tú. Gracias, gracias, gracias.

Esta tesis ha sido financiada por la Agencia Canaria de Investigación, Innovación y Sociedad de la Información a través de la Ayuda a la Formación del Personal Investigador dentro de los Programas Oficiales de Doctorado en Canarias en la convocatoria del año 2020 con número TESIS2020010027.

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RESUMEN

La presente tesis doctoral se interesa por el talento empresarial de los más jóvenes y por su capacidad para generar nuevas empresas y empleos contribuyendo a reducir la brecha en la transferencia intergeneracional. Con este objeto el trabajo se articula en torno a cinco capítulos. En la Introducción, *Capítulo I*, exponemos la justificación, objetivos y estructura de la misma presentando además sus principales resultados y conclusiones, al tiempo que se explican las limitaciones de un enfoque generacional en el estudio del emprendimiento para una cohorte en desarrollo como es la de *nativos digitales*, o generación *Z*.

El *Capítulo II* revela tanto el frente de investigación como el sustrato científico subyacente a la literatura sobre intención emprendedora –en adelante IE- y rastrea su evolución diacrónica. Con herramientas de análisis bibliométrico se lleva a cabo una revisión profunda de la literatura publicada entre 1970 y 2021 desde un enfoque cienciométrico que pretende observar el conocimiento acumulado sobre la IE por los casi 2.000 documentos publicados en el período bajo estudio. Los análisis de co-citación y de mapeo estratégico del área revelan que las disciplinas de estudio sobre la elección de carrera, la educación, la psicología social y el espíritu emprendedor se han apoyado mutuamente en el desarrollo de este tópico, y que aún existe hueco para su avance, tanto incorporando nuevos temas al frente de investigación, como actualizando el conocimiento de las disciplinas que la sustentan. El *Capítulo III* completa el anterior analizando el impacto de aquellos trabajos tanto dentro del tópico especializado como en áreas afines. Con este objeto utiliza indicadores de citación directa, distinguiendo la Cita Local y la Global. El mapeo estratégico aplicado nos permite identificar cuatro polos temáticos en este área: la modelización de la IE y la discusión de sus antecedentes y relaciones; la autoeficacia como antecedente de la IE; la IE social; y el efecto de la educación sobre la IE -distinguiendo el efecto del contexto educativo, del efecto de los factores personales sobre la IE.

Por su parte, con el apoyo de la *Teoría del Aprendizaje Sociocognitivo* de Bandura, en el *Capítulo IV* tratamos de revelar el poder explicativo y predictivo de las actitudes socio-cognitivas agregadas del individuo sobre el comportamiento emprendedor – en adelante CE-, más allá de la fase inicial de la creación de empresas, y tanto a nivel individual como colectivo. Utilizando la estadística Bayesiana y herramientas de análisis basados en el uso de la Inteligencia Artificial, los hallazgos indican que un mismo CE puede tener diferentes patrones sociocognitivos subyacentes y que esos patrones están expuestos a las turbulencias del entorno. El trabajo concluye explorando de manera incipiente la *Teoría Sociocognitiva del Emprendimiento*.

Por último, el Capítulo 5 se presenta como un ensayo en el que se profundiza en el concepto de generación y la catalogación de las principales cohortes generacionales del siglo XX y principios del XXI, para seguidamente interesarse por los estudios que están utilizando este enfoque de generaciones en el área de investigación en emprendimiento. Reparamos en el interés de esta tesis por analizar a la generación de *nativos digitales*, presentando el esquema de trabajo que ha de abordarse para abrir esta apasionante línea de investigación que toma desde este estudio su base al construir un marco teórico y empírico fiable que sustente una investigación de resultados trascendentes. Este ensayo únicamente persigue marcar el camino para culminar el trabajo comenzado.

Los hallazgos que se derivan de esta tesis son especialmente relevantes para el desarrollo de modelos predictivos sobre la IE y el CE al desvelar la verdadera naturaleza de las actitudes que subyacen a ambos eventos. El estudio del *gap* IE-CE desde un enfoque generacional permitirá redireccionar tanto la educación emprendedora de la población como las políticas públicas de promoción del espíritu empresarial.

ABSTRACT

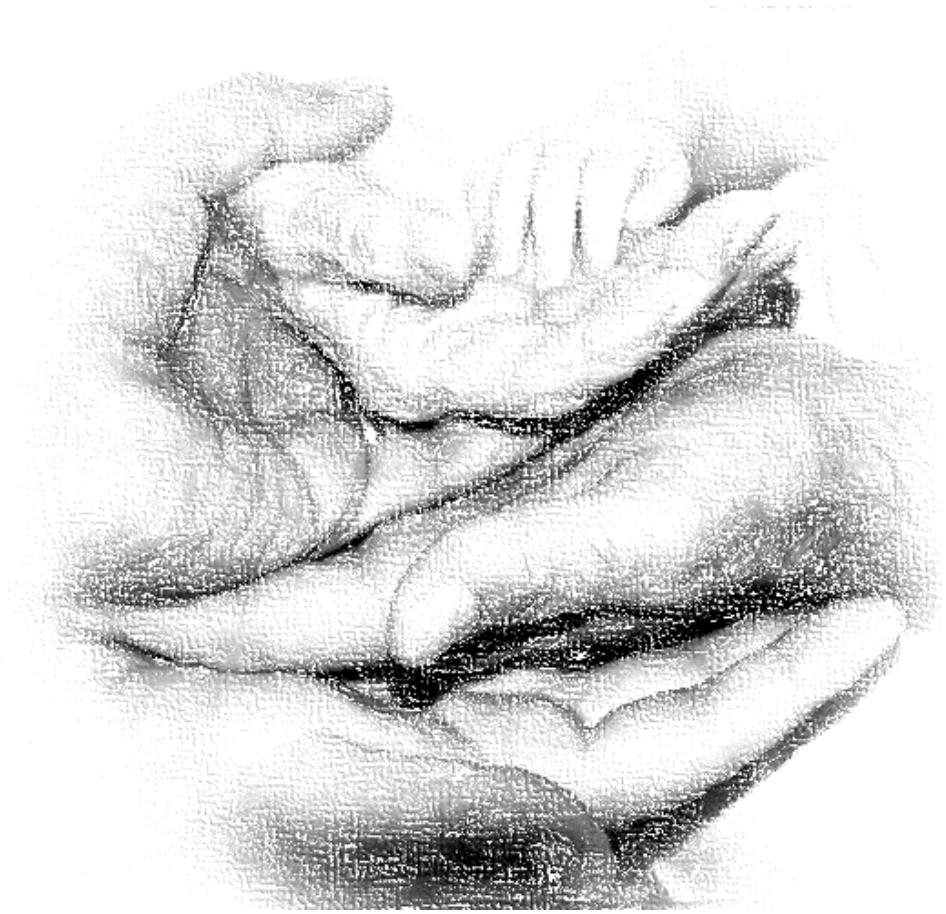
This doctoral thesis is interested in the entrepreneurial talent of the youngest and their ability to generate new companies and jobs contributing to reducing the gap in intergenerational transfer. To this end, the work is structured around five chapters. In the introduction, *Chapter I*, we present the justification, objectives and structure of the same, also presenting its main results and conclusions, while explaining the limitations of a generational approach to the study of entrepreneurship for a developing cohort such as *digital natives*, or generation *Z*.

Chapter II reveals both the research front and the scientific substrate underlying the literature on entrepreneurial intention -hereinafter IE- and traces its diachronic evolution. With bibliometric analysis tools, an in-depth review of the literature published between 1970 and 2021 is carried out from a scientometric approach that aims to observe the accumulated knowledge about EI by almost 2,000 documents published in the period under study. The analysis of co-citation and strategic mapping of the area reveals that the disciplines of study on career choice, education, social psychology and entrepreneurship have supported each other in the development of this topic and that there is still room for its advancement both incorporating new topics at the forefront of research, as updating the knowledge of the disciplines that sustain it. *Chapter III* completes the previous one by analyzing the impact of those works both within the specialized topic and in related areas. To this end, it uses Direct citation indicators, distinguishing between Local and Global Citation. Applied strategic mapping allows us to identify four thematic poles in this area: EI modelling and discussing its antecedents and relationships; self-efficacy as an antecedent of EI; social entrepreneurial intention; and the effect of education on EI - distinguishing the effect of the educational context from the effect of personal factors on EI.

On the other hand, with the support of *Bandura's* Sociocognitive Learning Theory, *in Chapter IV* we try to reveal the explanatory and predictive power of the aggregate socio-cognitive attitudes of the individual on entrepreneurial behaviour – hereinafter, EB-, beyond the initial phase of business creation, and both individually and collectively. Using Bayesian statistics and analysis tools based on the use of Artificial Intelligence, the findings indicate that the same EB may have different underlying sociocognitive patterns and that these patterns are exposed to the turbulence of the environment. The work concludes by exploring in an incipient way the *Sociocognitive Theory of Entrepreneurship*.

Finally, Chapter 5 is presented as an essay that delves into the concept of generation and cataloguing of the main generational cohorts of the twentieth and early twenty-first centuries, and then interested in studies that are using this approach of generations in the area of entrepreneurship research. We notice the interest of this thesis to analyze the generation of *digital natives*, presenting the work scheme to be addressed to open this exciting line of research that takes from this study its basis to build a reliable theoretical and empirical framework that supports an investigation of transcendent results. This essay only seeks to mark the way to complete the work begun.

The findings derived from this thesis are especially relevant for the development of predictive models on EI and EB by revealing the true nature of the attitudes underlying both events. The study of the IE-EB gap from a generational approach will allow redirecting both the entrepreneurial education of the population and public policies to promote entrepreneurship.



CAPÍTULO I

Introducción
Introduction

Nota de la autora: *A lo largo de toda la tesis se utilizarán las siglas IE, para referirnos a la Intención Emprendedora, y CE en sustitución del Comportamiento Emprendedor.*

Justificación del enfoque generacional en el estudio de la iniciativa emprendedora

En un estudio publicado recientemente, Abio et al. (2021:18) apuntaban que "Las personas, a lo largo de su vida, consumen, producen, ahorran y comparten recursos, y las actividades que desarrollan varían significativamente según el momento de su ciclo vital. Tanto en la infancia como en la etapa de la vejez, las necesidades de consumo personales superan las que podría cubrir cualquier actividad económica, mientras que solo durante la edad activa se producen recursos. Para satisfacer las necesidades y garantizar el bienestar de toda la población son claves las transferencias de recursos entre generaciones. A este fin, las sociedades organizan las transferencias de recursos intergeneracionales a través de las familias y del sector público". Esto revela el papel fundamental que juega cada cohorte o generación en el conjunto de la sociedad para mantener el equilibrio del estado de bienestar (Attias-Donfut, 2016).

En este contexto, la mejora en la calidad de vida de la población, especialmente en el mundo desarrollado, ha provocado un importante aumento de la esperanza de vida. Este hecho ha comprometido el estado de bienestar general de la población tal y como se planificó en el pasado siglo y se ha conocido hasta el momento. Basta pensar que, si en el siglo XIX la edad promedio general de la población global era de 52 años, a finales del siglo XX esta había aumentado en 26 años (Roser et al., 2013). En Europa, la esperanza de vida ha aumentado entre 2002 y 2021 en 11,5 años, es decir, en un 14,81% según Eurostat (2022). Para ese mismo período, en España la tendencia ha sido en conjunto de aumento en 3,3 años, pasando de una edad media de 76,3 años en los varones en el año 2002, a los 80,2 en 2021, y en las mujeres de 83,1 en aquel mismo año, a 85,3 en 2021 (Eurostat, 2022; INE 2022).

La cobertura de los derechos sociales de todos los ciudadanos está fuertemente ligada, al menos en nuestro país, a la generación de recursos vía cotizaciones e impuestos, de forma tal que se produzca la necesaria transferencia de recursos intergeneracionales entre las cohortes activas laboralmente y las pasivas. Es así como un porcentaje de los recursos recabados de unas generaciones apoya, por ejemplo, el pago del desempleo en la misma generación, pero también las jubilaciones de las generaciones precedentes (Abio

et al., 2021; Attias-Donfut, 2016). Si se tiene en cuenta además que la tasa de natalidad viene retrayéndose a un ritmo medio del 6,7% (Eurostat, 2022), situándose en España en el 7,12 (INE, 2022), nos encontramos ante un proceso que puede ser irreversible a los efectos de la transferencia intergeneracional, si no se logran tasas de natalidad crecientes, al tiempo que se aumenta el empleo de los efectivos y se limita el crecimiento de la tasa de desempleo.

Es precisamente la necesidad de aumentar el empleo lo que ha llevado a muchos investigadores a plantearse el origen de este en una sociedad (Birch, 1979; Chiesa et al., 2018; Fugate et al., 2021; Guilbert et al., 2016). Esta inquietud representa, bajo nuestro punto de vista y en la práctica, preguntarse por las causas mismas de la brecha en la transferencia intergeneracional que puede provocar quiebras en el estado de bienestar. La reducción de esta brecha encuentra en las políticas activas de empleo y las destinadas a fomentar el emprendimiento dos grandes aliados. Nuestro interés en este trabajo se focaliza especialmente en estas últimas por su potencial para generar empleo además de crecimiento económico e innovación (Ács et al., 2008; Audretch et al., 2006; Bosma et al., 2018).

Ahora bien, el equilibrio del estado de bienestar depende de múltiples factores entre los que destaca el grado de cohesión de una sociedad, entendida como las circunstancias generales que dan lugar a actitudes y comportamientos favorables de sus miembros (Bottoni, 2018), y este depende en gran medida del tipo de relación que se establece entre las generaciones que coexisten (Bolin, 2019). Esta cohesión se ha visto fuertemente afectada en los últimos años por el imparable desarrollo tecnológico. Así, este se ha acelerado vertiginosamente desde 1997 (Tapscott, 2009), es decir, en tan solo 25 años, lo que ha generado importantes problemas de cohesión entre generaciones, especialmente graves cuando se dan en el contexto del mercado laboral. En este sentido, no solo la productividad y la eficiencia se ven afectadas por el grado de cohesión intergeneracional, sino también las relaciones dentro de las organizaciones, generándose tensiones entre generaciones que pueden provocar efectos beneficiosos, pero también indeseables. Así, mientras que en la era analógica el mayor reto tecnológico para la generación *baby-boomer* era hacer funcionar un reproductor de video o una tostadora (Tapscott, 2009), en la sociedad interconectada de hoy hemos visto nacer una generación puramente digital (Prensky, 2001; Tapscott, 2009) que gana enteros ante la necesidad de implementar mejoras para resolver grandes retos, entre ellos los que impone la gestión empresarial.

Desde esta nueva realidad, parece lógico pensar que otro de los efectos de la mayor longevidad en los países desarrollados sea precisamente la coexistencia de cada vez más generaciones con diferentes niveles de alfabetización digital en el mercado laboral. Por lo que, cuantas más generaciones se incorporan al mismo más necesario es comprender qué las caracteriza (Burton et al., 2019) para tratar de generar las mejores sinergias entre aquellas. A pesar de esta realidad, el enfoque de generaciones, es decir, considerar los hechos sociales, económicos y culturales bajo el prisma de las diferentes cohortes de individuos nacidos bajo un mismo contexto (Angeline, 2011), es lo que permite entender la realidad desde la perspectiva de cada una de ellas y, sin embargo, apenas se ha considerado en los estudios sobre el comportamiento emprendedor y la creación de empresas. Y esto es así a pesar de que la literatura académica pone en valor el efecto del análisis desde un enfoque de generaciones cuando se analizan distintos aspectos clave para el desarrollo empresarial (Burton et al., 2019; Parker et al., 2019; Dias et al., 2015; Bennett et al., 2008; Oblinger et al., 2005, entre otros) como las dinámicas de grupo (Armstrong, 2011; Sirias et al., 2007; Karp & Sirias, 2001), los conflictos dentro de las organizaciones (Zhu et al., 2016; Leiter et al., 2010), el liderazgo (Madrid et al., 2016; Harmoinen et al., 2014) , los salarios y el entorno laboral (Joy & Haynes, 2011; Leschinsky & Michael, 2004), o el compromiso de los empleados dentro de las organizaciones (Orlowski et al., 2017; Singh & Gupta, 2015) por citar algunos, aspectos muchos de los cuales están altamente conectados con el estudio de la iniciativa emprendedora.

De esta forma, este enfoque cobra más sentido cuando, por ejemplo, se valora el importante papel que jugó la generación de los *baby-boomers –i.e.*, generación de la explosión demográfica- en la historia con su presencia en la Guerra de Vietnam o el movimiento Hippy, rol que ha venido a ser superado con creces por la generación digital (Tapscott, 2009). Estos últimos están liderando un cambio cultural en todas las esferas de la vida, tal y como Tapscott afirma en su libro, "[…] *With their reflexes tuned to speed and freedom, these empowered young people are beginning to transform every institution of modern life. From the workplace to the marketplace, from politics to education to the basic unit of any society, the family, they are replacing a culture of control with a culture of enablement*" (2009:23).

En esta tesis estamos especialmente interesados en la promoción del espíritu empresarial de los más jóvenes por su capacidad para generar nuevas empresas y, por

tanto, nuevos empleos que contribuyan a reducir la brecha en la transferencia intergeneracional de las generaciones que hoy coexisten. Esto supone ahondar en el marcado perfil emprendedor que se le atribuye a la generación Z en comparación con las anteriores –*i.e.*, *baby-boomers*, generación *X* e *Y*- (Mahmood et al., 2020). Sin embargo, para analizar a los individuos desde un enfoque de generación no basta solo con tener en cuenta la fecha de nacimiento de aquellos, sino que es necesario considerar otros factores.

Del concepto de generación y los inconvenientes de su homologación a nivel mundial

La noción de "generación" ha sido abordada desde distintas áreas de estudio, como la sociología, la antropología o las humanidades. Para todas ellas la edad y determinados eventos históricos determinan el nacimiento de una nueva generación, siendo esta conjunción de factores común a las tres áreas de estudio antes indicadas. Para los sociólogos tener una visión compartida del entorno, una educación similar y parecidos intereses, contribuye no solo a que los individuos se agrupen para constituir una nueva generación, sino que también observen una misma forma de resolver los conflictos. Sin embargo, los sociólogos más contemporáneos apuntan a que existe una generación global afectada por factores universales donde la edad juega un papel importante, siendo los más jóvenes considerados el termómetro de las nuevas tendencias (Attias-Donfut, 2016; Guisado & Agoiz, 2013; Leccardi & Feixa, 2011; Kertzer, 1983). Por su parte, los antropólogos mantienen que una sociedad está en cambio constante. Estos cambios sociales provocan la confrontación entre grupos de padres e hijos dando lugar al comienzo de una nueva generación con valores propios (Leccardi & Feixa, 2011). Igualmente importante para configurar el concepto de generación es la contribución que hacen los humanistas, entendiendo que cada generación es el resultado de su propio destino forzado por las circunstancias (Caballero & Baigorri, 2019) que actúan como detonantes (Toffler & Toffler, 1996:85) de los cambios sociales.

Si bien encontramos en todas estas disciplinas aquellos factores en común, lo cierto es que hoy en día no se ha llegado a un consenso sobre el concepto de "generación". Probablemente esta falta de unanimidad tenga mucho que ver con los incesantes cambios

a los que está sometida la sociedad (Caballero & Baigorri, 2019), lo que lleva a revisar su concepto constantemente. No obstante, la edad de los individuos y las cohortes que esta genera, los eventos históricos y el contexto social y económico, parecen factores clave para su concepción. Sobre este particular, cada generación parece conformarse en torno a su año de nacimiento, los hechos históricos que se sucedieron durante los años en que tomaban conciencia del mundo y los valores compartidos. De media, un ciclo generacional surge cada veinte años aproximadamente (Guisado & Agoiz, 2013) coincidiendo con el momento en el que los más jóvenes van reaccionando contra las normas establecidas. Sin embargo, el ciclo generacional puede verse afectado por distintas circunstancias como hemos mencionado con anterioridad. En España, por ejemplo, la denominada generación *Franquista* nació al amparo del contexto político (Caballero & Baigorri, 2019; Guisado & Agoiz, 2013), retrasando la generación *baby-boomer* en nuestro país y, en consecuencia, el resto de las generaciones respecto a los patrones generacionales de Estados Unidos y de otros países occidentales.

Así, a principios del siglo XX, bajo la influencia de los eventos de la época -*i.e.*, el periodo de entreguerras- surge, en los países abatidos por la guerra, la denominada generación *silenciosa* (1900-1944) cuya característica principal fue adaptarse a los cambios (Caballero & Baigorri, 2019). Es a mediados del siglo XX, al término de la Segunda Guerra Mundial, que asoma una generación hasta día de hoy de influjo dominante, la conocida como generación *baby-boomer* (1945-1964). Posteriormente, en un entorno de crisis políticas y económicas, una generación de niños, los *latchkey kids* –conocidos en España como "niños de la llave"- crecía sola porque sus padres, los *baby-boomers,* resultaron ser adictos al trabajo (Sharagay & Tziner, 2011). Estos son los conocidos como generación *X* (1965-1981) que configuran, en la actualidad, la fuerza de trabajo a nivel mundial. En pleno desarrollo tecnológico, a principio de la década de los 80, surgen los *Millennials* o generación *Y* (1982-1993), una generación protegida por sus padres, aupada en competencias y animada a cursar estudios superiores muchas veces en contra de su voluntad. Según un informe del *Pew Research Center* (Fry, 2020) esta generación jugará un papel clave dentro del mercado laboral en Estados Unidos pues ya supera en número de nacimientos a los *baby-boomers*. La generación *Z* (1994- ¿2014?) o de los *nativos digitales*, como también se la conoce, está conformada por individuos que nacen a mediados de los 90, en pleno desarrollo y posterior auge de la tecnología digital. Estas circunstancias les confieren, a los nacidos bajo las influencias remarcadas, unas

características que los distinguen de sus predecesores. En el caso de *la* generación *Z* se ha llegado a afirmar que esta generación muestra el comportamiento más emprendedor de todas (Nguyen et al., 2021) por su capacidad de iniciativa y comportamiento transgresor, entre otras características. En cualquier caso, el debate sobre la conclusión o no de esta generación aún está abierto, pues para algunos estamos en los prolegómenos de la llamada generación *Alfa* (Hamdi et al., 2022). En la Tabla 1 se resumen las diferentes generaciones clasificadas según el patrón estadounidense y el patrón español, así como las fuentes que catalogan cada una de ellas.

Tabla 1. Cohortes generacionales en Estados Unidos y en España

Generaciones	Años de referencia para la generación en USA y en España	Fuentes [1],[2]
Generación *silenciosa*	USA: 1900-1944	DiLullo et al., (2011), Hamdi et al., (2022), Howe & Strauss (2007), Oblinger et al., 2005), Parker et al., (2019)
	España: 1914-1928	Caballero & Baigorri (2019), Guisado & Agoiz (2013)
Generación *baby-boomer*	USA: 1945-1964	Caballero & Baigorri (2019), DiLullo et al., (2011), Hamdi et al., (2022), Howe & Strauss (2007), Oblinger et al., (2005), Parker et al., (2019),
	España: 1955-1974	Caballero & Baigorri (2019), Guisado & Agoiz (2013),
Generación *X* (niños de la llave)	USA: 1965-1981	Caballero & Baigorri (2019), Dias et al., (2015), DiLullo et al., (2011), Hamdi et al., (2022), Howe & Strauss (2007), Oblinger et al., (2005), Parker et al., (2019), Tapscott (2009)
	España: 1975-1993	Caballero & Baigorri (2019), Guisado & Agoiz (2013),
Generación *Y*	USA: 1982-1993	Caballero & Baigorri (2019), Dias et al., (2015), DiLullo et al., (2011), Hamdi et al., (2022), Howe & Strauss (2007), Oblinger et al., (2005), Parker et al., (2019), Tapscott (2009),
	España: 1994-2002	Caballero & Baigorri (2019), Guisado & Agoiz (2013),
Generación *Z*	USA: 1994- ¿2014?	Dias et al., (2015), Frunzaru et al., (2021), Hamdi et al., (2022), Howe & Strauss (2007), Nguyen et al., (2021), Oblinger et al., (2005), Parker et al., (2019), Tapscott (2009),
	España: 2003- ¿?	Caballero & Baigorri (2019), Guisado & Agoiz (2013),

Si bien este es el esquema general de las generaciones dominantes en el último siglo y medio, estas se pueden apreciar de manera más nítida no solo en Estados Unidos, sino

[1] Los autores referenciados para el contexto USA difieren entre ellos en uno o dos años a la hora de datar el comienzo y el fin de cada generación.

[2] Los autores referenciados para el contexto España adaptan el trabajo de Howe & Strauss (2007) para incluir la generación franquista.

también en Reino Unido o los países nórdicos. No es así en países que sufrieron una severa posguerra, como Alemania, Rusia o España quienes, bien por el proceso de reconstrucción tras la Segunda Guerra Mundial, bien por los regímenes políticos dominantes, las generaciones se conformaron bajo otros patrones que modifican en algún sentido las características de cada cohorte y las de sus descendientes (Caballero et al., 2019; Guisado & Agoiz, 2013). Todo ello ha dificultado la homologación global de las diferentes generaciones. Esta cuestión es también notoria si se considera el devenir de países como China, que se desarrolla política, económica y socialmente de manera centralizada, por citar tan solo algunos ejemplos que ilustran la dificultad de establecer un patrón generacional común a nivel internacional. Ahora bien, después del proceso de globalización y, precisamente por la digitalización creciente de la economía, todo parece converger hacia una homologación (Ghemawat, 2007) cada vez mayor de las generaciones, que solo el tiempo dirá si se sostiene y consolida.

Propósito general de la investigación

Con este marco de referencia, el objetivo principal de nuestra investigación es revelar la importancia del enfoque generacional en el estudio del emprendimiento, para lo cual nos propusimos constatar el comportamiento emprendedor de la nueva generación que ha surgido al amparo de la revolución digital, -*i.e.*, los *nativos digitales* o generación *Z*-, frente a las generaciones precedentes. Así, los últimos intentos por categorizar las generaciones atendiendo a los elementos arriba citados, sitúan a los nacidos en 1994 como el año en que daría comienzo la generación de *nativos digitales*. Prensky (2001) afirma que esta generación entra en contacto con la tecnología desde que nace. Los individuos catalogados en ella dominan el *"lenguaje"* digital como nunca antes se había observado, y este dominio les ayuda a comprender su entorno (Dias et al., 2015; Prensky, 2001) quedando patente en el manejo cercano y a la perfección de los ordenadores, los videojuegos o internet (Prensky, 2002). La capacidad de simultanear una variedad de tareas les permite usar dispositivos móviles al tiempo que juegan un videojuego o escuchan música (Bennett et al., 2008). Sin embargo, el abuso de la multitarea puede afectar a su curva de aprendizaje con la consecuente pérdida de habilidades, lo que puede constituir una barrera al aprendizaje transversal (DiLullo et al., 2011).

Quizá, lo más representativo de estos jóvenes *nativos digitales* sea su conexión constante, lo que les proporciona una visión sociopolítica distinta de la de sus predecesores, los *Millennial*. En este sentido, no solo aceptan la diversidad de razas sino que además, al incorporar nuevas estructuras de creencias, su concepto de familia y de género cambia sustancialmente. Si bien es cierto que esta joven generación está en plena concepción (Parker et al., 2019), ya se sabe que el entorno lo perciben con optimismo y positividad. Su cultura está influenciada por la tecnología (Bennett et al., 2008; Oblinger et al., 2005) que satisface sus necesidades de entretenimiento, comunicación, información e incluso de aprendizaje (Dias et al., 2015; Oblinger et al., 2005). Otra particularidad a destacar de los nativos digitales es la creación de nuevo material al que imprimen su sello personal en forma de imágenes, videos o audios (Bennett & Maton, 2010) todo ello, partiendo de información aleatoria (Dias et al., 2015), y no siempre estructurada. Las redes sociales, por otro lado, son vistas con positividad pues les proveen de información (Parker et al., 2019) que contraponen a la opinión que tienen otras generaciones de los mismos temas.

En general, los *Z* se distinguen de sus predecesores por ser una generación multirracial y multiétnica, que siente fascinación por la tecnología, se orientan a resultados y tienen acceso a un amplio abanico de actividades extracurriculares (Oblinger et al., 2005). Estos jóvenes *nativos digitales* son rebeldes y autónomos, habiendo desarrollado una fuerte creencia en sí mismos. Este marcado perfil independiente, en ocasiones, les hace ser pésimos oyentes, prestando poco o nulo interés por su círculo cercano para apreciar con más ahínco si cabe a sus coetáneos que se comunican en las redes sociales. Su círculo social, fuertemente ligado a Internet y esas redes sociales, les permite expresar libremente sus propias opiniones (Dias et al., 2015). En este sentido, podríamos estar ante una generación que presenta un perfil un tanto "descarado". Si a ello unimos que la reciente pandemia, surgida como consecuencia de la expansión a nivel global del Coronavirus, reforzó tanto para ellos como para sus ascendientes una mayor conexión digital, su carácter, lejos de contenerse, se ha reforzado.

Pero ¿qué sabemos de su iniciativa emprendedora?, ¿está esta generación en disposición de recortar la brecha intergeneracional y proporcionar más empleo en virtud de su iniciativa, del que actualmente demanda una estructura empresarial forjada por las generaciones precedentes? La cuestión es sin duda apasionante pero compleja, y para responderla se requiere hacer un trabajo previo que nos permita articular un marco teórico

fiable y objetivo que sustente una investigación empírica seria y de resultados trascendentes (Newert et al., 2022), aspecto que tratamos de abordar en los primeros capítulos de esta tesis.

Así, el propósito general de la investigación es llevar a cabo el estudio que nos permita reconocer si existe una "mentalidad" emprendedora característica y diferenciada entre generaciones, y conocer especialmente si esta es sustancialmente diferente en la generación *Z*. Si, como se ha llegado a afirmar, estamos ante la generación más emprendedora de todas las conocidas, nuestro objetivo de investigación es analizar tanto su comportamiento emprendedor como su cognición, para comprender qué la distingue de las cohortes generacionales precedentes. Para ello, es vital comprender cómo sus actitudes -*i.e.* patrones de creencias alimentadas por las percepciones del entorno (Hamdi et al., 2021)-, van moldeando su comportamiento que, finalmente, se vuelca en su entorno en forma de acciones que inspiran a sus coetáneos conformando así una suerte de ecosistema emprendedor inter- e intra-generacional. Si la investigación nos permitiera además de explicar, predecir el comportamiento emprendedor de esta generación, el propósito quedaría completo. Ahora bien, este propósito es ambicioso y no exento de dificultades. A continuación, presentamos la principal barrera para culminar esta propuesta a corto plazo.

Factores que facilitan y que limitan el desarrollo de la investigación

La recogida sistemática de datos sobre el conjunto de factores que influyen sobre la iniciativa emprendedora se ha venido a consolidar con proyectos de escala global como *Global Entrepreneurship Monitor* (GEM) para la población general, o el *Global University Entrepreneurial Spirit Student's Survey* (GUESSS) para el caso específico de la población universitaria. Estos proyectos nos proporcionan, metodológicamente hablando, un marco idóneo para el estudio propuesto, por otra parte, difícil de acometer si no se dieran estas condiciones. En nuestro caso, por la naturaleza del estudio a realizar, es GEM el proyecto que nos facilita información pertinente para el estudio.

Este proyecto, particularmente, se ocupa desde el año 1999[3] de monitorizar el fenómeno emprendedor en el mundo. Diseñado inicialmente para llevar a cabo ese seguimiento a nivel país, desde el año 2003 ha adaptado su metodología para plantear el análisis del fenómeno emprendedor también a escala regional, de ahí la riqueza de información que proporciona a través de los dos sondeos anuales que realiza: uno a través de la Encuesta a la Población Adulta, denominada por sus siglas en inglés APS (*Adult Population Survey)*, y otro a través de las entrevistas a Expertos del ecosistema emprendedor de cada país y región, conocido por NES (*National Expert Survey*). De esta forma, esta información se acumula en profusas bases de datos construidas a lo largo de más de dos décadas de seguimiento del fenómeno. No obstante, y a pesar de esta riqueza de información, las bases de datos recabadas por GEM presentan tres problemas que requieren atención para que la información atesorada durante estos años nos permita un abordaje generacional válido para el estudio propuesto. A saber:

1. GEM toma datos de panel, lo que supone recabar la misma información cada año de individuos diferentes. Esto le confiere un carácter transversal al estudio, desde el punto de vista de los individuos que participan en él; no obstante, y desde el punto de vista del país, la región, o incluso de las variables que se recaban de los individuos, su carácter es longitudinal.
2. Los países y regiones participantes en el estudio GEM no son estables año a año, lo que hace que los marcos institucionales referidos al país o a la región se mantengan en continuo cambio a lo largo de los años.
3. Además de los factores antes citados, es necesario no perder de vista que para un enfoque generacional la unidad de análisis es la generación, y esto conlleva un serio problema que solo el tiempo puede resolver. Así, cuantos más años se sucedan más cohortes generacionales podremos analizar con ayuda de una base de datos como la que GEM nos proporciona. Sin embargo, de la generación que nos interesa particularmente, solo podremos tener un conjunto importante de datos a partir del año 2023.

En cuanto a este último aspecto, la riqueza de GEM es innegable. Así, el proyecto GEM, si lo consideramos a nivel global, ha recogido hasta ahora datos de cinco

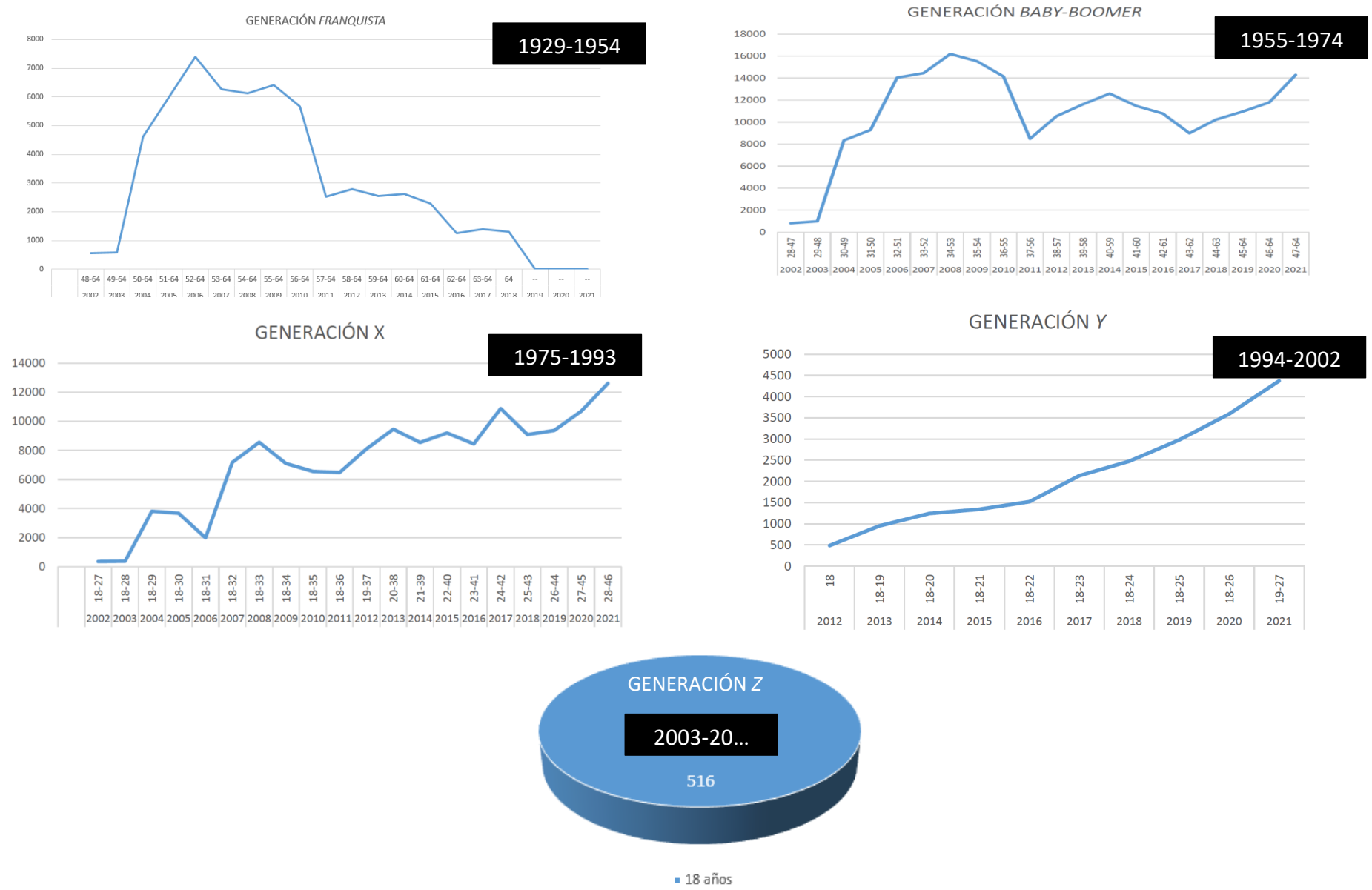
[3] El proyecto inició su andadura en el año 1997, abriéndose a su internacionalización en 1999 (Reynolds et al., 2000), convirtiéndose desde ese año en un proyecto de investigación estable que no ha hecho más que crecer en participación de países, académicos vinculados al proyecto y muestras. http://www.esbri.se/pdf/gem-rapport.pdf

generaciones que coexisten entre los últimos años del siglo XX y los primeros del siglo XXI. Es necesario hacer notar, que los datos de GEM acumulan información de individuos con edades comprendidas entre los 18 y 64 años, ambos inclusive, lo que nos permite explorar los comportamientos de las distintas generaciones a través de la población activa que participa en las encuestas recabadas anualmente. En el Anexo 1 se presenta una comparativa de los datos recabados para cada cohorte generacional entre los años 2002 y 2021, tanto considerando las generaciones estándar que han dominado el mundo occidental, como en España.

Sin embargo, estamos interesados en explicar, pero también predecir, el comportamiento emprendedor -en adelante, CE- de los jóvenes de la generación *Z*, además de compararlo con generaciones precedentes, y para todo ello es necesario contar con datos. En este sentido, los primeros *nativos digitales* alcanzaron su mayoría de edad en torno al año 2012, con 29 años cumplidos en el 2023 si seguimos el patrón establecido por Estados Unidos. Sin embargo, en España, al irrumpir una generación intermedia entre la *silenciosa* y la *baby-boomer*, en el período 1929-1954 (Guisado & Agoiz, 2013), se da la circunstancia de que los primeros *nativos digitales* alcanzan su mayoría de edad en torno al año 2020. Aunque muchos siguen aún cursando sus estudios, encontramos cada vez más jóvenes de esta generación que se están integrando en el mercado laboral.

En el Anexo 2 se incluye una estimación de las muestras que se pueden recabar en España en cada cohorte generacional. La Figura 1 resume el cómputo de cada muestra anual GEM España, y nos permite observar que en 2021 tan solo contamos con algo más de 500 casos de la generación que atrae nuestro interés. Y nos referimos exclusivamente a España por la riqueza de información que atesora en sus bases de datos, cuestión que en otros países no ocurre al considerar tan solo la muestra estándar de 2.000 individuos encuestados anualmente para conservar un error muestral a nivel de país del 2.19% (I.C.=95%).

Figura 1. Muestras por generaciones recabadas por GEM España (2002-2021)



De esta forma, observamos que cinco generaciones se encuentran representadas en los datos GEM. Teniendo presente que nuestro objetivo es explicar el CE de la generación *Z* frente a las precedentes, y predecir su comportamiento para los años venideros, consideramos que será a partir de la muestra recabada en 2023, que obtendremos una muestra acumulada más representativa de la generación que nos ocupa, año a partir del cual podremos acometer el estudio pretendido.

Objetivos y estructura de la tesis doctoral

A pesar de nuestro interés inicial, las anteriores limitaciones nos han llevado a enfocar el trabajo de tesis en desarrollar un marco preparatorio para poder ejecutar la anterior investigación con garantías. De esta manera, podremos contrastar las hipótesis relativas al CE de la generación *Z* frente a las anteriores cohortes generacionales, y conocer los factores que explican tanto su intención emprendedora -en adelante, IE- como su comportamiento en esta ocupación.

Con dicho fin, el trabajo que a continuación se presenta tiene por objetivo general exponer el marco teórico y empírico de análisis que facilite el estudio de la iniciativa emprendedora con un enfoque de generaciones. Para dicho fin se plantean dos subobjetivos: (i) llevar a cabo un análisis sobre el conocimiento acumulado en el estudio de la IE en la literatura académica desde sus orígenes y, además, (ii) definir la metodología más apropiada para analizar la IE y el CE considerando las cohortes generacionales.

Ambos subobjetivos han dado cuerpo al marco preparatorio que se presenta en esta tesis doctoral, permitiendo desarrollar, hasta el momento, tres trabajos de investigación independientes, articulados a través de tres publicaciones anexadas en esta tesis. Junto con los estudios que ahora mismo nos encontramos desarrollando, nos ayudarán a constituir la línea de investigación más arriba descrita.

Con el fin de presentar los trabajos culminados, esta tesis se organiza en torno a cinco capítulos que dan continuación al presente epígrafe introductorio y preceden a las conclusiones. En cada uno de ellos se presentan los objetivos de los estudios realizados y que pasamos a resumir a continuación:

- En el Capítulo 2 se incluye el trabajo que lleva por título *A Holistic Literature Review on Entrepreneurial Intention: A Scientometric Approach*. Considerando el aumento exponencial de los trabajos publicados, esta revisión de la literatura abarca, desde una visión holística, 50 años de investigación en IE. El propósito que lo guía es conocer el sustrato científico y la morfología del tópico a través de un enfoque cienciométrico que nos permite evaluar la evolución y el estado actual de la estructura del tópico, al tiempo que se proponen posibles itinerarios de investigación futura.
- El Capítulo 3 añade valor al anterior con la presentación del trabajo *A Scientometric Analysis On Entrepreneurial Intention Literature: Delving Deeper Into Local Citation* que se diseñó para compendiar las principales revisiones de la literatura – *i.e.,* sistemáticas y bibliométricas- sobre la IE. Además, se desarrolló con el fin de obtener información más detallada de los fundamentos científicos del área, los trabajos, revistas y autores que más han contribuido a este tópico de investigación, sus intereses emergentes y las lagunas existentes en la literatura. La consecución de este segundo objetivo fue posible en virtud de la discriminación de dos indicadores derivados de la citación directa de los trabajos de investigación: la Citación Local (CL) y la Citación Global (CG), explotando indicadores tales como el RCL –*Ratio de Citación Local*- que no habían sido analizados hasta ahora por los trabajos de revisión en este campo de estudio.
- El Capítulo 4 incluye el trabajo *Exploring The Socio-Cognitive Theory Of Entrepreneurship Using a Bayesian Learning Approach* cuyo objetivo es comprender cómo la mente, el comportamiento, y el entorno interactúan dentro del contexto emprendedor ayudando a explicar el CE tanto a nivel individual como colectivo. En este trabajo se pone el foco en la capacidad predictiva de las actitudes sociocognitivas de los individuos para explicar y predecir el comportamiento más allá de las fases iniciales del proceso emprendedor. Esta investigación nos permitió testar las bondades de la estadística bayesiana y las herramientas basadas en algoritmos de Inteligencia Artificial para el trabajo con amplias bases de datos, lo que nos anticipa el tipo de análisis a desarrollar para la investigación pretendida.

La metodología seguida en los estudios realizados ha sido diversa y ajustada a los fines de cada investigación, combinando tanto métodos de análisis cuantitativo como cualitativo. No obstante, para la extracción de resultados, todos los procesos han sido asistidos por diferentes paquetes informáticos que han facilitado, además, la interpretación de estos. Así, y en relación con los dos primeros trabajos, se han aplicado técnicas bibliométricas de gran potencia en virtud de las mejoras que la inteligencia artificial ha procurado en la aplicación de las mismas.

En el Capítulo 2 se detalla con profusión la metodología aplicada al estudio que se ha sostenido en una combinación de procedimientos de análisis bibliométricos, realizados con ayuda de los programas *VOSviewer -v.1.6.17* (van Eck & Waltman, 2010) y *Bibliometrix* -v.Rx64.4.1 integrado en *RStudio* -v.Rx64.4.1 (Aria & Cuccurullo, 2017). Con el primero de los paquetes reseñados se llevaron a cabo análisis de co-citación, mientras que con el segundo se desarrollaron mapas estratégicos por emparejamiento bibliométrico de tres períodos sucesivos de desarrollo de la literatura en IE.

El trabajo cienciométrico del Capítulo 3 también empleó activamente *Bibliometrix* -v.Rx64.4.1 para el análisis del nivel de impacto de las publicación a través del estudio de la citación directa, diferenciando, como ya anticipamos, la citación local de la global. Para el cálculo de los indicadores de impacto -*i.e*., *h-index* de los autores-, se utilizó además *Bibexcel* en su versión 2016.02.20 (Persson et al., 2009).

En el Capítulo 4, para la elección de las variables que formaron parte de los análisis, se utilizó el paquete estadístico SPSS PC –v.26, y el programa *Matlab* –v.RD2019b para los experimentos desarrollados, tanto para determinar la capacidad predictora de las variables sociocognitivas sobre los estados de comportamiento, como para generar modelos de clasificación bayesiana.

Principales resultados de la investigación

Tomando como base los diferentes estudios realizados en la presente tesis doctoral, presentamos aquí un breve resumen de los mismos y sus principales conclusiones:

- *A Holistic Literature Review on Entrepreneurial Intention: A Scientometric Approach* (Capítulo 2), es un trabajo que complementa otras revisiones

bibliográficas sobre IE llevando a cabo un análisis cienciométrico de casi cinco décadas de investigación (1970-2021) divididas en tres etapas de desarrollo: las fases de descubrimiento, despegue y crecimiento. Los casi 2.000 documentos analizados revelan cómo la investigación en este tópico se ha vinculado a la elección de carrera, la educación, la psicología social y el espíritu emprendedor. El análisis de emparejamiento bibliográfico forma grupos afines fundamentándose en las referencias citadas en los trabajos y desvelando pistas clave que visibilizan las líneas de investigación compartidas. Una vez agrupados, se mapean estratégicamente según su impacto -*i.e.*, número de citas- y su centralidad - *i.e.*, fuerza de asociación con otros grupos-, que los posiciona dentro del tópico. Así, los mapas estratégicos se sitúan en torno a temas motores, transversales, aislados y emergentes o en declive, que conforman la morfología del tópico. Estos últimos, los emergentes o en declive, van dejando un rastro que permite intuir hacia donde apunta la investigación. La observación de los mapas en su conjunto presenta una visión holística de la evolución del tópico que proporciona interesantes resultados. En la primera etapa, que reúne los artículos publicados entre 1970-2000, se observa que el interés por la IE era testimonial, con una estructura conceptual dispersa y una investigación construida a medida, y en buena parte vinculada a la elección de carrera, particularmente, de los estudiantes universitarios. En la segunda etapa, la de despegue (2001-2010), el progreso del tópico se consolida mediante el desarrollo de escalas psicométricas que permiten evaluar la IE en base a los modelos de intención desarrollados hasta el momento, principalmente siguiendo la Teoría del Comportamiento Planeado –conocida como TPB, por sus siglas en inglés-. El individuo, en la tercera etapa (2011-2021), toma un protagonismo singular en la medida en que es quien debe transitar desde la IE hasta el CE, siendo esta tercera etapa la que con más nitidez muestra una importante senda de trabajo para la futura investigación en el campo. No obstante, para captar bien este *gap* se necesitan estudios de corte longitudinal que resultan costosos en tiempo y dinero. El trabajo culmina mostrando las dos sendas de trabajo a las que debe encaminarse el campo: bien añadiendo nuevos frentes de investigación –*e.g.*, analizando la IE de otros colectivos distintos a los estudiantes universitarios-, pero también

rompiendo el sustrato de investigación para actualizar teorías y enfoques conforme a los avances que esas áreas vienen efectuando.

- El Capítulo 3, descubre en el trabajo *A Scientometric Analysis On Entrepreneurial Intention Literature: Delving Deeper Into Local Citation*, la producción intelectual de la investigación en IE y el papel que desempeña esta en otras áreas de investigación afines. Se presenta previamente una sinopsis de revisiones de la literatura que revela los principales hallazgos obtenidos por aquellas, todas las cuales emplearon como medida del impacto de los trabajos la cita directa. Ahora bien, analizar la cita directa desde dos prismas distintos -Citación Local y Citación Global- permite obtener resultados previamente pasados por alto, manifestando el *statu quo* actual y el verdadero progreso de este campo de investigación. La Citación Local junto a otras herramientas bibliométricas permite visibilizar las revistas, los trabajos y los autores clave de la investigación en IE, al tiempo que nos permiten descubrir cuatro polos temáticos de investigación en este tópico: el estudio de los modelos sobre IE, sus antecedentes y relaciones; la autoeficacia como antecedente de la IE; la IE social y el efecto de la educación en la IE. En este último polo, se observan además dos vertientes diferenciadas: (i) la que se interesa por los factores de contexto que influyen en la IE –*e.g.*, los institucionales, culturales, regionales o económicos, entre otros-; y (ii) aquellos otros factores relacionados con las características de los individuos y su contexto personal. Así, las citas globales dan protagonismo a temas como la educación emprendedora y la autoeficacia, relegando el polo que se ocupa de estudiar los modelos de IE, sus antecedentes y relaciones a una posición periférica que, sin embargo, se revela como un tema motor para el tópico cuando se estudian las citas locales. Ambos mapas estratégicos obtenidos posicionan en el cuadrante de temas motores aquellas investigaciones centradas en la autoeficacia y en los efectos de los factores personales relacionados con la educación en la IE. El análisis pormenorizado del frente de investigación nos lleva a la conclusión de que la cita directa no es un mero indicador estadístico que nos informa del impacto de una publicación, sino que, convenientemente utilizada, nos revela la importancia que estos trabajos tienen dentro y fuera del ámbito de estudio. Además, la identificación de los polos temáticos, ya sean motores,

transversales, emergentes o en declive, ayuda a mostrar una estructura realista del campo y a revelar las líneas de investigación presentes y futuras. A la luz de este trabajo nos preguntamos si ha llegado el momento de explorar nuevos enfoques y modelos de estudio de la IE, más allá del TPB, que ayuden a comprender mejor la mentalidad de los potenciales emprendedores, sus intenciones, y cómo estas se transforman en acciones reales de emprendimiento.

- El Capítulo 4, con el trabajo *Exploring The Socio-Cognitive Theory Of Entrepreneurship Using a Bayesian Learning Approach*, aplica la Teoría del Aprendizaje Sociocognitivo de Bandura (1986, 1999) como marco idóneo para reenfocar el estudio de la intención y el comportamiento emprendedor de los individuos. Analizamos de manera agregada las actitudes sociocognitivas que nos ayudan a comprender cómo opera el CE. Este comportamiento forma parte de una estructura compleja que se construye a partir de las percepciones e interpretaciones que el individuo hace de los sucesos de su entorno para adaptar su comportamiento, accionarlo y revertirlo nuevamente al entorno. De esta manera se plantea la Teoría Sociocognitiva de la Iniciativa Emprendedora para dar forma a un marco teórico más acorde con la realidad del fenómeno emprendedor, explicando así cómo interactúa la mente del emprendedor con su entorno, tanto a nivel individual como colectivo. Se llevan a cabo experimentos basados en la clasificación bayesiana con herramientas de inteligencia artificial, en particular, el Aprendizaje Máquina Supervisado e Informado. Cuatro actitudes sociocognitivas relevantes para la iniciativa emprendedora –*i.e.*, miedo al fracaso, reconocimiento de oportunidades, autoeficacia y reconocimiento de capital social- se combinan para definir hasta 16 patrones sociocognitivos de referencia. Los hallazgos, resultado del análisis de un total de 300.000 individuos participantes en GEM en 14 años de investigación, detectan aquellos patrones realmente relevantes para cada etapa del proceso emprendedor, desde el no emprendimiento hasta el cese de la actividad emprendedora, pasando por la intención emprendedora, el emprendimiento naciente y el de empresa consolidada. Los resultados se presentan en un mapa de *Diversidad y Relevancia* que muestra la intensidad y sensibilidad de los patrones sociocognitivos a nivel colectivo y para un

conjunto de años que incluye el turbulento 2008. De manera sintética se observa que los patrones que respaldan el CE son diversos y no inmutables a los sucesos del entorno. El resultado es especialmente relevante para los estudios de la IE en los que los modelos comúnmente aceptados consideran estas actitudes como únicas y resilientes a las turbulencias del entorno. El estudio permite realizar los primeros ensayos para el tratamiento de los factores que explican la IE y el CE de las cohortes generacionales que se someterán a estudio.

ANEXO 1. Franjas de edad incluidas en cada cohorte anual de GEM siguiendo el patrón generacional de Estados Unidos y de España (22 años)

Año	ESTADOS UNIDOS					ESPAÑA				
	Generación *Silenciosa* (1900-1944)	**Generación *Baby-boomer* (1945-1964)**	**Generación *X* (1965-1981)**	**Generación *Y* (1982-1993)**	**Generación *Z* (1994-…)**	**Generación *Franquista* (1929-1954)**	**Generación *Baby-boomer* (1955-1974)**	**Generación *X* (1975-1993)**	**Generación *Y* (1994-2002)**	**Generación *Z* (2003-20...)**
2002	**58-64**	**38-57**	**21-37**	**18-20**	--	**48-64**	**28-47**	**18-27**	--	--
2003	**59-64**	**39-58**	**38-22**	**18-21**	--	**49-64**	**29-48**	**18-28**	--	--
2004	**60-64**	**40-59**	**39-23**	**18-22**	--	**50-64**	**30-49**	**18-29**	--	--
2005	**61-64**	**41-60**	**24-40**	**18-23**	--	**51-64**	**31-50**	**18-30**	--	--
2006	**62-64**	**42-61**	**25-41**	**18-24**	--	**52-64**	**32-51**	**18-31**	--	--
2007	**63-64**	**43-62**	**26-42**	**18-25**	--	**53-64**	**33-52**	**18-32**	--	--
2008	**64**	**44-63**	**27-43**	**18-26**	--	**54-64**	**34-53**	**18-33**	--	--
2009	--	**45-64**	**28-44**	**18-27**	--	**55-64**	**35-54**	**18-34**	--	--
2010	--	**46-64**	**29-45**	**18-28**	--	**56-64**	**36-55**	**18-35**	--	--
2011	--	**47-65**	**30-46**	**18-29**	--	**57-64**	**37-56**	**18-36**	--	--
2012	--	**48-66**	**31-47**	**19-30**	**18**	**58-64**	**38-57**	**19-37**	**18**	--
2013	--	**49-67**	**32-48**	**20-31**	**18-19**	**59-64**	**39-58**	**20-38**	**18-19**	--
2014	--	**50-68**	**33-49**	**21-32**	**18-20**	**60-64**	**40-59**	**21-39**	**18-20**	--
2015	--	**51-69**	**34-50**	**22-33**	**18-21**	**61-64**	**41-60**	**22-40**	**18-21**	--
2016	--	**52-70**	**35-51**	**23-34**	**18-22**	**62-64**	**42-61**	**23-41**	**18-22**	--
2017	--	**53-71**	**36-52**	**24-35**	**18-23**	**63-64**	**43-62**	**24-42**	**18-23**	--
2018	--	**54-72**	**37-53**	**25-36**	**18-24**	**64**	**44-63**	**25-43**	**18-24**	--
2019	--	**55-73**	**38-54**	**26-37**	**18-25**	--	**45-64**	**26-44**	**18-25**	--
2020	--	**56-74**	**39-55**	**27-38**	**18-26**	--	**46-64**	**27-45**	**18-26**	--
2021	--	**57-75**	**40-56**	**28-39**	**18-27**	--	**47-64**	**28-46**	**19-27**	**18**
2022	--	**58-76**	**41-57**	**29-40**	**18-28**	--	**48-64**	**29-47**	**20-28**	**18-19**
2023	--	**59-77**	**42-58**	**30-41**	**18-29**	--	**49-64**	**30-48**	**21-29**	**18-20**

ANEXO 2. Muestras GEM por generación en España (20 años)

Año	Generación *Franquista* (1929-1954)	Muestra GEM	Generación *Baby-boomer* (1955-1974)	Muestra GEM	Generación *X* (1975-1993)	Muestra GEM	Generación *Y* (1994-2002)	Muestra GEM	Generación *Z* (2003-20...)	Muestra GEM
2002	**48-64**	556	**28-47**	811	**18-27**	349	--	--	--	--
2003	**49-64**	591	**29-48**	992	**18-28**	378	--	--	--	--
2004	**50-64**	4.627	**30-49**	8.346	**18-29**	3.808	--	--	--	--
2005	**51-64**	5.996	**31-50**	9.286	**18-30**	3.671	--	--	--	--
2006	**52-64**	7.409	**32-51**	14.037	**18-31**	1.981	--	--	--	--
2007	**53-64**	6.267	**33-52**	14.444	**18-32**	7.169	--	--	--	--
2008	**54-64**	6.129	**34-53**	16.193	**18-33**	8.557	--	--	--	--
2009	**55-64**	6.403	**35-54**	15.539	**18-34**	7.100	--	--	--	--
2010	**56-64**	5.676	**36-55**	14.140	**18-35**	6560	--	--	--	--
2011	**57-64**	2.532	**37-56**	8.485	**18-36**	6483	--	--	--	--
2012	**58-64**	2.782	**38-57**	10.531	**19-37**	8100	**18**	487	--	--
2013	**59-64**	2.558	**39-58**	11.625	**20-38**	9464	**18-19**	953	--	--
2014	**60-64**	2.622	**40-59**	12.590	**21-39**	8544	**18-20**	1244	--	--
2015	**61-64**	2.285	**41-60**	11.473	**22-40**	9199	**18-21**	1343	--	--
2016	**62-64**	1.251	**42-61**	10.781	**23-41**	8449	**18-22**	1519	--	--
2017	**63-64**	1.399	**43-62**	8.986	**24-42**	10879	**18-23**	2136	--	--
2018	**64**	1.308	**44-63**	10.225	**25-43**	9090	**18-24**	2477	--	--
2019	--	--	**45-64**	10.948	**26-44**	9373	**18-25**	2979	--	--
2020	--	--	**46-64**	11.786	**27-45**	10696	**18-26**	3593	--	--
2021	--	--	**47-64**	14.281	**28-46**	12614	**19-27**	4374	**18**	516
TOTAL		60.391		215.499		142.464		21.105		516

Justification of the generational approach in the study of entrepreneurship

In a recently published study, Abio et al. (2021:18) pointed out that "People, throughout their lives, consume, produce, save and share resources, and the activities they develop vary significantly according to the moment of their life cycle. Both in childhood and in old age, personal consumption needs exceed those that could be covered by any economic activity, while only during working age are resources produced. To meet the needs and ensure the well-being of the entire population, transfers of resources between generations are key. To this end, societies organize intergenerational resource transfers through families and the public sector." This reflection reveals the fundamental role that each cohort or generation plays in society as a whole in maintaining the balance of the welfare state (Attias-Donfut, 2016).

In this context, the improvement in the quality of life of the population, especially in the developed world, has led to a significant increase in life expectancy. This fact has compromised the general welfare state of the population as planned in the last century and has been known so far. Just think that, if in the nineteenth century, the general average age of the global population was 52 years, by the end of the twentieth century it had increased by 26 years (Roser et al., 2013). In Europe, life expectancy has increased between 2002 and 2021 by 11.5 years, that is, by 14.81% according to Eurostat (2022). For the same period, in Spain the trend has been overall 3.3 years, going from an average age of 76.3 years in men in 2002, to 80.2 in 2021, and in women from 83.1 in the same year, to 85.3 in 2021 (Eurostat, 2022; INE 2022).

The coverage of the social rights of all citizens is strongly linked, at least in our country, to the generation of resources via contributions and taxes, so that the necessary transfer of intergenerational resources between the active and passive cohorts occurs. Thus, a percentage of the resources collected from some generations supports, for example, the payment of unemployment in the same generation, but also the retirements of previous generations (Abio et al., 2021; Attias-Donfut, 2016). If we also take into account that the birth rate has been retracting at an average rate of 6.7% (Eurostat, 2022), standing at 7.12% in Spain (INE, 2022), we are facing a process that may be irreversible,

for intergenerational transfer, if increasing birth rates are not achieved, while increasing the employment of the workforce and limiting the growth of the unemployment rate.

It is precisely the need to increase employment that has led many researchers to consider the origin of employment in society (Birch, 1979; Chiesa et al., 2018; Fugate et al., 2021; Guilbert et al., 2016). This concern represents, from our point of view and in practice, asking about the very causes of the gap in intergenerational transfer that can cause bankruptcies in the welfare state. The reduction of this gap finds in active employment policies and those aimed at promoting entrepreneurship two great allies. Our interest in this work focuses especially on the latter because of their potential to generate employment as well as economic growth and innovation (Ács et al., 2008; Audretch et al., 2006; Bosma et al., 2018).

However, the balance of the welfare state depends on multiple factors, among which the degree of cohesion of a society stands out, understood as the general circumstances that give rise to favourable attitudes and behaviours of its members (Bottoni, 2018), and this depends to a large extent on the type of relationship established between the generations that coexist (Bolin, 2019). This cohesion has been strongly affected in recent years by unstoppable technological development. Thus, this has accelerated vertiginously since 1997 (Tapscott, 2009), that is, in just 25 years, which has generated important cohesion problems between generations especially serious when these occur in the context of the labour market. In this sense, not only productivity and efficiency are affected by the degree of intergenerational cohesion, but also relationships within organizations, generating tensions between generations that can cause beneficial, but also undesirable effects. Thus, while in the analogue era, the greatest technological challenge for the *baby-boomer* generation was to run a video player or a toaster (Tapscott, 2009), in today's interconnected society we have seen the birth of a purely digital generation (Prensky, 2001; Tapscott, 2009) that wins whole before the need to implement improvements to solve great challenges, including those imposed by business management.

From this new reality, it seems logical to think that another effect of greater longevity in developed countries is precisely the coexistence of more and more generations with different levels of digital literacy in the labour market. Therefore, the more generations that join it, the more necessary it is to understand what characterizes them (Burton et al., 2019) to try to generate the best synergies between them. Despite this

reality, the approach of generations, that is, considering social, economic and cultural facts through the prism of the different cohorts of individuals born under the same context (Angeline, 2011), is what allows us to understand reality from the perspective of each of them and, however, has hardly been considered in studies on entrepreneurial behaviour (EB) and business creation. And this is so even though the academic literature values the effect of analysis from a generational approach when analysing different key aspects of business development (Burton et al., 2019; Parker et al., 2019; Dias et al., 2015; Bennett et al., 2008; Oblinger et al., 2005, among others) and group dynamics (Armstrong, N, 2011; Sirias et al., 2007; Karp, H & Sirias, D, 2001), conflicts within organizations (Zhu et al., 2016; Leiter et al., *2010), leadership* (Madrid et al., *2016*; Harmoinen et al., 2014), wages and the work environment (Joy & Haynes, 2011; Leschinsky & Michael, 2004), or employee engagement within organizations (Orlowski et al., 2017; Singh & Gupta, 2015) to name a few, many aspects of which are highly connected to the study of entrepreneurship.

In this way, this approach makes more sense when, for example, one assesses the important role played by the *baby-boomer generation* – i.e., *the generation* of the population explosion – in history with its presence in the Vietnam War or the Hippy movement, a role that has come to be far surpassed by the digital generation (Tapscott, 2009). The latter is leading a cultural change in all spheres of life, as Tapscott states in his book, "[...] *With their reflexes tuned to speed and freedom, these empowered young people are beginning to transform every institution of modern life. From the workplace to the marketplace, from politics to education to the basic unit of any society, the family, they are replacing a culture of control with a culture of enablement*" (2009:23).

In this thesis we are especially interested in the promotion of entrepreneurship of the youngest for its ability to generate new companies and, therefore, new jobs that contribute to reducing the gap in the intergenerational transfer of the generations that coexist today. This means delving into the marked entrepreneurial profile attributed to Generation Z compared to previous generations – *i.e.*, baby boomers, *generation* X *and* Y – (Mahmood et al., 2020*).* However, to analyse individuals from a generation approach, it is not enough to take into account their date of birth, but it is necessary to take into account other factors.

The concept of generation and the drawbacks of its worldwide approval

The notion of "generation" has been approached from different areas of study, such as sociology, anthropology or the humanities. For all of them, age and certain historical events determine the birth of a new generation, this conjunction of factors being common to the three areas of the study indicated above. For sociologists, having a shared vision of the environment, a similar education and similar interests contribute not only to individuals grouping to constitute a new generation but also to observing the same way of resolving conflicts. However, most contemporary sociologists point out that there is a global generation affected by universal factors where age plays an important role, with the youngest considered the thermometer of new trends (Attias-Donfut, 2016; Guisado & Agoiz, 2013; Leccardi & Feixa, 2011; Kertzer, 1983). For their part, anthropologists maintain that society is constantly changing. These social changes provoke the confrontation between groups of parents and children giving rise to the beginning of a new generation with its values (Leccardi & Feixa, 2011). Equally important to configure the concept of generation is the contribution that humanists make, understanding that each generation is the result of its destiny forced by circumstances (Caballero & Baigorri, 2019) that act as triggers (Toffler & Toffler, 1996: 85) of social changes.

Although we find in all these disciplines those factors in common, the truth is that today there has been no consensus on the concept of "generation". This lack of consensus probably has a lot to do with the incessant changes to which society is subjected (Caballero & Baigorri, 2019), which leads to constantly reviewing its concept. However, the age of the individuals and the cohorts that this generates, the historical events and the social and economic context seem key factors for its conception. In this regard, each generation seems to be shaped around its year of birth, and the historical events that took place during the years in which it became aware of the world and shared values. On average, a generational cycle arises approximately every twenty years (Guisado & Agoiz, 2013) coinciding with the moment in which the youngest are reacting against the established norms. However, the generational cycle can be affected by different circumstances as we have mentioned before. In Spain, for example, the so-called *Francoist generation* was born under the protection of the political context (Caballero & Baigorri, 2019; Guisado & Agoiz, 2013), delaying the *baby-boomer* generation in our

country *and, consequently, the rest of the generations concerning the generational patterns of the United States and other European countries, for example.*

Thus, at the beginning of the twentieth century, under the influence of the events of the time -*i.e.*, the interwar period- emerges, in the countries struck down by war, the so-called *silent generation* (1900-1944) whose main characteristic was to adapt to changes (Caballero & Baigorri, 2019). It is in the mid-twentieth century, at the end of the Second World War, that a generation appears until today of dominant influence, known as the *baby-boomer* generation (1945-1964). Later, in an environment of political and economic crisis, a generation of children, *the latchkey kids* – known in Spain as "niños de la llave" – grew up alone because their parents, the *baby boomers*, turned out to be workaholics (Sharagay & Tziner, 2011). These are known as Generation *X* (1965-1981) which currently make up the workforce worldwide. In full technological development, at the beginning of the 80s, the *Millennials* or Generation *Y* (1982-1993) emerged, a generation protected by their parents, boosted in skills, and encouraged to pursue higher education many times against their will. According to a report by *the Pew Research Center* (Fry, 2020), this generation will play a key role in the labour market in the United States as it already exceeds the number of births to the *baby-boomers*. *Generation Z* (1994-2014?) or *digital natives*, as it is also known, is made up of individuals born in the mid-90s in full development and subsequent rise of digital technology. These circumstances confer on those born under the characteristics of the above influence that distinguish them from their predecessors. In the case of Generation *Z,* it has been stated that this generation shows the most EB of all (Nguyen et al., 2021), due to its capacity for initiative and transgressive behaviour, among other characteristics. In any case, the debate on the conclusion or not of this generation is still open, because for some we are in the prolegomena of the so-called *Alpha generation* (Hamdi et al., 2022). Table 1 summarizes the different generations classified according to the American pattern and the Spanish pattern, as well as the sources that catalogue each of them.

Table 1. Generational cohorts in the United States and Spain

Generations	Reference years for the USA and Spain generations	Resources [4,5]
Silent generation	USA: 1900-1944	DiLullo et al., (2011), Hamdi et al., (2022), Howe & Strauss (2007), Oblinger et al., 2005), Parker et al., (2019)
	Spain: 1914-1928	Caballero & Baigorri (2019), Guisado & Agoiz (2013)
Baby-boomer generation	USA: 1945-1964	Caballero & Baigorri (2019), DiLullo et al., (2011), Hamdi et al., (2022), Howe & Strauss (2007), Oblinger et al., (2005), Parker et al., (2019),
	Spain: 1955-1974	Caballero & Baigorri (2019), Guisado & Agoiz (2013),
Generation *X* (*latchkey kids*)	USA: 1965-1981	Caballero & Baigorri (2019), Dias et al., (2015), DiLullo et al., (2011), Hamdi et al., (2022), Howe & Strauss (2007), Oblinger et al., (2005), Parker et al., (2019), Tapscott (2009)
	Spain: 1975-1993	Caballero & Baigorri (2019), Guisado & Agoiz (2013),
Generation *Y*	USA: 1982-1993	Caballero & Baigorri (2019), Dias et al., (2015), DiLullo et al., (2011), Hamdi et al., (2022), Howe & Strauss (2007), Oblinger et al., (2005), Parker et al., (2019), Tapscott (2009),
	Spain: 1994-2002	Caballero & Baigorri (2019), Guisado & Agoiz (2013),
Generation *Z*	USA: 1994- ¿2014?	Dias et al., (2015), Frunzaru et al., (2021), Hamdi et al., (2022), Howe & Strauss (2007), Nguyen et al., (2021), Oblinger et al., (2005), Parker et al., (2019), Tapscott (2009),
	Spain: 2003- ¿?	Caballero & Baigorri (2019), Guisado & Agoiz (2013),

While this is the general scheme of the dominant generations in the last century and a half, these can be seen more clearly in countries such as the United States, the United Kingdom or the Nordic countries. This is not the case in countries that suffered a severe post-war period, such as Germany, Russia or Spain, either by the reconstruction process after the Second World War or by the dominant political regimes, the generations were formed under other patterns that modify in some sense the characteristics of each cohort and those of their descendants (Caballero et al., 2019; Guisado & Agoiz, 2013), thus hindering the global homologation of the different generations. This issue is also notorious if one considers the future of countries such as China, which develops politically, economically, and socially in a centralized manner, to cite just a few examples

[4] The authors referenced for the USA context differ between them in a couple of years in dating the beginning and end of each generation.

[5] The authors referenced for the context in Spain adapt the work of Howe & Strauss (2007) to include the Francoist generation.

that illustrate the difficulty of establishing a common generational pattern at the international level. However, after the process of globalization and, precisely, due to the growing digitalization of the economy, everything seems to converge towards an increasing homologation (Ghemawat, 2007) of the generations, which only time will tell if it is sustained and consolidated.

The general purpose of the research

With this frame of reference, the main objective of our research is to reveal the importance of the generational approach in the study of entrepreneurship, for which we set out to verify the EB of the new generation that has emerged under the protection of the digital revolution, *-i.e., the digital natives* or generation *Z* -, compared to previous generations. Thus, the latest attempts to categorize the generations according to the elements mentioned above, place those born in 1994 as the year in which the generation of digital natives would begin. Prensky (2001) states that this generation comes into contact with technology from birth. The individuals catalogued in it master digital *"language"* as never before observed, and this domain helps them understand their environment (Dias et al., 2015; Prensky, 2001) is evident in the close and perfect handling of computers, video games or the internet (Prensky, 2002). The ability to simultaneously perform a variety of tasks allows them to use mobile devices while playing a video game or listening to music (Bennett et al., 2008). However, the abuse of multitasking can affect their learning curve with the consequent loss of skills, which can constitute a barrier to transversal learning (DiLullo et al., 2011). Perhaps, the most representative of these young digital natives is their constant connection, which provides them with a socio-political vision different from that of their predecessors, the *Millennial*. In this sense, they not only accept the diversity of races but also, by incorporating new belief structures, their concept of family and gender changes substantially. While it is true that this young generation is in full conception (Parker et al., 2019), it is already known that the environment perceives it with optimism and positivity. Their culture is influenced by technology (Bennett et al., 2008; Oblinger et al., 2005). Another particularity highlight of digital natives is the creation of new material to which they print their stamp in the form of images, videos or audio (Bennett & Maton, 2010) all based on random information, and not always structured. Social media, on the other hand, is viewed positively because

it provides them with information (Parker et al., 2019) that contrasts with the opinion that other generations have of the same issues. In general, Z's are distinguished from their predecessors by being a multiracial and multiethnic generation, fascinated by technology, results-oriented, and accessible to a wide range of extracurricular activities (Oblinger et al., 2005). These young *digital natives* are rebellious and autonomous, having developed a strong belief in themselves. This marked independent profile, sometimes, makes them lousy listeners lending little or no interest in their close circle to appreciate more strongly if possible, their peers who communicate on social networks. Their social circle, strongly linked to the Internet and these social networks, allows them to freely express their own opinions (Dias et al., 2015). In this sense, we could be facing a generation that presents a somewhat "shameless" profile. If we add to this that the recent pandemic, which emerged as a result of the global expansion of the Coronavirus, reinforced both for them and for their ancestors a greater digital connection, its character far from being contained has been reinforced.

But what do we know about their entrepreneurial initiative? Is this generation in a position to narrow the intergenerational gap and provide more employment by its initiative, which is currently demanded by a business structure forged by previous generations? The issue is undoubtedly exciting, but complex to appraise, and for its studies, it is necessary to do previous work that allows us to articulate a reliable and objective theoretical framework that supports serious empirical research and transcendent results (Newert et al, 2022), an aspect that we try to address in the first chapters of this thesis.

Thus, the general purpose of the research is to carry out the study that allows us to recognize if there is a characteristic and differentiated entrepreneurial "mentality" between generations, and to know especially if this is substantially different in generation *Z*. If, as has been claimed, we are facing the most entrepreneurial generation of all known, our research objective is to analyze both their EB and their cognition, to understand what distinguishes them from the previous generational cohorts. For this, it is vital to understand how their attitudes -patterns of beliefs fed by perceptions of the environment (Hamdi et al., 2021)-, are shaping their behaviour that finally turns to their environment in the form of actions that inspire their peers, thus forming a kind of inter- and intra-generational entrepreneurial ecosystem. If research allowed us to explain, in addition to explaining, predicting the EB of this generation, the purpose of the research would be

complete. However, this aim is ambitious and not without difficulties. Below, we present the main barrier to completing this proposal.

Factors Facilitating and Limiting the research development

The systematic collection of data on the set of factors that influence entrepreneurship has been consolidated with projects on a global scale such as the Global *Entrepreneurship Monitor* (GEM) for the general population, or the *Global University Entrepreneurial Spirit Student's Survey* (GUESSS) for the specific case of the university population. These projects provide us, methodologically speaking, with an ideal framework for the proposed study, which would also be difficult to undertake if these conditions were not met. In our case, due to the nature of the study to be carried out, GEM is the project that provides us with relevant information for the study.

This project, in particular, has been concerned since 1999[6] with monitoring the entrepreneurial phenomenon in the world. Being initially designed to carry out this monitoring at the country level, since 2003 it has adapted its methodology to propose the analysis of the entrepreneurial phenomenon also at the regional level, hence the wealth of information it provides through the two annual surveys it carries out: one through the Adult Population Survey, called by its acronym in English APS (*Adult Population Survey),* and another through interviews with experts of the entrepreneurial ecosystem of each country and region, known as NES (*National Expert Survey*). In this way, this information is accumulated in profuse databases built over more than two decades of monitoring the phenomenon. However, despite this wealth of information, the databases collected by GEM present three problems that require attention so that the information accumulated during these years allows us a valid generational approach for the proposed study. Namely:

1. GEM takes panel data, which means collecting the same information each year from different individuals. This gives a transversal character to the study, from the point of view of the individuals who participate in it; However, from the point of view of the country, the region, or even the variables collected from individuals, its character is longitudinal.

[6] The project began its journey in 1997, opening to its internationalization in 1999 (Reynolds et al., 2000), becoming since that year a stable research project that has only grown in participation of countries, academics linked to the project and samples. http://www.esbri.se/pdf/gem-rapport.pdf

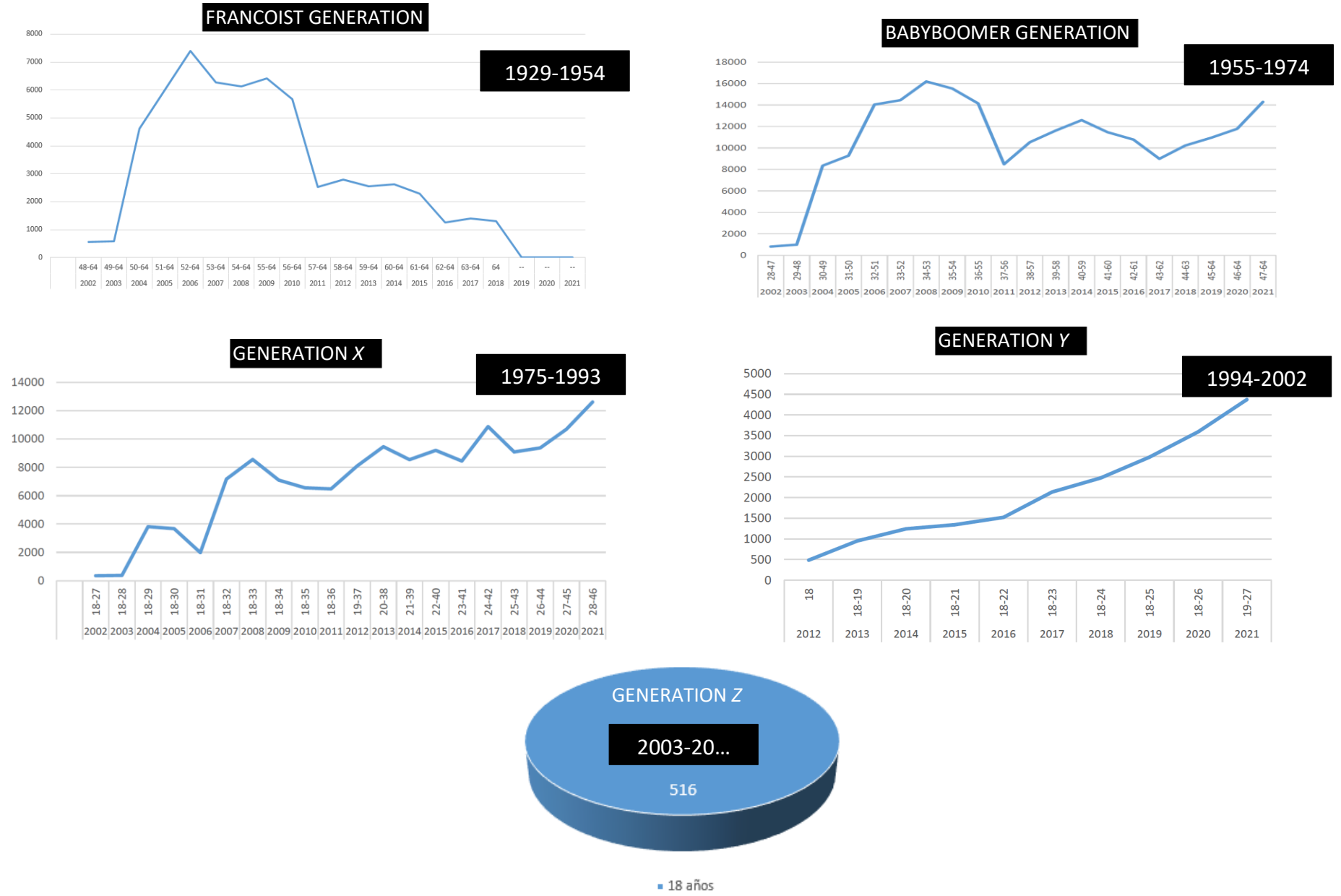
2. The countries and regions participating in the GEM study are not stable from year to year, which means that the institutional frameworks referred to the country or region remain in continuous change over the years.
3. In addition to the factors mentioned above, it is necessary not to lose sight of the fact that for a generational approach, the unit of analysis is the generation, and this entails a serious problem that only time can solve. Thus, the more years that follow, the more generational cohorts we can analyze with the help of a database such as the one GEM provides. However, of the generation that particularly interests us, we will only be able to have a significant set of data from the year 2023.

Regarding this last aspect, the richness of GEM is undeniable. Thus, the GEM project, if we consider it at a global level, has so far collected data from five generations that coexist between the last years of the twentieth century and the first years of the twenty-first century. It should be noted that GEM data accumulate information on individuals aged between 18 and 64 years, both inclusive, which allows us to explore the behaviours of different generations through the individuals who compose them and who participate in the surveys collected annually. Appendix 1 presents a comparison of the data collected for each generational cohort between 2002 and 2021, both at the level of the United States – considering the standard generations that have dominated the Anglo-Saxon world – and in Spain.

However, we are interested in explaining, but also predicting, the EB of young people of Generation *Z*, in addition to comparing it with previous generations, and for all this it is necessary to have data. In this sense, the first *digital natives* reached their majority around 2012, with 29 years of age in 2023 if we follow the pattern established by the United States. However, in Spain, when an intermediate generation between the *silent* and the *baby boomer* burst in, in the period 1929-1954 (Guisado & Agoiz, 2013), it happens that the first *digital natives* reach their majority around the year 2020. Although many are still in school, we find more and more young people of this generation who are integrating into the labour market.

Appendix 2 includes an estimate of the samples that can be collected in Spain in each generational cohort. Figure 1 summarizes the calculation of each annual GEM Spain sample and allows us to observe that in 2021 we only have just over 500 cases of the generation that attracts our interest. And we refer exclusively to Spain for the wealth of

Figure 1. Samples by generations collected by GEM Spain (2002-2021)



information it treasures in its databases, an issue that in other countries does not occur when considering only the standard sample of 2,000 individuals surveyed annually to maintain a sampling error at the country level of 2.19% (I.C. = 95%).

In this way, we observe that five generations are represented in the GEM data. Bearing in mind that our objective is to explain the EB of Generation Z compared to previous generations, and predict their behaviour for the coming years, in the present year 2023 we believe that we will obtain a more representative accumulated sample of the generation that concerns us, year from which we can undertake the intended study.

Objectives and doctoral thesis structure

Despite our initial interest, the above limitations have led us to focus the thesis work on developing a preparatory framework to be able to execute the previous research with guarantees. In this way, we will be able to contrast the hypotheses related to the EB of Generation *Z* against the previous generational cohorts and know the factors that explain both their entrepreneurial intention (EI) and their behaviour in this occupation.

To this end, the work presented below has the general objective of exposing the theoretical and empirical framework of analysis that facilitates the study of entrepreneurship with a generational approach. To this end, two sub-objectives are proposed: (i) to carry out an analysis of the knowledge accumulated in the study of EI in the academic literature from its origins and, in addition, (ii) to define the most appropriate methodology to analyse EI and behaviour considering generational cohorts.

Both sub-objectives have given body to the preparatory framework presented in this doctoral thesis, allowing to develop so far three independent research works, articulated through three publications annexed in this thesis. Together with the studies that we are currently developing, they will help us to constitute the line of research described above.

To present the completed works, this thesis is articulated around five chapters that continue this introductory chapter. In each of them, the objectives of the studies carried out are presented, which we will summarize below:

- Chapter 2 includes A *Holistic Literature Review on Entrepreneurial Intention: A Scientometric Approach*. Considering the exponential increase

in published works, this literature review covers, from a holistic view, 50 years of research in EI. The purpose that guiding it is to know the scientific substrate and morphology of the topic through a scientometric approach that will enable us to know and evaluate the evolution and current state of the topic structure while proposing possible itineraries for future research.

- Chapter 3 adds value to the previous one with the presentation of the work *A Scientometric Analysis On Entrepreneurial Intention Literature: Delving Deeper Into Local Citation* which was designed to summarize the main reviews of the literature – i.e. systematic and bibliometric – on IE. In addition, it was developed to obtain more detailed information on the scientific foundations of the area, the works, journals, and authors that have contributed most to this research topic, emerging interests and gaps in the literature. The achievement of this second objective was made possible under the discrimination of two indicators arising from the direct citation of the articles: Local Citation (CL) and the Global Citation (GC) exploiting indicators such as the LCR -Local Citation Rate- that had not been previously analysed by the review works in this field of study.
- Chapter 4 includes the work *Exploring The Socio-Cognitive Theory Of Entrepreneurship Using a Bayesian Learning Approach* which aims to understand how the mind, behaviour and environment interact within the entrepreneurial context by helping to explain EB at both the individual and collective levels. This work puts focus on the predictive power of individuals' sociocognitive attitudes to explain and predict behaviour beyond the initial phases of the entrepreneurial process.

The methodology followed in the studies carried out has been diverse and adjusted to the purposes of each investigation, combining both quantitative and qualitative analysis methods. However, for the extraction of results, all the processes have been assisted by different computer packages that have also facilitated their interpretation. Thus, and concerning the first two works, high-powered bibliometric techniques have been applied as a result of the artificial intelligence improvements in the application of these techniques.

Chapter 2, profusely details the methodology applied to the study, which was sustained by a combination of scientometric analysis procedures with the help of VOSviewer -*v.1.6.17* (van Eck & Waltman, 2010) and Bibliometrix (v.Rx64.4.1) integrated into RStudio (v.Rx64.4.1) (Aria and Cuccurullo, 2017). The first package was used to perform the cocitation analysis and the second was to develop the strategic maps by bibliographic coupling to analyse three successive periods of the EI literature development.

The scientometric work of Chapter 3 also uses actively Bibliometrix (v.Rx64.4.1) to analyse the publication impact level through the direct citations, differencing, as we anticipate previously, local from global citations- and, for the calculation of impact indicators -*i.e*., h-index of the authors-, we used Bibexcel (v.2016.02.20) (Persson et al., 2009).

In Chapter 4, for the choice of the variables that are part of the analyses, the SPSS PC (version 26) and the Matlab program (version RD2019b) are used for the experiments developed to determine the predictive capacity of the sociocognitive variables on the entrepreneurial stages; and to generate Bayesian classification models.

Main results of the research

Based on the different studies carried out in this doctoral thesis, we reach the following conclusions which are summarised as follows:

- *A Holistic Literature Review on Entrepreneurial Intention: A Scientometric Approach*, Chapter 2, complements other literature reviews on EI by conducting a scientometric analysis of nearly five decades of research (1970-2021) divided into three stages of development: the discovery, takeoff, and growth phases. The nearly 2,000 papers analyzed reveal how research on this topic has been linked to career choice, education, social psychology and entrepreneurship. The analysis of bibliographic pairing forms related groups based on the references cited in the works, reveals key clues that make visible the shared lines of research. Once grouped, they are strategically mapped according to their impact -number of citations- and their centrality -strength of association with other groups-, which positions

them within the topic. Thus, the strategic maps are located around motor, transversal, isolated and emerging or declining themes that make up the morphology of the topic. The latter, emerging or declining, is leaving a trail that lets us intuit where the research is pointing. The observation of the maps as a whole presents a holistic view of the evolution of the topic that provides interesting results. In the first stage, which brings together the articles published between 1970-2000, it is observed that the interest in EI was testimonial with a dispersed conceptual structure and tailor-made research, linked to the choice of career, particularly of the students. In the second stage, the take-off stage (2001-2010), the progress of the topic is consolidated through the development of psychometric scales that allow assessing EI based on the intention models developed so far -e.g. TPB-. The individual, in the third stage (2011-2021), occupies a leading role in the creation of companies and, therefore, it is vital to know how he moves from EI to EB. Although it is true, to capture the phenomenon longitudinal studies are needed that are costly in time and money. However, the evidence found is overwhelming and it is crucial to continue moving in this direction. Therefore, in the era of *big data*, we propose the use of methodologies based on artificial intelligence as a valid option for the analysis of the gap between EI and behaviour.

- Chapter 3, *A Scientometric Analysis On Entrepreneurial Intention Literature: Delving Deeper Into Local Citation*, uncovers the intellectual basis of EI research and the role it plays in other areas of research. A synopsis of literature reviews is previously presented, revealing the main findings obtained by those reviews, which used direct citation as a measurement variable. However, analysing direct citations from two different prisms -Local Citation and Global Citation- allows us to obtain previously overlooked results, manifesting the current *status quo* and the true progress of this field of research. Local Citation together with scientometric tools makes it possible to make visible the journals, papers and key authors of research at IE while discovering four thematic poles of research in this topic: the study of models on EI, their antecedents and relationships; self-efficacy as an antecedent of EI; social EI and the effect of education on EI. In this last pole, we have two different aspects: (i) the

one that is interested in the contextual factors that influence EI, such as institutional, cultural, regional or economic, among others; and (ii) those other factors related to the characteristics of individuals and their context. Thus, global citations give prominence to topics such as entrepreneurial education and self-efficacy, relegating the pole that deals with studying EI models, their antecedents and relationships to a peripheral position that, however, is revealed as a driving theme for the topic when studying local appointments. It is then corroborated that this pole that deals with studying the TPB with its implications for EI and behaviour falls short when it comes to explaining how the start-up of a company materializes. Both maps place in the quadrant of motor themes those investigations focused on self-efficacy and the effects of education in EI that studies personal factors. The detailed analysis of the research front leads us to the conclusion that direct citation is not a mere statistical indicator that informs us of the impact of a publication but is conveniently used, revealing the importance that these works have inside and outside the topic. In addition, the identification of thematic poles, whether motor, transversal, emerging or declining, helps to show a realistic structure of the field and thus glimpse present and future lines of research. The role of the TPB model within the topic plays a driving role for it when EI is analyzed, however, this same model has a testimonial presence outside of it. We wonder if the time has come to explore models or theoretical frameworks other than TPB to analyze the mental structure of potential entrepreneurs, their behaviours and how these are transformed into real actions.

- Chapter 4, *Exploring The Socio-Cognitive Theory Of Entrepreneurship Using a Bayesian Learning Approach*, applies Bandura's Sociocognitive Learning Theory (1986, 1999) as an ideal framework to approach this work. We analyze in an aggregate way the sociocognitive attitudes that help us understand the highly complex EB. This EB is part of a structure that is built from the perceptions that the individual receives from the environment and interprets to adapt their behaviour, activate it and revert it to the environment. Experiments based on Bayesian classification are carried out with artificial intelligence tools, in particular, supervised and informed machine learning. The findings, the result of longitudinal analysis of GEM

data on a total of 300,000 individuals over 14 years, detect 16 patterns of attitudinal behaviour for the same EB. The results allow us to explain and predict how individuals behave, whether or not they are involved in the entrepreneurial process. The four sociocognitive attitudes chosen for the experiments are fear of failure, recognition of opportunities, self-efficacy and social capital which also include five states of entrepreneurship: those without EI, EI, newly created companies, consolidated companies and closures or transfers. The results are presented in a map of Diversity and Relevance both individually and collectively where we can observe its evolution and the turbulence of the environment -eg crisis of 2008-. Synthetically, we show the sociocognitive patterns that best explain the entrepreneurial process: individuals who are afraid of failure and believe they have self-efficacy, do not recognize opportunities or have social capital; Individuals who have the previous two, do not recognize opportunities, but they do say they have social capital and the one who claims to have self-efficacy, social capital, recognizes opportunities and is not afraid of failure. Models and theories related to the study of IE and behaviour do not consider attitudes to be part of the phenomenon and, therefore, do not capture its true nature. In this sense, the Sociocognitive Theory of Entrepreneurship is developed to shape a theoretical framework more in line with the reality of the entrepreneurial phenomenon explaining how the entrepreneurial mentality interacts at an individual and collective level. We are more aligned, if possible, with the line of research that gave rise to this thesis. We are still interested in predicting behaviours and understanding, now, the entrepreneurial mental structure of Generation *Z* and those to come. All this, without a doubt, will have an impact on the design of entrepreneurship education programs and recovery strategies in the face of economic crises. On the other hand, we already know that the entrepreneurial mental structure is exposed to constant changes due to its interaction with the environment, perceptions and behaviours of our own and others, this provides us with the opportunity to influence it by promoting the necessary changes that help the creation and maintenance of companies.

Appendix 1. Age ranges included in each annual GEM cohort following the U.S. and Spanish generational patter (22 years)

Year	UNITED STATES					SPAIN				
	Silent Generation **(1900-1944)**	***Baby-boomer Generation*** **(1945-1964)**	***Generation X*** **(1965-1981)**	***Generation Y*** **(1982-1993)**	***Generation Z*** **(1994-…)**	***Francoist Generation*** **(1929-1954)**	***Baby-boomer Generation*** **(1955-1974)**	***Generation X*** **(1975-1993)**	***Generation Y*** **(1994-2002)**	***Generation Z*** **(2003-20...)**
2002	**58-64**	**38-57**	**21-37**	**18-20**	--	**48-64**	**28-47**	**18-27**	--	--
2003	**59-64**	**39-58**	**38-22**	**18-21**	--	**49-64**	**29-48**	**18-28**	--	--
2004	**60-64**	**40-59**	**39-23**	**18-22**	--	**50-64**	**30-49**	**18-29**	--	--
2005	**61-64**	**41-60**	**24-40**	**18-23**	--	**51-64**	**31-50**	**18-30**	--	--
2006	**62-64**	**42-61**	**25-41**	**18-24**	--	**52-64**	**32-51**	**18-31**	--	--
2007	**63-64**	**43-62**	**26-42**	**18-25**	--	**53-64**	**33-52**	**18-32**	--	--
2008	**64**	**44-63**	**27-43**	**18-26**	--	**54-64**	**34-53**	**18-33**	--	--
2009	--	**45-64**	**28-44**	**18-27**	--	**55-64**	**35-54**	**18-34**	--	--
2010	--	**46-64**	**29-45**	**18-28**	--	**56-64**	**36-55**	**18-35**	--	--
2011	--	**47-65**	**30-46**	**18-29**	--	**57-64**	**37-56**	**18-36**	--	--
2012	--	**48-66**	**31-47**	**19-30**	**18**	**58-64**	**38-57**	**19-37**	**18**	--
2013	--	**49-67**	**32-48**	**20-31**	**18-19**	**59-64**	**39-58**	**20-38**	**18-19**	--
2014	--	**50-68**	**33-49**	**21-32**	**18-20**	**60-64**	**40-59**	**21-39**	**18-20**	--
2015	--	**51-69**	**34-50**	**22-33**	**18-21**	**61-64**	**41-60**	**22-40**	**18-21**	--
2016	--	**52-70**	**35-51**	**23-34**	**18-22**	**62-64**	**42-61**	**23-41**	**18-22**	--
2017	--	**53-71**	**36-52**	**24-35**	**18-23**	**63-64**	**43-62**	**24-42**	**18-23**	--
2018	--	**54-72**	**37-53**	**25-36**	**18-24**	**64**	**44-63**	**25-43**	**18-24**	--
2019	--	**55-73**	**38-54**	**26-37**	**18-25**	--	**45-64**	**26-44**	**18-25**	--
2020	--	**56-74**	**39-55**	**27-38**	**18-26**	--	**46-64**	**27-45**	**18-26**	--
2021	--	**57-75**	**40-56**	**28-39**	**18-27**	--	**47-64**	**28-46**	**19-27**	**18**
2022	--	**58-76**	**41-57**	**29-40**	**18-28**	--	**48-64**	**29-47**	**20-28**	**18-19**
2023	--	**59-77**	**42-58**	**30-41**	**18-29**	--	**49-64**	**30-48**	**21-29**	**18-20**

Appendix 2. GEM samples by Generation Spain (20 years)

Year	*Francoist Generation* (1929-1954)	GEM Sample	*Baby-boomer Generation* (1955-1974)	GEM Sample	*Generation X* (1975-1993)	GEM Sample	*Generation Y* (1994-2002)	GEM Sample	*Generation Z* (2003-20...)	GEM Sample
2002	**48-64**	556	**28-47**	811	**18-27**	349	--	--	--	--
2003	**49-64**	591	**29-48**	992	**18-28**	378	--	--	--	--
2004	**50-64**	4.627	**30-49**	8.346	**18-29**	3.808	--	--	--	--
2005	**51-64**	5.996	**31-50**	9.286	**18-30**	3.671	--	--	--	--
2006	**52-64**	7.409	**32-51**	14.037	**18-31**	1.981	--	--	--	--
2007	**53-64**	6.267	**33-52**	14.444	**18-32**	7.169	--	--	--	--
2008	**54-64**	6.129	**34-53**	16.193	**18-33**	8.557	--	--	--	--
2009	**55-64**	6.403	**35-54**	15.539	**18-34**	7.100	--	--	--	--
2010	**56-64**	5.676	**36-55**	14.140	**18-35**	6560	--	--	--	--
2011	**57-64**	2.532	**37-56**	8.485	**18-36**	6483	--	--	--	--
2012	**58-64**	2.782	**38-57**	10.531	**19-37**	8100	**18**	487	--	--
2013	**59-64**	2.558	**39-58**	11.625	**20-38**	9464	**18-19**	953	--	--
2014	**60-64**	2.622	**40-59**	12.590	**21-39**	8544	**18-20**	1244	--	--
2015	**61-64**	2.285	**41-60**	11.473	**22-40**	9199	**18-21**	1343	--	--
2016	**62-64**	1.251	**42-61**	10.781	**23-41**	8449	**18-22**	1519	--	--
2017	**63-64**	1.399	**43-62**	8.986	**24-42**	10879	**18-23**	2136	--	--
2018	**64**	1.308	**44-63**	10.225	**25-43**	9090	**18-24**	2477	--	--
2019	--	--	**45-64**	10.948	**26-44**	9373	**18-25**	2979	--	--
2020	--	--	**46-64**	11.786	**27-45**	10696	**18-26**	3593	--	--
2021	--	--	**47-64**	14.281	**28-46**	12614	**19-27**	4374	**18**	516
TOTAL		60.391		215.499		142.464		21.105		516

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CAPÍTULO II

A Holistic Literature Review on Entrepreneurial Intention: A Scientometric Approach[*]

[*] This article is under review in a JCR Q1 ranked scientific journal. Submission date: March, 13rd 2023. Co-authors: Batista-Canino, R.M. & Medina-Brito, P.

Sinopsis y justificación del capítulo en el contexto de la línea de investigación sobre el enfoque generacional en el estudio del emprendimiento

Este capítulo trata de aproximarse al conocimiento acumulado en el estudio de la intención emprendedora en la literatura académica, abarcando desde los primeros trabajos publicados en este tópico de investigación hasta la fecha en que concluyó la búsqueda en las bases de datos científicas consultadas.

Dado el interés de la línea de investigación por comprender los factores que explican tanto la intención como el comportamiento emprendedor en las distintas cohortes generacionales, no parecía razonable acercarnos al objeto de estudio sin conocer primero el estado de la cuestión. Para ello se optó por llevar a cabo un análisis profundo tanto del sustrato científico que da fundamento a la investigación en IE a lo largo de algo más de 40 años de estudio sobre el tópico, como del frente de investigación a lo largo de esos mismos años. En ambos casos se han descubierto tanto las disciplinas implicadas en el estudio de la IE, como los temas de preocupación de los investigadores y cómo ambos han evolucionado en el tiempo.

Esta aproximación está siendo actualmente complementada con una revisión de la literatura escrita sobre la relación intención-comportamiento al objeto de completar la línea de investigación desde el punto de vista teórico. En tal sentido, y visto el interés predictivo de los análisis a realizar, este trabajo no podría culminarse sin antes conocer cómo la intención se convierte en comportamiento, un aspecto controvertido sobre el que aún no hay resultados concluyentes. En cualquier caso, y para el interés que aquí nos trae, este primer paso contribuirá a responder algunas preguntas tales como: ¿Es razonable esperar que el tránsito de la intención al comportamiento emprendedor pueda diferir entre unas generaciones y otras? ¿Están afectados los factores que explican este *gap* intención-comportamiento por diferencias de percepción y capacidades cognitivas según las distintas generaciones?

ABSTRACT

This paper reveals the scientific substrate underlying the literature on entrepreneurial intention (EI) tracking its diachronic evolution. It reviews the literature on EI from a holistic view over nearly 50 years (1970-2021), complementing previous reviews on this topic. We adopt a scientometric approach actively using bibliographic coupling, co-citation, and thematic strategic maps, which enables us to present the changing morphology of EI research over the years. Supported by *VOSviewer* and *Bibliometrix*, we analysed almost 2,000 documents, revealing how research on career choice, education, social psychology, and entrepreneurship have supported each other in developing this topic. The horizon for improving EI knowledge is still open. This paper invites researchers to add new issues to the research front and to break the ice of the intellectual base of this research field by bringing new research frameworks as well as ongoing improvements in psycho-social approaches to the individual.

Keywords: Entrepreneurial Intention, Literature Review, Scientometric, VOSviewer, *Bibliometrix.*

Introduction

The creation of new businesses remains one of the main ways to solve some of the growing problems generated by economic crises, unemployment, and lack of innovation (Ács et al., 2008; Valliere & Peterson 2009; Xu et al. 2021), hence the efforts being made by regional development agents –*i.e.*, governments and other institutions- to promote business development policies and improvements in entrepreneurship education. This context explains the growing interest of economics, business management, and human behaviour scholars in the study of Entrepreneurial Intention (hereafter EI).

The literature on EI is at the core of entrepreneurship research and has become one of the main topics of this research field (Chandra, 2018; García-Lillo et al., 2023). It has attracted the attention of numerous researchers from different research areas whose interests have focused on predicting new venture creation behaviour (Kautonen et al., 2013) while considering intention as the best individual predictor of the same (Krueger & Carsrud, 1993). Interest in this topic begins in the entrepreneurship field with the work of Bird (1988) -Liñán & Fayolle (2015)-, although its progress is strongly rooted in studies on the career choice of university students and human behaviour as we manifest in this research.

Scientists should be seen as entrepreneurs (Callon et al., 1993) whose resources and aims are both defined in interaction with other researchers, institutions, and key informants. This interaction in EI literature has been intense and prolific, leading to a significant volume of in-depth literature reviews and bibliometrics motivated by an interest in the progress of this research topic –see, for instance, Alferaih (2017); Al-Jarrasi et al. (2014); Batista-Canino et al. (2023); Dolhey (2019); Donaldson (2019); Ruíz-Alba et al. (2021); Liñán & Fayolle (2015); Neves & Brito (2020); Pérez-Macías et al. (2021); Schlaegel & Koenig (2014), Silva Martins et al. (2018), Tan et al. (2020)-. The published work of Donaldson (2019) is remarkable due to his manifest desire to resurrect an area of study for which other authors, ironically, suggested digging a grave (Krueger, 2009). The approaches and methodologies of these reviews have been varied and some of them have been conducted at the intersection with other topics of interest -*e.g.*, self-efficacy (Santos & Liguori, 2019); entrepreneurs' personal values (Hueso et al., 2021); women's EI (Patra & Lenka, 2021).

If we look at the standalone reviews of EI and their development as a singular topic, both methodologically and chronologically, we can detect some gaps still unsolved by

the bibliometric analyses and literature reviews that have been carried out. Moreover, their focus is limited to a short period and does not attempt sequential and co-citation evolving analyses. Particularly important is the scant attention paid to the intellectual structure supporting the topic under analysis and its evolution over the years. This article addresses these shortcomings by analysing, in a holistic view, the research topic over time, connecting the foundational structure of this body of literature, using co-citation analyses (CCA), and the progress made in this domain helped by bibliographic coupling (BC) analyses and thematic strategic mapping (TSM).

Extant literature reviews on EI show us less fragmentation and dispersion in the progress of this research than that we find in other topics of interest in the field of entrepreneurship –see for instance, entrepreneurial well-being (Contreras-Barraza et al., 2021), identity in entrepreneurship (Mmbaga et al., 2020) or entrepreneurial education (Loi et al., 2016), among others-. The strong concentration of the EI corpus of papers on a few approaches and theories has created a compact body of literature from which it seems difficult to escape. It would seem we have reached a point of no return and one from which it may be impossible to advance on an issue that is critical to the field of entrepreneurship. This perception invites us to take another look at the progress of this topic using a scientometric approach to reveal the intellectual structure of the field and to visualise its diachronic evolution over nearly 50 years in which this literature has been developed. Because of our interest in building a comprehensive understanding of the dynamics of this research topic, this paper applies, in a convergent way, quantitative and qualitative analyses of the literature (Callon et al., 1986) useful for updating entrepreneurship scholars, trainers, and policymakers. Thus, the scientometric approach makes us not only apply bibliometric analyses to the body of literature but also go deeper into the most important papers in the field, to track knowledge and uncover future research paths (Callon et al., 1993). This approach aims to find previously unexplored opportunities for improvement in the study of EI. To advance this work of synthesis and reflection, a systematic literature review has been carried out, uncovering almost 2,000 documents published in scientifically indexed journals on the topic retrieved from the *Scopus* database. Bibliometric analyses and other visualisation resources were applied throughout the stages studied. These analyses have been developed with the help of *VOSviewer* software (Van Eck & Waltman, 2010) to extract CCA, as well as the *Bibliometrix* tool to construct TSM based on BC (Aria & Cuccurullo, 2017).

After more than four decades of research on EI, this seems to be a good moment to carry out a retrospective evaluation applying recent advances in scientometric software packages. To identify the lines of thought underlying the development of the literature in this field, and consider a collective logic approach (Loi et al., 2016; Teixeira, 2011), we try to discover the invisible "guilds" that have made this field of study grow. Thus, three main objectives are pursued in this paper: (1) to unveil the evolution of the research on EI from the seventies –the decade in which we found the first paper on EI- to 2021 using BC (Kessler, 1963) to distinguishing the ongoing scholarly discussions at each stage, (2) to develop TSM to discover the morphology of this research field and its evolution over time (Callon et al., 1993), and (3) to highlight the collective logic and scientific knowledge foundation in this area using CCA (Small, 1973). In doing so, we will connect the research front (conceptual structure) and its intellectual structure into a simple scheme that explains the progress of the research topic. The latter objective highlights the limited scientific substrate that supports the progress of EI research. Therefore, there is still a horizon of opportunities that provides scope for broadening this scientific structure. To provide a framework for our purposes, we divide the long period into three broad stages, namely the discovery phase (1970-2000), the take-off phase (2001-2010), and the growth phase (2011-2021). The life cycle of the EI issue has still not entered a "plateau" phase, as the signs show that we have not yet exhausted research on this topic.

To this end, the paper is divided into five sections preceded by this introduction. In section two, we present the methodology on which this research is built, which will lead us to the results that are subsequently discussed in section three. We conclude and remark on the limitations of this study not without first presenting in section four the paths open to researchers interested in progressing in this research area in the near future.

Overview of the review process and research methodology

Research Methodology

To achieve our aim, we go beyond a systematic analysis of the literature (Gaur & Kumar, 2018; Kraus et al., 2020; Transfield, 2003) adopting a scientometric approach (Li et al. 2021). We are concerned with the exploration and evaluation of scientific research (Mingers & Leydesdorff, 2015), showing bibliometric macro-level indicators (Braun et al., 1995), and examining the production of knowledge, its spatiality and the relationship between the network of global actors of thematic co-authorship (Contreras-Barraza et al., 2021). These analyses imply a combination of different techniques that lead us to uncover

the intellectual and conceptual structure, facts as well as figures of a specific domain (Boyack & Klavans, 2014; Chandra, 2018; Dolhey, 2019; Patra & Lenka, 2021). Text mining and visualisation will help us to identify regular patterns of research and the structure of the field, with two different software tools aiding us in this purpose, that were chosen for their versatility: *VOSviewer* –v1.6.16, and *Bibliometrix R* package –v3.2.1. These software packages are useful for conducting scientometric analyses and plotting research maps, helping to reveal the structure and dynamics of a scientific area. Their results establish associations between different items, reveal the latent structure of the field, and help to explain the origin of the topic, its foundations, and its evolution over time (Boyack & Klavans, 2014). This introduces quantitative rigour into the subjective evaluation of literature (Zupic & Čater, 2015), and help us to share with the scientific community a clear and replicable review process (Kraus et al., 2020; Zupic & Čater, 2015).

VOSviewer provides multiple analyses based on the Visualisation Of Similarities[7] (Van Eck & Waltman, 2010), mapping the existing networks between documents by using the association strength as a normalisation parameter between the units of analysis, assigning each document a weight and a position within the group. Nodes are mapped in a way that those closest to each other have a stronger association and the contrary for more distant nodes. The node size will depend on the number of normalised citations received and is connected to others by lines, with the line thickness indicating the strength of association (Gálvez, 2018). Thus, if an article is frequently cited together with others, a connection exists between them -*i.e.*, co-citation-. This reveals the existence of a similar structure of concepts or shared thoughts (Reis et al., 2021). On the other hand, the *Bibliometrix R* package[8] (Aria & Cuccurullo, 2017) offers a tool that enables a time-based evolution mapping of the selected unit of analysis –*i.e.*, documents in our analyses and their author's keywords-. When making this analysis we assume that each field of study is characterised by its own list of keywords (De la Hoz-Correa et al., 2018). In this way, authors include similar words in their articles establishing a thematic relationship (Gálvez, 2018; Leung et al., 2017; Zupic & Čater, 2015) that builds a conceptual structure. This bibliometric package has recently introduced a scientific mapping tool that adds some improvements to the traditional centrality-density maps devised by Callon et al.

[7] For the introduction in *VOSviewer* see: https://www.vosviewer.com
[8] Analyse the procedures implemented by *Bibliometrix* in: *Biblioshiny: Bibliometrix for no coders* available in https://bibliometrix.org/biblioshiny/assets/player/KeynoteDHTMLPlayer.html#0

(1993) and well implemented by software tools such as *Scimat* (Cobo et al., 2011; Cobo et al., 2012). *Bibliometrix*'s strategic mapping generates a useful impact-centrality map that we will use in this article to show changes in the morphology of this field of study. This map is made by first applying the BC –*i.e.*, linking two documents coupled by their references-, and then, labelling each cluster, considering the co-occurrence of authors' keywords [9] between the previously linked documents. Since keywords analysis has significant limitations in characterising the clusters, allowing us to barely "scratch" the surface of true cluster characterisation, to complete the qualitative analysis, the authors conducted an in-depth study of the key papers revealed in the clustering process.

Data collection

To compile the published papers that were valid for the study, we follow other authors' recommendations –see, Zupic & Čater (2015); Loi et al. (2016); Kraus et al. (2020)-. Our research unit is the "document" when CCA and BC are the purposes. We chose the *Sci-verse Scopus* database which contains the world's largest number of peer-reviewed and other documents publications (Moya-Anegón et al., 2004; Reis et al., 2021) in the field of Social Sciences, and allows for more accurate bibliometric research (Zupic & Čater 2015). This database also provides comprehensive bibliographic information enabling a complete analysis (Teixeira, 2011). Replicating other scholars with a similar purpose (Donaldson, 2019; Liñán & Fayolle, 2015; Loi et al., 2016), in searching we used together Entrepr* Intent*. These terms must be in the title, abstract, and/or keywords. Rather than focusing on grey literature, this search focused on research articles, written in English from all subject areas and in all years, as these are considered certified knowledge (Callon et al., 1993), *i.e.*, the result of the pressure exerted by the international review processes.

Figure 1 summarised the steps followed in the systematic literature review using the PRISMA protocol (Preferred Reporting Items for Systematic Reviews and Met-Analysis) –Liberati et al. (2009)-. The initial search resulted in a total of 4,121 documents downloaded in March 2021, which were reduced to 2,871 papers due to our language and document type screening criteria. To validate the results, we read the abstracts and keywords, going back to the article to read it in-depth when meeting the criteria was unclear. A margin of error in the data validation and an associated bias to this analysis

[9] Although is not our research focus in this paper, for those interested readers can see in Appendix 1 the co-occurrence of author's keywords analysis in the different period analysed here, using *Scimat* bibliometric package to perform the words tree.

phase is feasible, however, the authors discussed the issues in depth to make a final decision, with one author acting as "devil's advocate". As a result of this first inspection, 942 articles were removed from the collection for a variety of reasons -*e.g.*, the central focus of the paper had very few links to the study of EI, EI was only tangentially addressed in the paper, the paper did not justify either the theoretical or empirical study of EI…-. In addition, given the possible endogenous effect of including literature reviews and meta-analyses in a literature review, 9 articles -reviews specifically focused on EI- were removed to consider only theoretical and/or empirical contributions to this area of research. However, it should be borne in mind that these review articles are pillars on which the development of the research topic has evolved. The final sample comprised 1,920 documents.

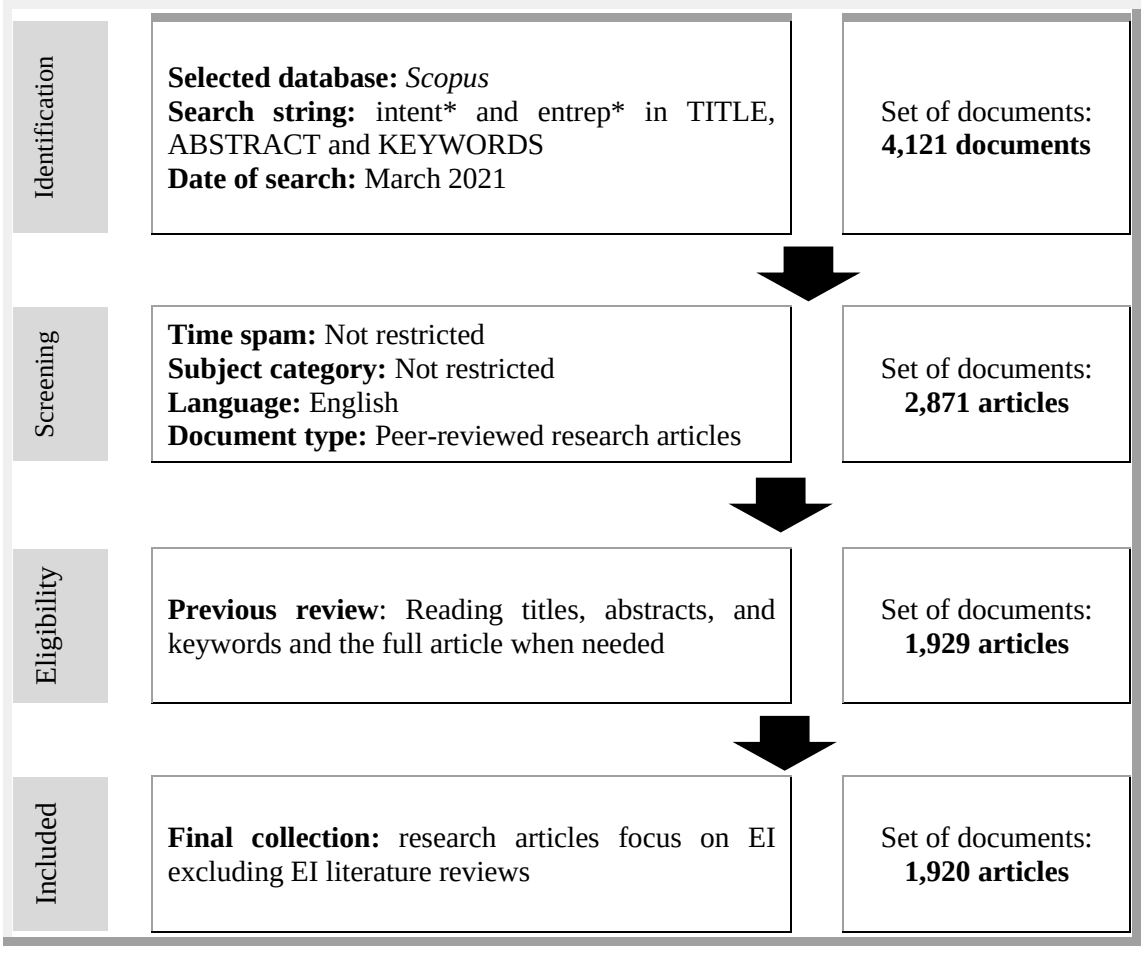
Analytical processes

For this study, we divided the long period of time into three stages, which we have named the discovery phase (1970-2000), the take-off phase (2001-2010), and the growth phase (2011-2021). This division into periods, coinciding mainly with the last two decades, is made for the sole purpose of tracking the evolution of the field and recording the changes it has undergone. It is therefore of no interest other than to allow the effects of one phase to be drawn on the following one. Hence, the first period includes 20 documents in which the work of Krueger et al. (2000) acts as a trigger for a new stage; the second comprises 118 documents with Fayolle & Liñán's (2014, 2015) review, although not included in our scientometric procedures, being the driving force behind this stage; and finally, the third period includes 1,782 documents published up to the end of March 2021.

To enable replicability, Table 1 shows the key figures and decisions made by the period in each analytic process performed. We use CCA thoroughly through *VOSviewer* and clustering by coupling using *Bibliometrix* to develop TSM. On the one hand, CCA is one of the best techniques for obtaining relational information on documents in trying to schematically represent the foundational image of a domain (Boyack & Klavans, 2014; Chandra, 2018; Gálvez, 2018; Lampe et al., 2020; Moya-Anegón et al., 2004). This analysis counts the frequency with which two documents are cited together in a third document (Small, 1973; Aria & Cuccurullo, 2017), and shows their relationship and the similarity of concepts shared by those documents (Chandra, 2018; Gálvez, 2018; García-Lillo et al., 2023). The focus of this analysis is the cited articles. In other words, when two documents are frequently cited together a link is created between these references,

which means that the same knowledge is shared by them (Gálvez, 2018). This procedure requires a previous treatment using a thesaurus tool to match duplicated references due to different origins. On the other hand, BC links two or more documents that share very similar bibliographies, with the citing documents being the focus of analysis (García Lillo et al., 2023). This occurs when a third party is cited by two different authors in their papers, showing that their line of research is going in the same direction (Zupic & Čater, 2015). So, while CCA is useful in unfolding the theoretical core of a topic, BC is adequate for investigating the recent trends and current discussion of scholars -*i.e*., for gaining insight into the research front- (Li et al., 2021; Loi et al., 2016). These techniques applied over the studied period reveal the scientific achievements, showing the research path the EI topic follows (Crupi et al., 2020).

Figure 1 PRISMA statement and search criteria used in the systematic literature review
Source: own elaboration



To develop TSM, clustering by coupling procedure was used, firstly applying BC and then matching the author's keywords. In these maps, the size of the circles reflects

the number of documents clustered by BC procedure, showing overprinted hot topics treated by them, while the position shows the cluster's impact-centrality in the research field. This position is set using the centrality of a cluster –*i.e.*, the closeness of the relationship between one cluster and another (Callon et al. 1993; Leydesdorff, 2007)- and impact, measured by Normalised Global Citation Impact (NGCI) of the clustered papers (Aria & Cuccurullo, 2017). This normalisation, when applied to a set of documents, in our case that of EI collection, is obtained by the weighted average of the NGCI scores for all the documents contained in the collection, being calculated by this normalised index by *Bibliometrix* as follows:

$$\text{NGCI}_i = \frac{GC_i}{e_{fdt}}$$

Where: NGCI_i= Normalised Global Citation Impact of the paper *i* included in the collected sample; GC_i= Total Global Citations -*i.e.*, in this work obtained by the paper *i* in *Scopus*-; e = expected citation rate; *f*=field of the subject area*; d*= type of document; *t*= year.

The position of a cluster in a map helps us to discover the morphology of the research field –Callon *et al.* 1993; Cobo et al. (2011, 2012); Aria & Cuccurullo (2017)-. When impact-centrality is measured, adapting the Callon's et al. (1993) nomenclature, those positioned in the upper-right square (Q1) are considered motor themes (high centrality and high impact in the field). This quadrant groups together documents that achieve a position of impact in the field under the systematic and sustained supervision of many researchers. Those in the upper-left (Q2) of the diagram are clusters with high centrality but low impact, they are considered basic and general themes in the field. Lower-left (Q4) clusters are emerging or disappearing themes; while peripheral to the field, they are related to highly specialised topics of study and themes with an important impact are set in the lower-right square (Q3).

Table 1 Key figures and selected thresholds by period	**1970-2000**	**2001-2010**	**2011-2021**
Number of documents in the collection by period	20	118	1,782
THEMATIC STRATEGIC MAPS BY BC (See Fig A 1.1, A 2.1, A 3.1)			
Number of clusters	3	5	5
Number of papers grouped per cluster*	7-5-3	30-26-24-20-16	509-454-351-337-98
A weighted average of NGCI** per cluster	1.6-1.0-1.8	2.6-4.5-2.0-1.8-0.6	3.5-2.8-3.1-2.1-2.6
Number of documents selected for the interpretation of the BC analyses	15	20*5	20*5
CO-CITATION ANALYSES (See Fig A 1.2; A 2.2; A 3.2)			
Cited references before applying thesaurus procedure	859	5,598	89,779
Cited references after applying thesaurus procedure***	67	4,711	88,914
Co-citing threshold criteria (Minimum number of citations of a co-cited reference)	3	10	100
Number of most co-cited papers analysed	20	20	30

***** Some papers are isolated after the clustering process and are not added to any cluster.
** We focus on global, rather than local, citation because of our interest in considering the morphology of the field resulting from the general interest in this research topic, even in other disciplines, and not just considering the hyper-specialized EI research.
*** The older the documents are, the less homogeneous their references are. With the standardisation of citation systems, this problem has been solved considerably.

In applying CCA some decisions were made to choose a representative number of references to be analysed per period. Although Lampe et al. (2020) remind us that there is a degree of subjectivity involved in this sort of decision, following their suggestions and Chandra's (2018) view, and due to our interest in qualitative analysis and tracking the evolution of this research topic, we decided to apply what we have referred to here as the "rule of 20", to be concentrated on the hottest topics in this science area (Boyack & Klavans, 2014). This rule leads us to selecting the threshold of co-citations that show the 20 most important papers per cluster, in terms of normalised citation, of each period. This rule was only broken in the third period as 30 co-cited documents allowed us to interpret the period more coherently. When applying the BC analyses, no restrictions were applied when creating the map. However, when labelling each cluster, we adopted the same rule, selecting the first 20 papers in NGCI order to be studied and discussed in depth by the researchers. Thus, applying this rule, 70 co-cited documents were studied in CCA, while in BC analyses 215 papers were thoroughly studied.

Results and discussion

Figure 2 summarises the evolution of the study of EI. Section I in this figure shows the volume of articles published in the period analysed, showing its rising trend as well as its resistance to entering a plateau phase. Section II in the same figure allows observing the conceptual pillars of the field (CCA), while section III shows the strategic maps constructed by BC analyses and labelled by the co-occurrence of keywords. See detailed maps in Appendix 2 to 4.

The clustering found at each stage related to the analyses carried out is shown in Table 2. As mentioned above, the description chosen summarises the concern and interest expressed by the authors of the clustered articles, and it was set by an intensive discussion and scrutiny of the papers by the research team. A nomenclature is used to summarise the content of each cluster (see Table 2). Appendix 5 shows the top three papers collected by BC in each cluster, while Appendix 6 presents the research papers which are pillars of the topic in different phases. An in-depth analysis reveals interesting aspects, whether each stage is analysed separately or in an integrated manner. Thus, considering the BC analysis, the research shows that, until 2000, the study of EI was indeed in its foundation stage. The large number of terms used as synonyms and interchangeable terms with EI, such as intentionality (Bird, 1988), new venture initiation (Krueger & Carsrud, 1993), interest in small firms ownership (Tan et al., 1996), entrepreneurial aspirations (Ross, 1998), or new enterprise formation (Forbes, 1999; Mazzarol et al., 1999), attests to this, as there is no consensus on the denomination of the central topic under study. At this first stage, scholars were beginning to generate *ad hoc* models to explain what moved individuals to define their professional career as self-employed by setting up their businesses. The first works moved very much in the orbit of those who studied the career choice of university students, which strongly linked the empirical progress of the field to this target group. This seems to be the origin of the curiosity about EI, as a singular manifestation of the individual's career intention. Moreover, almost all the studies adopt an individual approach, with only four studies in this first stage that add the organisational level and one that does the same at the macro level. So, the empirical works of this stage show the incipient interest in students as the focus of analysis, the others being reserved for the study of entrepreneurs or owners of small and medium-sized enterprises or other groups such as the general population in the work of Davidsson (1995), Jewish emigrants (Mesch & Czamanski, 1997) or delinquents and ex-convicts (Rieple, 1998).

Furthermore, the co-citation analyses of this first stage leave no room for doubt. It reveals that works related to individual career choice, which brings to the fore Ajzen's Theory Planned Behaviour model, will inspire much of the research developed in the following years. Bird (1988), with a genuine attempt within the field of entrepreneurship research, builds her model but fails to match the interest that the TPB has aroused in the field. This last theory led to the development of an abundant amount of research papers that have been published in this area in recent decades. The Entrepreneurial Event Model of Shapero & Sokol (1982) similarly fails to arouse the same level of interest. However, Barbara Bird, Albert Shapero, and Lisa Sokol opened Pandora's box by revealing the specific interest in the study of EI around entrepreneurship.

We find the transition in the second stage (Figure 2 section I), from an embryonic phase (1970-2000) to another of consolidated growth (2011-2021). However, if we analyse in detail the first half of the second stage there was a certain degree of disorder and a persistent lack of awareness of the EI topic. This issue dissipated in the second half of that same decade, to such an extent that the star psychometric measure emerged at the end of that decade to consolidate the progress of the field in the third stage around Ajzen's TPB and the Liñán and Chen's EIQ -Entrepreneurial Intention Questionnaire-. Nevertheless, researchers analysed in the third stage are still looking for ways to better adapt the TPB as a key research model in this area, so that EI is well explained by the genuine and proper antecedents of this behaviour. We cannot ignore the fact that the TPB emerges as a psychosocial model that explains the intention to act in practically all human activities, from the possibility of crime to the choice of a professional career. It is in the second stage of development in the study of EI, however, that a still incipient interest in how and why new firms are created bursts forth, an interest that has been consolidated in the research developed since 2011. The latter prevails over the understanding of the career choice of individuals, an issue that strongly fuelled the development of the first stage.

This difference is subtle but powerful at the same time and is the reason why it seems to reinforce, in the third period, the interest that the background of EI is well outlined and agreed upon by the academic community that develops research in entrepreneurship. However, although not the same, both interests go hand in hand insofar as it is the individual, without a doubt, who is the protagonist of both the intention and the action of entrepreneurship. The individual is who makes a career choice but at the same time the artificer who lights the fuse for the future growth of a company as an

organisation. This nuance is something that has not always been considered in the investigation of the topic, which would certainly have consequences in the way research is designed.

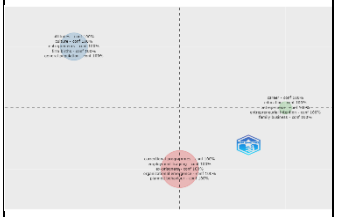
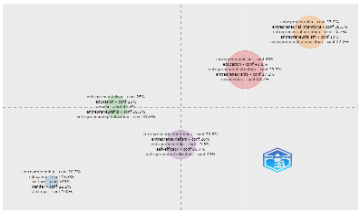
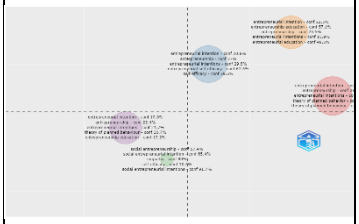
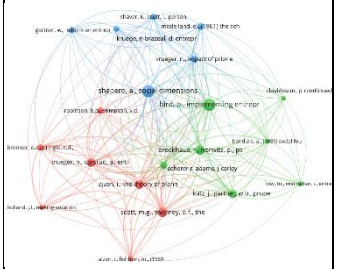
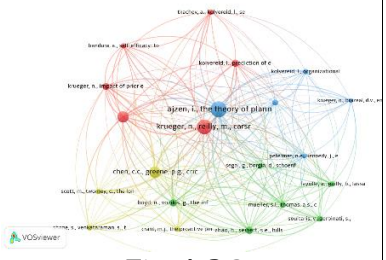
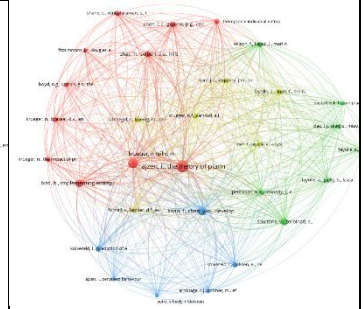
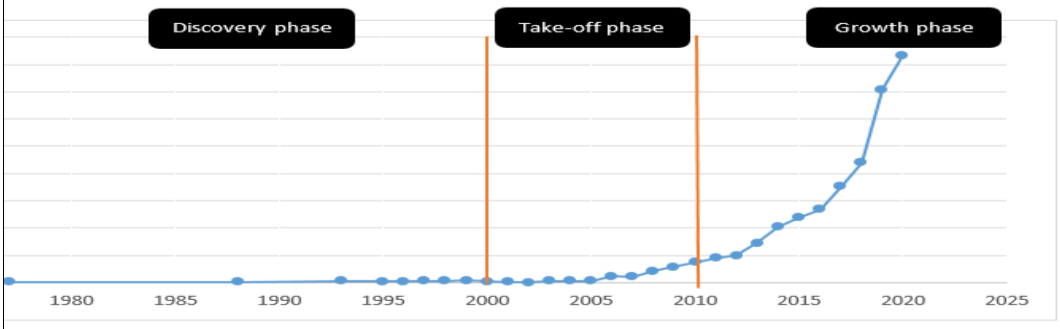
Table 2 Bibliographic coupling and co-citation analyses: Thematic description of clusters (Documents clustered; Impact Score=Weighted average of NGCS)*

	Discovery phase 1970-2000	**Take-off phase** 2001-2010	**Growth phase** 2011-2021
I Bibliographic coupling	E: Impact of education on EI (3; 1.8) - GREEN	T, P_1: Fundamental technical analysis about scales, measures and models applied to EI (26; 4.5) -YELLOW	T, P_1: Analysis of TPB components and EI-EB relationship (509; 3.5) - RED
	T, P_1: Psychometric studies and EI models (7; 1.6) - RED	E: Design and components of entrepreneurial training for university students and the institutional framework of these teachings (30; 2.6) - RED	E: Entrepreneurial Education and effect on EI (351; 3.1) - YELLOW
	P_2, C: Influence of personal and contextual features on EI (5; 1.0) -BLUE	C: Institutional and cross-cultural framework and its effect on EI (24; 2.0) - PURPLE	C, P_2: Contextual effects on personal traits and individual EI (454; 2.8) -BLUE
	---	ST_1: Gender Studies and EI (20; 1.8) - GREEN	ST_2: Explanatory factors for EI in social entrepreneurship and sustainable entrepreneurship (98; 2.6) - GREEN
	---	P_2: Personal and psychological traits of the individual and their impact on EI (16; 0.6) -BLUE	ST_3: Institutional framework and regional entrepreneurial ecosystem affecting the EI-EB relationship, with special reference to entrepreneurship in scientists (337; 2.1) -PURPLE
II Co-citations	Cr: Career choice of individuals - RED	T: Theoretical or practical interest in models developed to explain EI (TPB, EEM and others) - RED	T, P_1: Main models and constructs of EI - RED
	P_2: Psychological traits and demographic of entrepreneurs -BLUE	E: EI and antecedent factors in students' career choice using mainly TPB -BLUE	T: Key contributions to the TPB - BLUE
	EL: Literature on entrepreneurship that adds organisational focus to EI - GREEN	P_2: Psychological, demographic, and training factors influencing EI - GREEN	E: Impact of entrepreneurial education on EI - GREEN
	---	EL: Nature of entrepreneurship and its foundations giving a special role to perceived self-efficacy and proactivity as the most valued characteristics - YELLOW	LR: Literature reviews and theoretical revision of EI research -YELLOW

* The colours are shown identifying each cluster found.

Nomenclature- TPB: Theory of Planned Behaviour; EEM: Entrepreneurial Event Model; EB: Entrepreneurial behaviour; E: Education; T: Theory; P_1: Psychometric tools; P_2: Psychological and demographic traits; C: Context; EL: Entrepreneurship literature; Cr: Career Choice; ST_1: Special Topic (Gender); ST_2: Special Topic S-ship (Social Entrepreneurship and Sustainable Entrepreneurship); ST_3: Context and academics; LR: Literature reviews.

Figure 2 The output of bibliometric processes in each phase*
Source: own elaboration

	Discovery phase 1970-2000 Appendix 2	**Take-off phase** 2001-2010 Appendix 3	**Growth phase** 2011-2021 Appendix 4
III Morphology based on BC	 Fig. A.2.1	 Fig. A.3.1	 Fig. A.4.1
II Co-citations	 Fig. A.2.2	 Fig. A.3.2	 Fig. A.4.2
I Evolution in num of papers			

* When examining the map, remember that the colours in the different stages are not coordinated. The bibliometric software prevents you from manipulating this aspect according to the convenience of the inspection.

On the other hand, the models and parameters associated with the core measure of EI in the second phase began in earnest and are still being discussed today, but progress is slow in uncovering the factors that transform intention into behaviour. The transition towards a more precise approach to this transformation will require a certain amount of self-criticism that is not always easy for the academic community to accept, but which seems to appeal to the conscience of some researchers in recent times (see, for instance, Brännback & Carsrud, 2018; Krueger, 2009; Newbert et al. 2022). In this sense, we agree

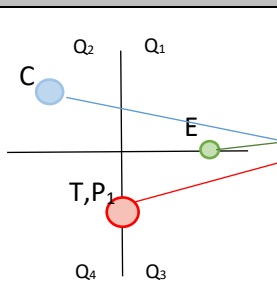
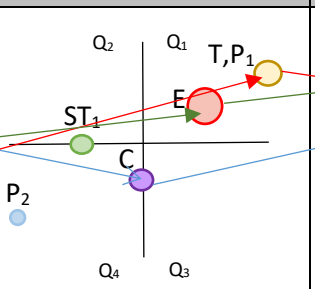
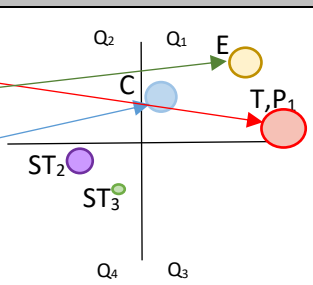
with Silva Martins et al. (2018) on the need to review the models and include new variables, theories, and methods to advance a better understanding of the topic.

In a bird's view, the evolution of the TSM allows us to observe in the first phase the existence of a field in progress –dominance of the bisector in quadrants Q2-Q3-, to pass in the second phase to show the typical morphology of an organised field –dominance of the Q1-Q4 bisector- which is reinforced in the third phase.

This third phase shows a consolidated research field around three motor themes, in order of impact: (1) the development of the theoretical models that support the field, with a special interest in the EI-EB relationship; (2) entrepreneurship education and its effect on IE; and (3) the effect of context on EI. At the opposite pole, a few emerging themes and only time will tell if they achieve their consolidation, open important possibilities for those interested both in the institutional context affecting the relationship between EI and EB, but also for those concerned with other variants of the entrepreneurial phenomenon (S-ship phenomenon): social entrepreneurship and sustainable entrepreneurship, and the particularities of EI in these contexts.

Two facts are surprising in this evolution: (1) considering CCA, the marginal place that the literature on entrepreneurship, as a pillar of the area of study, takes in this research area, and (2) having into account the BC results, the evolution shown by some emerging topics in this field. This is the case of the relationship between gender and EI, which emerged in the second stage but lost strength or merged with other topics in the third stage, but also the interest in the cross-cultural context in the second stage which later joined the studies on context and EI, consolidating as the motor theme of the field. Figure 3 provides a schematic visualisation of the course that the field of study has taken in the period analysed, enabling the readers to draw their conclusions. In section II of this table it can be seen how topics that are trending at one stage feed the field in the next –see section III of the table-. This movement is in some ways natural and logical and indicates that the field is building on the achievements of the previous stock of knowledge in this field to make its progress in the following phases. However, it may hide a risk of endogamy. This is true if we consider that the study of EI is based on disciplines other than entrepreneurship literature which support it and which continue to make progress in their knowledge. In this sense, there is a risk of sterilising the research field if these improvements are not incorporated into the EI knowledge base. In the following section, we add some examples that may illustrate how to overcome this risk.

Figure 3 Thematic tracking of the research area

	Discovery phase 1970-2000	**Take-off phase** 2001-2010	**Growth phase** 2011-2021
III Morphology based on BC and co-word analysis			
II Bibliographic coupling	E	T, P_1	T,P_1
	T,P_1	E	E
	P_2, C	C	C, P_2
	—	ST_1	ST_2
	—	P_2	ST_3
I Co-citations	Cr	T	T,P_1
	P_2	E	T
	EL	P_2	E
	—	EL	LR

E: Education; T: Theory; P_1: Psychometric tools; P_2: Psychological and demographic traits; C: Context; EL: Entrepreneurship literature; Cr: Career Choice; ST_1: Special Topic (Gender); ST_2: Special Topic (S-ship: Social Entrepreneurship and Sustainable Entrepreneurship; ST_3: Context and academics; LR: Literature reviews.

Concerning the first fact mentioned above, it is important not to overlook that it is the literature on entrepreneurship, in the search for its own identity as a field of research (Gartner, 1988; Landström, 2008; Shane & Venkataraman, 2000), which brings the study of EI to the forefront in the 1980s. Bird's (1988) work uncovers the possibilities offered to this searched identity by modelling EI in an attempt to distinguish entrepreneurial work from managerial tasks. The special attention paid by the emerging field of study in entrepreneurship to EI reveals that it was looking for the cornerstone on which the development of this potpourri field (Low, 2001) would be based, to a large extent. Everything points to the fact that the EI is integrated to justify the urgent need to differentiate the field of entrepreneurship from other related fields with a longer trajectory and solid scientific bases. However, for the study of EI, the field has required the

assistance of the literature on human behaviour, education, and career choice, which come to dominate the pillars of this research topic.

Future research path

This work reveals that the area of study, from the perspective of entrepreneurship literature, has been based on different research areas, which have shaped the growth of interesting knowledge for entrepreneurship research but often ignores the fact that intention is a prior step for behaviour, which for this area of knowledge is the start-up of a new firm and the opportunity development. This fact has left out of the debate a good number of aspects that are key from an organisational and opportunity exploitation point of view. However, given this topic's remaining growth potential and its resistance to entering a plateau phase, the evolution of this research issue could take place in two directions, and therefore the scientific effort in this area should look at both: (i) feeding the research front with new targets and contexts of study, and/or (ii) by moving the research foundations, the latter being the rockier path.

On the one hand, if we look only at the research front and the current conceptual structure of the field, this can be substantially tempered by considering new contexts of study, as well as by moving away from the study of university students towards other groups of interest, in the same way, that gender studies or the incorporation of the analysis of the EI of scientists has provided a body of literature of interest for its specificity. Firstly, it would be important to approach the study of EI by monitoring different age groups and by considering how EI is constructed at each stage of a person's life to give it a dynamic character. Particularly important is the study of EI in the senior population given the tireless vitality that the over-60s seem to show, or in young people in non-university vocational training. To deepen the dynamic nature of IE, it is also interesting to work with specific samples of serial and portfolio entrepreneurs (Westhead and Wright, 1998). In addition, the volume of data collected by projects with an established track record such as the Panel Study of Entrepreneurial Dynamics (PSED) –Reynolds et al. (2004), Reynolds (2017)- would allow modelling of the EI-EB relationship away from students and close to entrepreneurs. But value can also be added at the macro level by using the GEM (Reynolds et al., 2005) and the GUESSS (Sieger et al., 2014) databases to advance a more precise understanding of its dynamics and effects, being especially useful for the study of this EI-EB relationship and the application of artificial intelligence and big data techniques (Obschonka & Audretsch, 2019). Moreover, an area of interest

not yet sufficiently explored concerns EI in specific contexts for the development of a digital economy and in the age of AI, where other factors may come into play in the construction of EI such as technological alertness or those related to technology acceptance (Davis, 1989; Yordanova, 2021).

Secondly, the over-zealous focus on the individual's role in intention has led to the predominance of a socio-psychological approach to the study of intention (Kautonen et al., 2015), and has overlooked the existence of other ways to enter an entrepreneurial career through new forms of leadership, more shared and less individual, provided by the group –see the approach of Brännback et al. (2018)-. Finally, it may also be time to deepen the study from other perspectives not only related to purely business entrepreneurship but along the lines of those focused on s-ship, going deeper into social entrepreneurship (Chell, 2007), sustainable entrepreneurship (Muñoz & Cohen, 2018) or sports entrepreneurship (González-Serrano et al., 2019), as well as cultural entrepreneurship (Gehman & Soublière, 2017), *i.e.*, in the direction already shown by the emerging cluster in the third period.

But where the study of intention can make a 180-degree turn is by renewing the scientific pillars for the field, that is, by introducing new theories or specific advances from those related areas of knowledge that give corpus to EI literature. Thus, for example, studies on career choice have generated a generous body of literature on the topic of employability (Fugate et al. 2021). The reality is that these analyses present the career prospects of university students and other groups with professional experience as being rooted in the individual's perception of employability (Rothwell & Arnold, 2007), the main counterpoint of which lies in factors external to the individual. These studies can complement measures of self-efficacy facilitating to capture both the individual's perception of one's skills and the perception of the labour market in which these skills will be put into practice. Both the concept and the components of perceived employability, still under debate, may offer new possibilities for EI research.

Similarly, researchers in education have reinforced their interest in the study of the development of individual competencies, giving a privileged place among them to the analysis of competencies for entrepreneurship (Reis et al., 2021). These entrepreneurial competencies may add interesting dimensions of analysis for a second-generation TPB-based model. But, related to this model is where moving the research foundations is key to improving our knowledge of EI, considering the review of other psychosocial models

and methodological strategies. Related to those methodological issues, there is still room for improvement if one dwells on considering them. We have found an absolute absence of the application of qualitative analyses that would allow us to investigate the process in depth, especially how EI becomes EB. In this sense, although it is easy and quick to count on students for the quantitative analysis of EI, the abuse of this resource to compose the study samples has taken its toll on the progress in the knowledge of the topic. As a result, it is important to also count on entrepreneurs who have gone through the process of setting up a company. To this end, and given that it is often difficult to access the entrepreneur at this stage, the introduction of enquiry techniques such as that of reminiscence (Bluck & Levine, 1998), for use from both a qualitative and quantitative perspective, is important. These techniques allow the individual to be taken back to past activities, experiences, and events and would help to complement existing theories or build new ones, approaching the study not forwards but backwards.

But we should not lose sight of the fact that EI is important because it reflects the magnitude of the effort that an individual must exert (Ajzen, 1991) to achieve EB. However, the latter behaviour is usually the object of study for the entrepreneurship field, not so much the intention itself. But still, the relationship between intention and behaviour is widely contested in general terms (Ajzen, 2011; Wiedemann et al., 2009). In this sense, Ajzen's (2011, 2020) reflections on the goodness of the model generated by the TPB, the most widely accepted in the literature to predict human social behaviour, and the growing number of papers that reveal its low level of explanation of the variance of EB (Schlaegel & Koenig, 2014), continue to cast important doubts on the efficiency of EI as a predictor of action. In this way, researchers in the field have other possible avenues of advancement in this area so as not to burn Azjen's model to exhaustion. And it is precisely the overexploitation of this model and the author's self-criticism of his theory (Ajzen, 2011, 2020) that gives rise to the hope that this area of study will experiment with new theories, but also borrow from the advances and self-criticisms of other theoretical framework in the field of human behaviour.

Although EI is a necessary condition, it is not sufficient to trigger the materialisation of EB (Fayolle & Liñán, 2014; Schlaegel & Koenig, 2014). Some research explains the gap between intention and action by alluding to important nuances that add new constructs to the original model. For example, the difference between motivation and volition has been alluded to (Adam & Fayolle, 2015; Gollwitzer, 1990; Heckhausen &

Gollwitzer, 1987; Hikkerova, Ilouga and Sahut, 2016; Kautonen et al, 2015; Van Gelderen et al., 2008), while others draw on the difference between target intention and intention to implement (Adam & Fayolle, 2015), highlighting the need for a "Theory of Trying" (Esfandiar, Sharifi-Tehrani, Pratt and Altinay, 2019; Krueger, 2009). Therefore, even if the EI exists, if there is no commitment to implementation (Gollwitzer & Sheeran, 2006; Sherkat and Chenari, 2020) there would be no behaviour. However, the intention to implement does not develop without a strong commitment to the goal (Gollwitzer & Brandstätter, 1997; Loi, Barbieri, Castriota and Di Guardo, 2021; Linder and Nippa, 2019; Reuel Johnmark, Munene and Balunywa, 2016; Sherkat and Chenari, 2022), which has also brought this variable into the debate, leading to the consideration of different types of commitment -affective, normative, continuance- and levels of commitment (Adam & Fayolle, 2015; Kautonen et al., 2015; Sherkat and Chenari, 2022). Recently, Meoli et al. (2020) invite us to study the transition from EI to EB looking at the individual's socio-cognitive traits. However, for Ajzen (2011) the problem lies strongly in the perception of control, as a proxy measure of the individual's own control over behaviour.

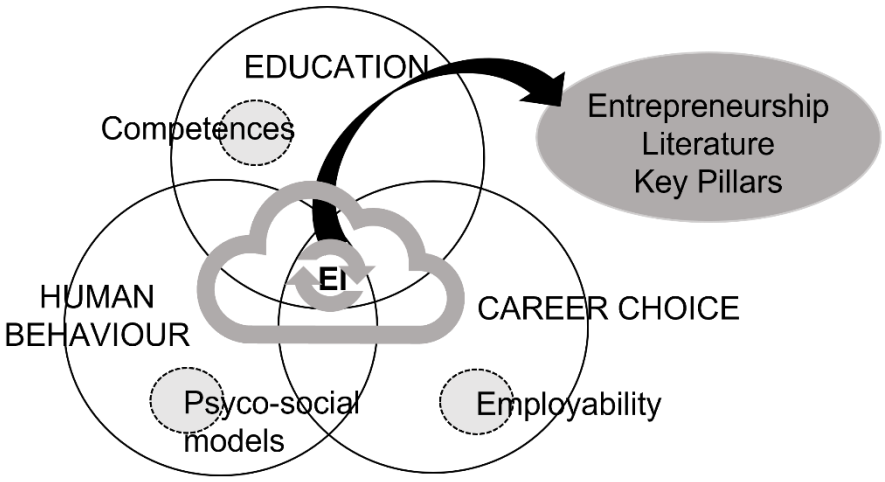
Thus, behaviour can be negatively affected by other important emotions that hinder the transition from intention to action: aversion, fear, and doubt about action (Foo et al., 2009) that contribute to procrastination (McMullen & Shepherd, 2006) or avoidance of action (Foo et al., 2009; Welpe et al., 2012). Thus, TPB has been seen as an overly rational model that takes little account of the cognitive and affective processes that have been shown to significantly affect human judgement and behaviour. Perhaps the limit of reasoned action has been reached (Ajzen, 2011, 2020).

However, the prediction of behaviour depends in part on factors beyond individual control (Ajzen, 2011). What should not be forgotten is that entrepreneurial initiative is conditioned by circumstantial determinants that many authors already revealed more than two decades ago, since the profit margins of the industry (Dunne et al., 1988), the life cycle of technology (Utterback, 1994), the stage of economic growth (Reynolds et al., 1995) or the cost of capital (Shane, 1996), among others, affect entrepreneurial initiative at an individual level. Such relationships are highly dependent on national, regional, and local conditions, associated with economic, institutional, and sociocultural factors (Amorós et al., 2012; Valliere & Peterson, 2009; Wennekers et al., 2010) that should not

be overlooked to study both intention and behaviour from a macro perspective in the way the blue and purple clusters in the third period do (BC analysis).

Figure 4 shows the different paths explained before, related to renewing the scientific pillars to overcome the risk of sterilising EI research. A quick look at the evolution of the field in the months between March 2021 and February 2023 has allowed us to observe that there is still a significant risk of sterilisation of the field of study if we do not intentionally invest in a necessary renewal of both its scientific substratum and the research front in the sense discussed above. In Appendix 7, and just to check the materialisation of this risk, the thematic map of the literature published till the first quarter of 2023 shows the strengthening of the motor areas, led by the studies on entrepreneurial education and the TPB model, highlighting now the study of self-efficacy as a general and basic theme due to its important role as an antecedent of EI.

Figure 4 Overcoming the risk of sterilising EI research: Three examples of the research pathway to update EI research foundations
Source: own elaboration



The opening up of these avenues of study, together with the progress already made in the area of EI research, would be of value to public policymakers interested in promoting entrepreneurship. Thus, the advances that can be developed on these fronts will be especially useful at times of uncertainty generated by crises of a socio-economic origin, as well as the most recent health crisis, for which the maintenance of people trained in entrepreneurial skills and ready for action is critical. Moreover, it is important not to lose sight that any effort in advancing knowledge of EI is key to the reconstruction of the productive network after these turbulent periods. In this sense, and given that improvisation is not good, any progress made in this area is ground gained to face future

crises, especially if we bear in mind that the socio-labour scenario in the medium term will undergo unpredictable changes due to massive automation of hitherto complex tasks.

Conclusion and limitations

The number of works available on the topic of EI is increasing rapidly, and it is not easy to connect their findings (Maalaoui et al., 2018). This work has been conducted from a scientometric approach, paying special attention to the diachronic evolution of the field, and considering quantitative and qualitative aspects of this scientific production to study its dynamic. Even though the effort involved, both in time and human effort, it is a valuable analysis in terms of the details, the wealth of information, and the research tracking.

This review has found, both on the research front and on its scientific substrate, opportunities to renew the study of EI. By taking on the challenges described above, we would be making a quantum leap towards achieving a more precise knowledge of the factors that feed EI, but also of those that allow it to become a behaviour. However, to open the future path requires two fundamental prerequisites: researchers committed to this progress and fearless in their aims, who are determined to break the status quo and survive the peer review process (Brännback & Carsrud, 2018), and editors who will support the necessary refocusing of EI research.

Nevertheless, this work draws interesting conclusions that are based on a research study that may be affected by biases and subjectivities to which no research, even if we strive to the contrary, is immune. Thus, the review of the topic, far from being complete, still requires new approaches. The *Scopus* database was used to retrieve works, which, although it is one of the most profuse in terms of the number of references and journals, does not always capture the totality of the scientific production relevant to the study. An extra effort in systematic literature reviews including other data sources and grey literature undoubtedly would shed light on the current progress in this research field. Finally, we have adopted here the "rule of 20" to facilitate the interpretation and qualitative analysis of such a huge number of documents. Although it ensures that we work with the most influential papers in the literature on the topic, it isolates us from research that is produced with less success in terms of the number of citations received as well as from those recently published. We are aware that some contributions that might be relevant do not fit our search and inclusion criteria and are therefore “hidden” from

our analysis. Complementary studies and a continuous track of the EI topic growth will be necessary to strengthen its knowledge.

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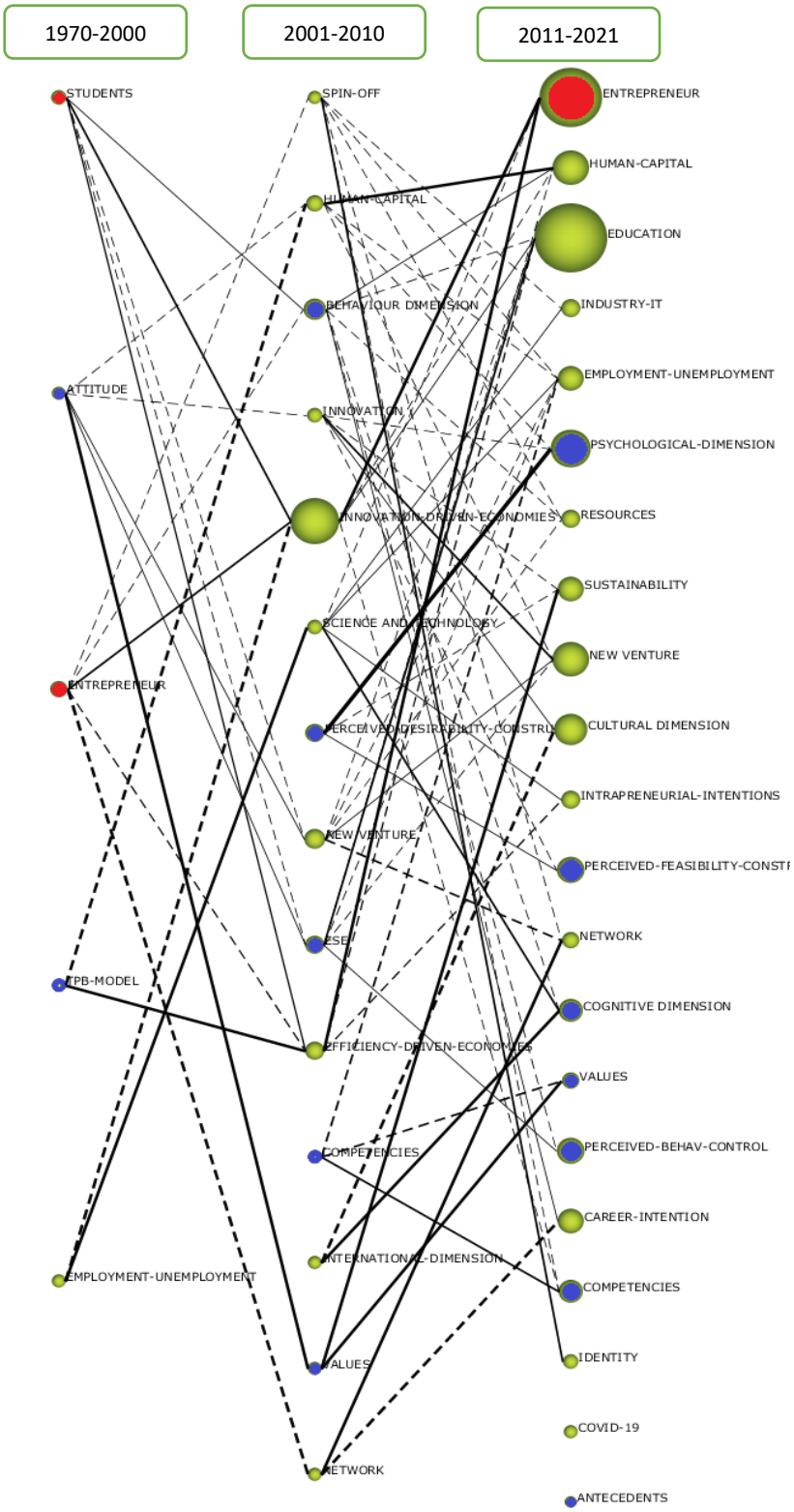
Appendix 1. Co-occurrence of author keywords of papers published by period (1970-2021): Evolution map

Source: Own elaboration based on the documents published in the period and using *SciMat*



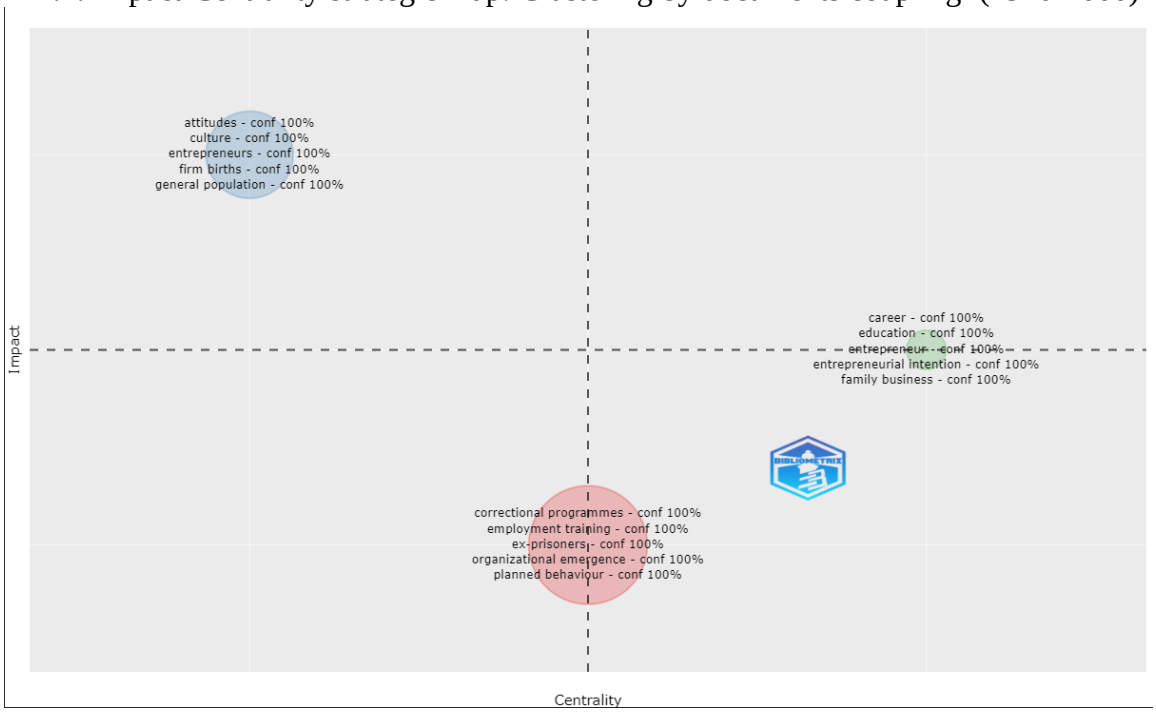
1st-period themes
Students
Attitude
Entrepreneur
TPB model
Employment-unemployment

2nd-period themes
Spin-off
Human-capital
Behaviour dimension
Innovation
Innovation-driven economies
Science and Technology
Perceived desirability construct
New venture
ESE
Efficiency-driven economies
Competencies
International dimension
Values
Network

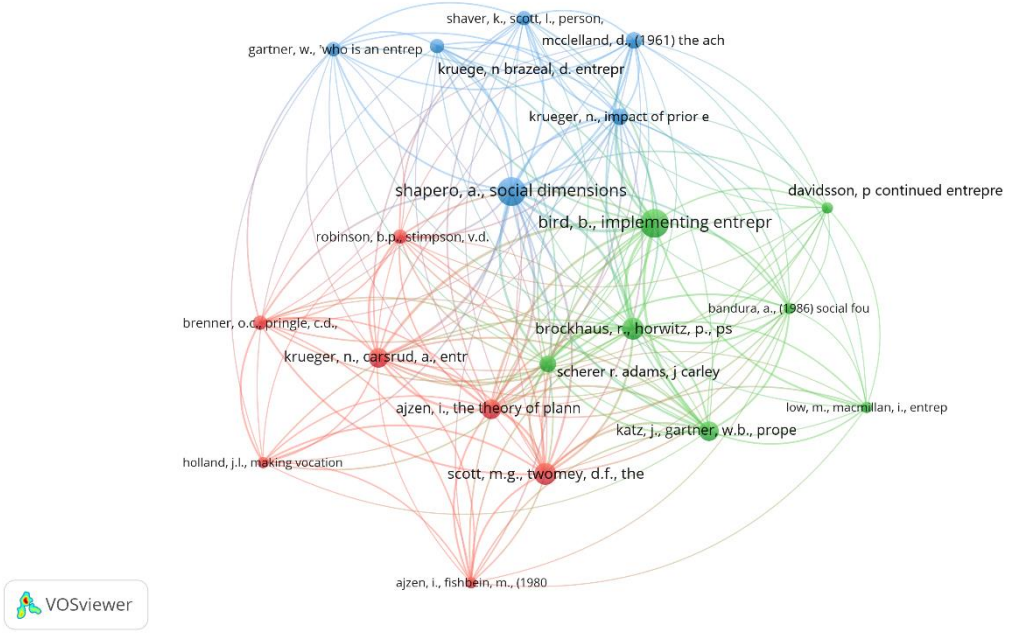
3rd Period themes
Entrepreneur
Human capital
Education
Industry-IT
Employment-unemployment
Psychological dimension
Resources
Sustainability
New venture
Cultural dimension
Intrapreneurial-intention
Perceived feasibility construct
Network
Cognitive dimension
Values
Perceived behavioural control
Career-intention
Competencies
Identity
COVID-19
Antecedents

Appendix 2 Papers published about EI in the period 1970-2000: Strategic Map and Co-citation network

A 2.1. Impact-Centrality strategic map: Clustering by documents coupling (1970-2000)

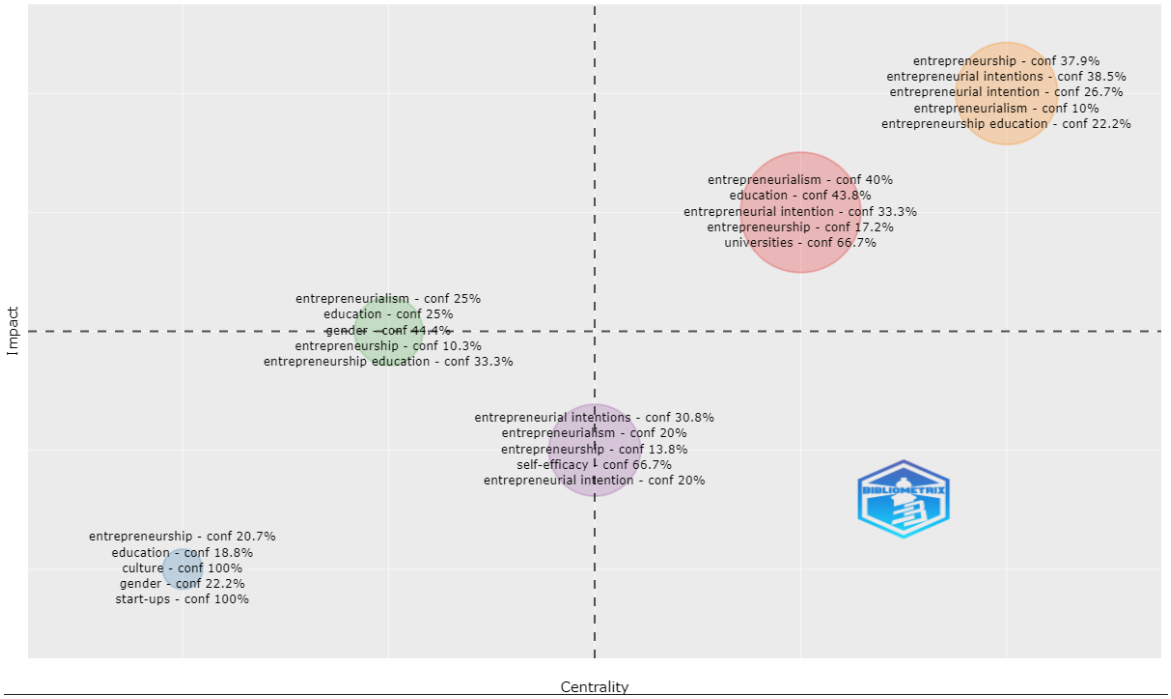


A 2.2. Theoretical foundations of the per 1970-2000: Co-citation network map of the 20 most cited papers of this period

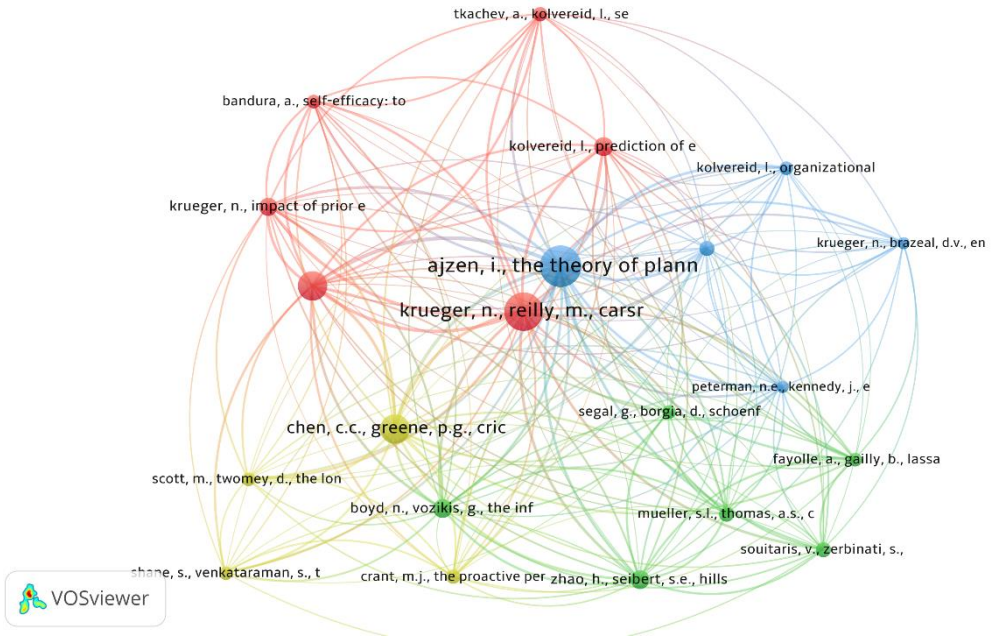


Appendix 3 Papers published about EI in the period 2001-2010: Strategic Map and Co-citation network

A3.1 Impact-Centrality strategic map: Clustering by documents coupling (2001-2010)

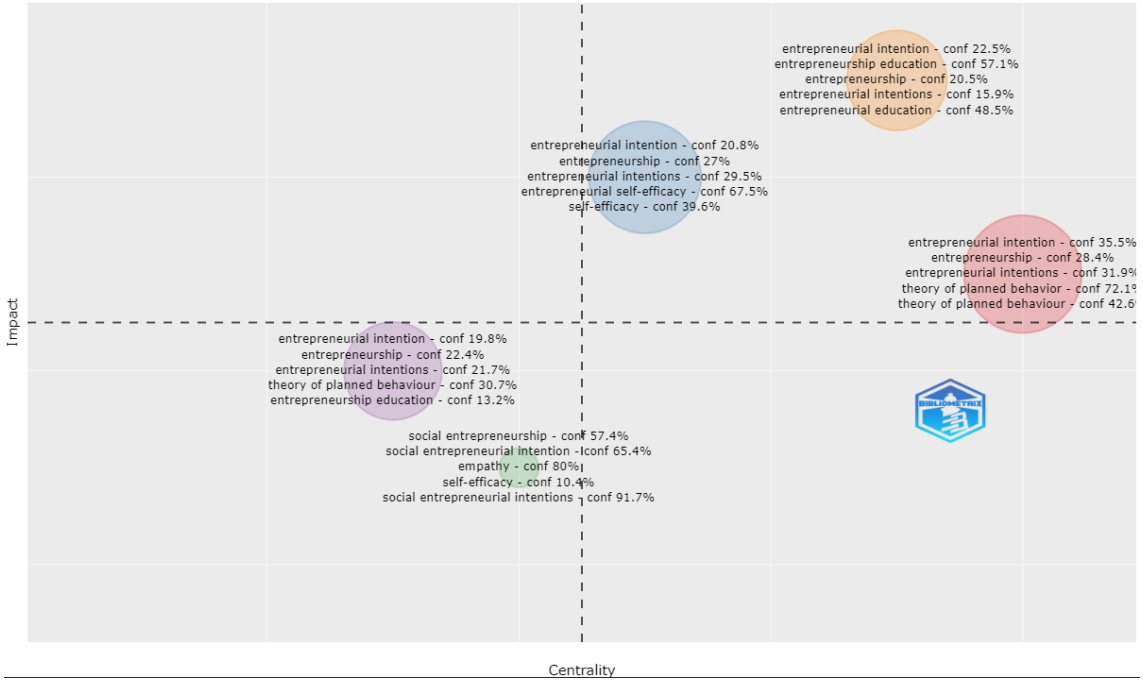


A 3.2. Theoretical foundations of the period 2001-2010: Co-citation network map of the 20 most cited papers of this period

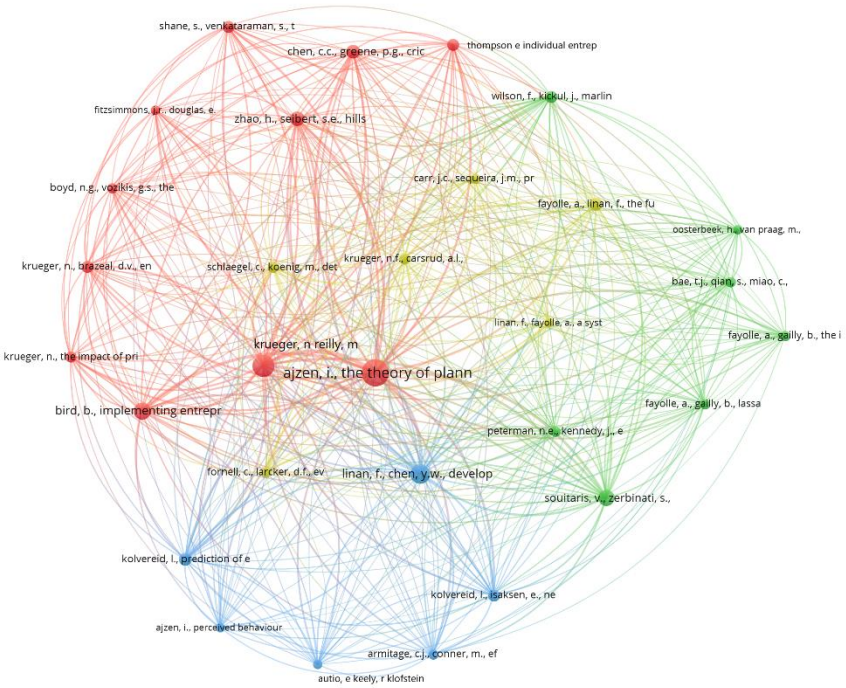


Appendix 4 Papers published about EI in the period 2011-2021: Strategic Map and Co-citation network

A.4.1. Impact-Centrality strategic map: Clustering by documents coupling (2011-2021)



A.4.2. Theoretical foundations of the period 2011-2021: Co-citation network map of the 30 most cited papers of this period



Appendix 5 Top three papers clustered by Bibliographic Coupling considering Normalized Global Citation Impact (NGCI)

1970-2000			2001-2010			2011-2021		
CLUSTER NGCI	**YEAR**	**Author(s)**	**CLUSTER NGCI**	**YEAR**	**Author(s)**	**CLUSTER NCSI**	**YEAR**	**Author(s)**
RED 1.9798	**2000**	Krueger, Reilly, & Carsrud	**RED** 5.72287	**2006**	Fayolle, Gailly, & Lassas-Clerc	**RED** 12.6219	**2015**	Kautonen, van Gelderen, & Fink
RED 1.6586	**1996**	Tan, Long, & Robinson	**RED** 4.43862	**2010**	Von Graevenitz, Harhoff, & Weber	**RED** 11.4206	**2019**	Esfandiar, Sharifi-Tehrani, Pratt, & Altinay
RED 0.6365	**1993**	Krueger & Carsrud	**RED** 3.6347	**2007**	Souitaris, Zerbinati, & Al-Laham	**RED** 9.3598	**2020**	Meoli, Fini, Sobrero, & Wiklund
BLUE 2.9866	**1998**	Chen, Greene, & Crick A.	**BLUE** 1.33833	**2010**	Gurel, Altinay, & Roberto	**BLUE** 9.3973	**2018**	Bacq & Alt
BLUE 1.4581	**1995**	Davidsson	**BLUE** 1.19139	**2008**	Harris & Gibson	**BLUE** 8.1182	**2020**	López-Núñez, Rubio-Valdehita, Aparicio-García, & Díaz-Ramiro
BLUE 0.9832	**1999**	Mazzarol, Volery, Doss, & Thein	**BLUE** 0.93126	**2006**	Choo & Wong	**BLUE** 7.766	**2020**	Hernández-Sánchez, Cardella, & Sánchez-García
GREEN 2.1488	**1999**	Tkachev & Kolvereid	**GREEN** 3.28712	**2007**	Wilson, Kickul, & Marlino	**GREEN** 10.6692	**2017**	Hockerts
GREEN 1.9715	**1997**	Kolvereid & Moen	**GREEN** 1.72346	**2010**	Packham, Jones, Miller, Pickernell, & Thomas	**GREEN** 5.4082	**2018**	Vuorio, Puumalainen, & Fellnhofer
GREEN 0.5419	**1995**	Matthews & Moser	**GREEN** 1.10228	**2009**	Schwarz, Wdowiak, Almer-Jarz, & Breitenecker	**GREEN** 4.1211	**2017**	Tiwari, Bhat, & Tikoria
—	—	—	**PURPLE** 3.14708	**2009**	Gupta, Turban, Wasti, & Sikdar	**PURPLE** 9.2645	**2021**	Iwu, Opute, Nchu, Eresia-Eke, Tengeh, Jaiyeoba, & Aliyu
—	—	—	**PURPLE** 3.08318	**2009**	Thompson	**PURPLE** 5,826	**2012**	Goethener, Obschonka, Sibereisen, & Cantner
—	—	—	**PURPLE** 2.50334	**2010**	Díaz-García & Jiménez-Moreno	**PURPLE** 5,6124	**2013**	Solesvik, Westhead, Matlay, & Parsyak
—	—	—	**YELLOW** 8.32299	**2009**	Liñán & Chen	**YELLOW** 12.3343	**2020**	Ahmed, Chandran, Klobas, Liñán, & Kokkalis
—	—	—	**YELLOW** 7.09601	**2010**	Oosterbeek, van Praag, & Ijsselstein	**YELLOW** 12.2647	**2019**	Nowiński & Haddoud
—	—	—	**YELLOW** 3.68762	**2010**	Kuckertz & Wargner	**YELLOW** 10,2992	**2018**	Nabi, Walmsley, Liñán, Akhtar, & Neame

Appendix 6 Scientific foundations of the published documents on EI in the period 1970-2021

Year	Author(s)	Document title	1970-2000 Cluster[1]	2001-2010 Cluster[1]	2011-2021 Cluster[1]	Total co-citations	Global citations	% Local citation/Global citation[2]
1961	McClelland	The achieving society, Princeton: van Nostrand	B (5)	* (9)	* (23)	37	4,775	**0.8**
1973	Holland	Making vocational choices: a theory of careers (1983) theories of career development, osipow, s. h. (ed.), Englewood cliff: Prentice-hall	R (3)			3	4,756	**0.1**
1977	Bandura	Self-efficacy: toward a unifying theory of behavioral change (1977) Psychological Review, 84, pp. 191-215		R (11)	* (157)	168	24,394	**0.7**
1980	Ajzen & Fishbein	Understanding attitudes & predicting social behavior, Prentice-hall, Englewood cliffs (1980)	R (3)		* (48)	51	17,777	**0.3**
1981	Fornell & Larcker	Evaluating structural equation models with unobservable variables & measurement error (1981) Journal of Marketing Research, 18, pp. 39-50			Y (122)	122	39,874	**0.3**
1982	Shapero	Social dimensions of entrepreneurship (1982) the encyclopedia of entrepreneurship, Kent, c., sexton, d. & vesper, k. (eds). Englewood cliffs: prentice hall	B (10)	* (13)		23	1,460	**1.6**
1986	Bandura	Social foundations of thought & action: a social cognitive theory, Englewood cliffs: Prentice-hall (1986)	G (3)	* (4)	* (32)	39	28,303	**0.1**
1986	Brockhaus & Horwitz	Psychology of the entrepreneur (1986) the art & science of entrepreneurship, pp. 25-48., in d. sexton & r. smilor, eds., Cambridge: Ballinger	B (7)	* (1)		8	360	**2.2**
1988	Bird	Implementing entrepreneurial ideas-the case for intention (1988) Academy of Management Review, 13 (3), pp. 442-453 (454)	G (10)	R (29)	R (324)	363	1,185	**30.6**
1988	Scott & Twomey	The long-term supply of entrepreneurs: students' career aspirations in relation to entrepreneurship (1988) Journal of Small Business Management, 26 (4), pp. 5-13	R (7)	Y (11)		18	210	**8.6**
1988	Katz & Gartner	Properties of emerging organizations (1988) Academy of Management Review, 13 (3), pp. 429-441	G (6)	* (8)	* (10)	24	656	**3.7**
1988	Low & Macmillan	Entrepreneurship: past research & future challenges (1988) Journal of Management, 14, pp. 139-151	G (3)	* (6)		9	1,029	**0.9**
1988	Gartner	Who is an entrepreneur?' is the wrong question (1988) American Journal of Small Business, 13, pp. 11-32	B (4)	* (1)		5	1,323	**0.4**

Year	Author(s)	Document title	1970-2000 Cluster[1]	2001-2010 Cluster[1]	2011-2021 Cluster[1]	Total co-citations	Global citations	% Local citation/Global citation[2]
1989	Scherer, Adams, Carley & Wibe	Role model performance effects on development of entrepreneurial career preference (1989) Entrepreneurship Theory & Practice, 13 (3), pp. 53-81	G (5)	* (4)	* (5)	14	263	**5.3**
1991	Ajzen	The theory of planned behavior (1991) Organisational Behavior & Human Decision Processes, 50 (2), pp. 1-63 50, pp. 179-211	R (6)	B (45)	R (800)	851	36,102	**2.4**
1991	Shaver & Scott	Person, process, choice: the psychology of new venture creation (1991) Entrepreneurship: Theory & Practice, 16, pp. 23-45	B (4)	* (9)	* (5)	18	654	**2.8**
1991	Brenner, Pringle & Greenhaus	Perceived fulfilment of organizational employment versus entrepreneurship: work values & career intentions of business college graduates (1991) Journal of Small Business Management, 29 (3), pp. 62-74	R (4)	* (2)		6	81	**7.4**
1991	Robinson, Stimpson, Huefner & Hunt	An attitude approach to the prediction of entrepreneurship (1991) Entrepreneurship Theory & Practice, 15 (4), pp. 13-31	R (4)	* (1)	* (46)	51	507	**10.1**
1991	Davidsson	Continued entrepreneurship: ability, need, & opportunity as determinants of small firm growth (1991) Journal of Business Venturing, 6 (6), pp. 405-429	G (3)	* (3)		6	351	**1.7**
1993	Krueger	Impact of prior entrepreneurial exposure on perceptions of new venture feasibility & desirability (1993) Entrepreneurship Theory & Practice, 18 (1), pp. 5-21 18 (1), pp. 5-22	* (5)	R (16)	R (140)	161	1,165	**13.8**
1993	Krueger & Carsrud	Entrepreneurial intentions: applying the theory of planned behavior (1993) Entrepreneurship & Regional Development, 5 (4), pp. 315-330	R (6)	* (15)	Y (145)	166	753	**22.0**
1994	Boyd & Vozikis	The influence of self-efficacy on the development of entrepreneurial intentions & actions (1994) Entrepreneurship Theory & Practice, 18 (4), pp. 63-77	* (2)	G (17)	R (117)	136	869	**15.7**
1994	Krueger & Brazeal	Entrepreneurial potential & potential entrepreneurs (1994) Entrepreneurship Theory & Practice, 18 (3), pp. 91-104	B (4)	B (10)	R (164)	178	1,165	**15.3**
1996	Kolvereid	Prediction of employment status choice intentions (1996) Entrepreneurship: Theory & Practice, 21(1), pp. 47-57	* (2)	R (17)	B (189)	208	617	**33.7**

Year	Author(s)	Document title	1970-2000 Cluster[1]	2001-2010 Cluster[1]	2011-2021 Cluster[1]	Total co-citations	Global citations	% Local citation/Global citation[2]
1996	Crant	The proactive personality scale as a predictor of entrepreneurial intentions (1996) Journal of Small Business Management, 34, pp. 42-50	* (2)	Y (12)	* (104)	118	429	**27.5**
1996	Kolvereid	Organizational employment versus self-employment: reasons for career choice intentions (1996) Entrepreneurship Theory & Practice, 20, pp. 23-31	* (2)	B (11)	* (5)	18	334	**5.4**
1998	Chen, Greene & Crick	Does entrepreneurial self-efficacy distinguish entrepreneurs from managers? (1998) Journal of Business Venturing, 13, pp. 295-316		Y (29)	R (210)	239	1,274	**18.8**
1999	Tkachev & Kolvereid	Self-employment intentions among russian students (1999) Entrepreneurship & Regional Development, 11, pp. 269-280.		R(12)	* (108)	120	318	**37.7**
2000	Krueger, Reilly & Carsrud	Competing models of entrepreneurial intentions (2000) Journal of Business Venturing, 15 (2), pp. 411-432	B	R (41)	R (557)	598	2,159	**27.7**
2000	Shane & Venkataraman	The promise of entrepreneurship as a field of research (2000) Academy of Management Review, 25(1), pp. 217-226		Y (11)	R (172)	183	5,846	**3.1**
2001	Mueller & Thomas	Culture & entrepreneurial potential: a nine country study of locus of control & innovativeness (2001) Journal of Business Venturing, 16 (1), pp. 51-75		G (13)	* (14)	27	807	**3.3**
2001	Armitage & Conner	Efficacy of the theory of planned behaviour: a meta-analytic review (2001) British Journal of Social Psychology, 40 (4), pp. 471-499		*** (3)**	B (124)	124	5,122	**2.4**
2001	Autio, Keeley, Klofsten & Parker	Entrepreneurial intent among students in scandinavia & in the usa (2001) Enterprise & Innovation Management Studies, 2 (2), pp. 145-160		*** (12)**	B (108)	120	126	**95.2**
2002	Ajzen	Perceived behavioural control, self-efficacy, locus of control, & the theory of planned behaviour (2002) Journal of Applied Social Psychology, 32 (4), pp. 665-683		*** (1)**	B (101)	102	3,238	**3.2**
2003	Luthje & Franke	The ‘making’ of an entrepreneur: testing a model of entrepreneurial intent among engineering students at mit (2003) R&D Management, 33, pp. 135-147		B (13)	* (90)	103	493	**20.9**

Year	Author(s)	Document title	1970-2000 Cluster[1]	2001-2010 Cluster[1]	2011-2021 Cluster[1]	Total co-citations	Global citations	% Local citation/Global citation[2]
2003	Peterman & Kennedy	Enterprise education: influencing students' perceptions of entrepreneurship. Entrepreneurship Theory & Practice, 28(2), pp. 129-144		B (10)	G (122)	132	810	**16.3**
2005	Zhao, Seibert & Hills	The mediating role of self-efficacy in the development of entrepreneurial intentions (2005) The Journal of Applied Psychology, 90 (6), pp. 1265-1272		G (17)	R (252)	269	1207	**22.3**
2005	Segal, Borgia & Schoenfeld	The motivation to become an entrepreneur. International Journal of Entrepreneurial Behaviour & Research, 11 (1), pp. 42-57		G (11)	* (83)	94	408	**23.0**
2006	Fayolle, Gailly & Lassas-Clerc	Assessing the impact of entrepreneurship education programmes: a new methodology. Journal of European Industrial Training, 30 (9), pp. 701-720		G (11)	G (130)	141	572	**24.7**
2006	Kolvereid & Isaksen	New business start-up & subsequent entry into self-employment (2006) Journal of Business Venturing, 21 (6), pp. 866-885		* (9)	B (169)	178	438	**40.6**
2007	Souitaris, Zerbinati & Al-laham	Do entrepreneurship programmes raise entrepreneurial intention of science & engineering students? the effect of learning, inspiration & resources. Journal of Business Venturing, 22(4), pp. 566-591		G (13)	G (282)	295	976	**30.2**
2007	Wilson, Kckul & Marlino	Gender, entrepreneurial self–efficacy, & entrepreneurial career intentions: implications for entrepreneurship education. Entrepreneurship Theory & Practice, 31 (3), pp. 387-406		* (8)	G (155)	163	852	**19.1**
2007	Carr & Sequeira	Prior family business exposure as intergenerational influence & entrepreneurial intent: a theory of planned behavior approach. Journal of Business Research, 60, pp. 1090-1098			Y (116)	116	336	**34.5**
2009	Thompson	Individual entrepreneurial intent: construct clarification & development of an internationally reliable metric. Entrepreneurship: Theory & Practice, 33 (3), pp. 669-694			R (175)	175	417	**42.0**
2009	Liñan & Chen	Development & cross–cultural application of a specific instrument to measure entrepreneurial intentions. Entrepreneurship: Theory & Practice, 33 (3), pp. 593-617		* (1)	B (415)	416	1098	**37.9**

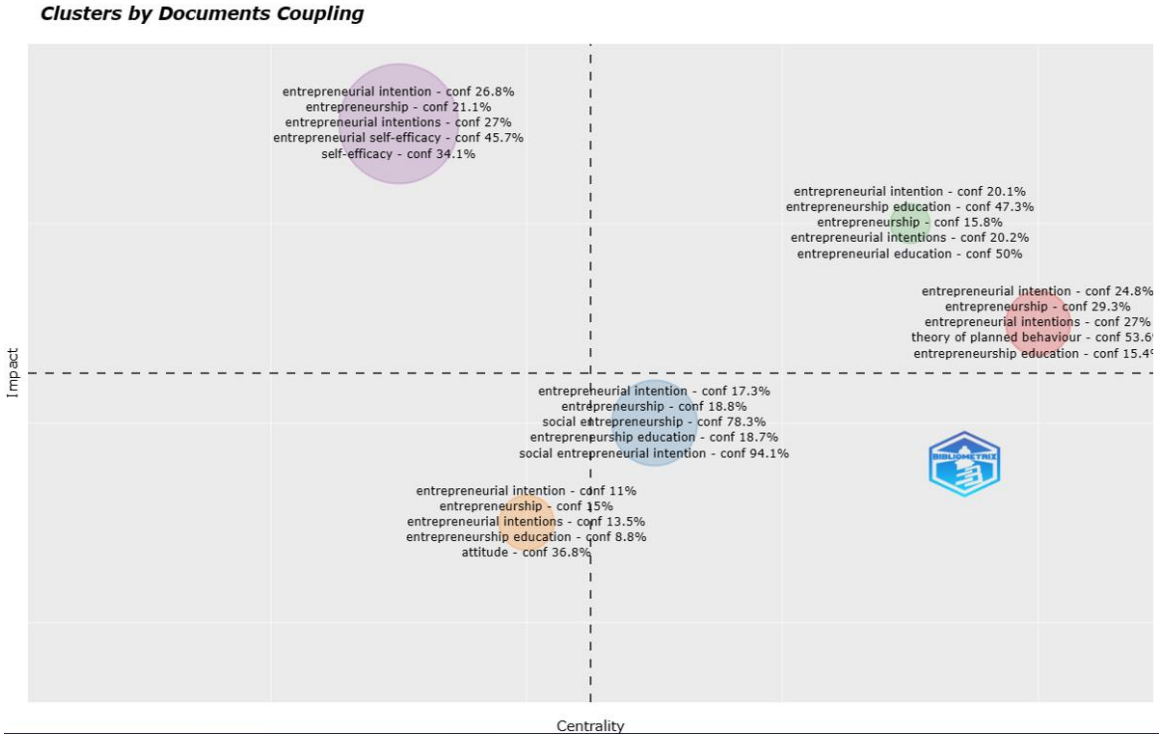
Year	Author(s)	Document title	1970-2000 Cluster[1]	2001-2010 Cluster[1]	2011-2021 Cluster[1]	Total co-citations	Global citations	% Local citation/Global citation[2]
2010	Oosterbeek, van Praag & Ijsselstein	The impact of entrepreneurship education on entrepreneurship skills & motivation. European Economic Review, 54, pp. 442-454			G (108)	108	556	**19.4**
2011	Fitzsimmons & Douglas	Interaction between feasibility & desirability in the formation of entrepreneurial intentions (2011) Journal of Business Venturing, 26, pp. 431-440			R (109)	109	303	**36.0**
2014	Bae, Qian, Miao & Fiet	The relationship between entrepreneurship education & entrepreneurial intentions: a meta-analytic review (2014) Entrepreneurship Theory & Practice, 38 (2), pp. 217-254			G (128)	128	516	**24.8**
2014	Fayolle & Liñan	The future of research on entrepreneurial intentions (2014) Journal of Business Research, 67, pp. 663-666			Y (183)	183	370	**49.5**
2014	Schlaegel & Koenig	Determinants of entrepreneurial intent: a meta-analytic test & integration of competing models (2014) Entrepreneurship Theory & Practice, 38 (2), pp. 291-332.			Y (148)	148	413	**35.8**
2015	Fayolle & Gailly	The impact of entrepreneurship education on entrepreneurial attitudes & intention: hysteresis & persistence (2015) Journal of Small Business Management, 53 (1), pp. 75-93.			G (116)	116	338	**34.3**
2015	Liñan & Fayolle	A systematic literature review on entrepreneurial intentions: citation, thematic analyses, & research agenda (2015) International Entrepreneurship & Management Journal, 11 (4), pp. 907-933.			Y (106)	106	403	**26.3**

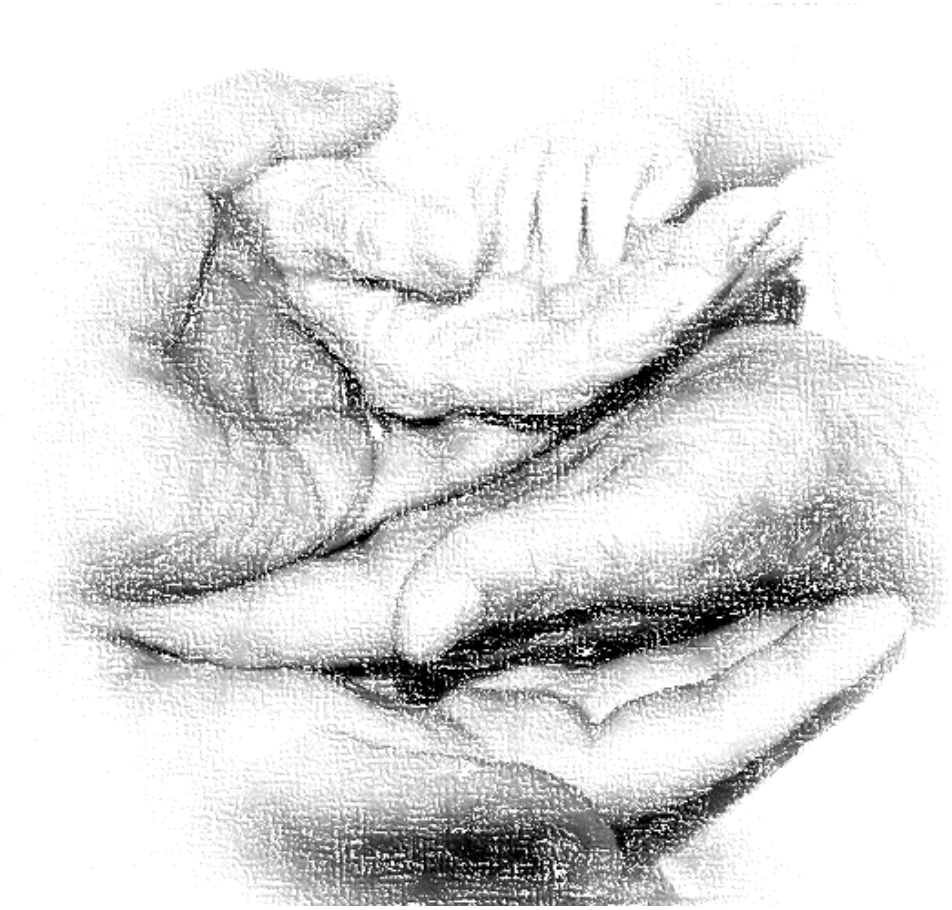
[1] R: Red cluster; B: Blue cluster; G: Green cluster; Y: Yellow cluster; P: Purple cluster. The number referred to in brackets refers to the total number of co-citations in the document in the period.

[2] Local citation rate: Percentage of citations received in the EI literature (Local citation) out of the global citations received by the document. The higher the percentage, the more genuine the paper is in the EI research topic (see Batista-Canino et al. 2023).

*Papers not included in any cluster studied in the period, but co-cited in that period.

Appendix 7 Thematic Strategic Map by clustering by coupling period March 2021 to February 2023





CAPÍTULO III

A Scientometric Analysis on Entrepreneurial Intention Literature: Delving Deeper into Local Citation[*]

[*]This chapter has been published in *Heliyon* (2023). Co-authors: Batista-Canino, R.M. & Medina-Brito, P. doi: 10.1016/j.heliyon. 2023.e13046

Sinopsis y justificación del capítulo en el contexto de la línea de investigación sobre el enfoque generacional en el estudio del emprendimiento

Esta parte del trabajo es, en la práctica, una precuela del anterior, por lo que remitimos al lector al mismo para comprender su contribución a la línea de investigación que nos ocupa. Así pues, se puede considerar una separata del trabajo presentado en el segundo capítulo con el fin de profundizar en un aspecto que, de haberse incluido en el anterior trabajo lo alargaría innecesariamente, no permitiendo presentar los resultados de este con la minuciosidad y el detalle con el que sí procedemos en el presente.

Su interés radica en mostrar un aspecto novedoso de las revisiones bibliométricas en las que la mayoría de autores que llevan a cabo análisis sistemáticos de literatura con ayuda de técnicas bibliométricas apenas han reparado. Con la citación directa local se logra poner en evidencia los autores, los trabajos y las revistas altamente especializados en el estudio de la intención emprendedora, aspecto que evidencia la verdadera estructura de la investigación en el tópico y, por contraposición al estudio de la citación global, su grado de contribución a otras áreas de conocimiento afines e interesadas no de manera focal, en el fenómeno bajo estudio.

La revista elegida para su publicación fue de carácter multidisciplinar precisamente buscando ampliar su alcance más allá de los estudios sobre emprendimiento y bajo el entendido de que la contribución de carácter metodológico y cienciométrico podría ser de interés no solo para esta área de investigación que nos ocupa. *Heliyon* es una revista de editorial *Elsevier* catalogada en la *Journal Citation Report Expanded* Q2 (JCR 62.84-28/74) en *Multidisciplinary Sciences* y en *Scopus* Q1 (SJR 0.609) en la misma categoría.

ABSTRACT

The present study provides a summarised view of entrepreneurial intention (EI) research to date. Before the application of scientometric techniques over the 1,920 papers retrieved from Scopus, this paper collects the main systematic reviews and pioneering bibliometric analyses and summarises their major findings. The use of direct citation, differentiating between Local and Global Citation, has not been used in the area of EI research. However, it provides the current status quo of this field of research, as well as interesting results on the progress of the study of this research topic, revealing previously overlooked findings. The application of scientometric tools allows us to identify the four thematic poles that concentrate the greatest effort of researchers in this area: modelling EI and discussing its antecedents and relationships; self-efficacy as an antecedent of EI; social entrepreneurial intention; and the effect of education on EI -distinguishing the effect of educational context from the effect of personal factors on EI-. It also uncovers the inspirational role of this area of research on others, while revealing the most highly specialised journals in EI, the papers that play a foundational role in the field, and the authors with the most extensive careers in this topic. This research also assesses progress on the most important challenges facing the field and raises some unanswered questions.

Keywords: Entrepreneurial Intention, Scientometrics, Local Citation Rate, Entrepreneurial intention h-index, Bibliometrix R package, Bibexcel.

Introduction

Unemployment continues to be one of the issues of greatest concern to governments. The world must face the fact that job seekers exceed the demand provided by current employers. Therefore, the solution may lie in the creation of new businesses due to the fact that governments will not be able to provide employment for everybody (1). Entrepreneurship has emerged as 'the great solution' to the issue of unemployment and the growing problems generated by global crises (2), and this fact explains the great interest in entrepreneurial intention (EI) research over the last two decades. Thus, the study of entrepreneurship has focused its efforts, among other aspects, on better understanding what drives a person to start and develop a new business. This impetus plays a crucial role in national growth (3), and fully grasping it has become an important issue for governments.

Since the first paper published about this topic, research on EI has been broad and particularly focussed on testing the effectiveness of EI models in predicting this intention. The research in this area has been intense (4) and unstoppable. Thus, the growing importance of EI has led to an exponential increase in publications since 2006. Undoubtedly, research can tend to become dispersed and fragmented (5) due to redundancy and information overload. This would also explain the boom in literature reviews and bibliometric studies that this area of study has experienced in the last decade.

In this paper we are particularly interested in that body of research that, within the EI issue, has attempted to demonstrate the progress in the field, to reveal the main lines of work that have been developed within the subject, and the gaps that are still unsolved.

Most systematic literature reviews, which attempt to synthesise the progress of a research topic (6), and bibliometric reviews have taken the volume of direct citations received as a key reference for the impact of a paper or author. But they do not pay attention to the origin of these citations, nor do they consider the degree of specialisation of the cited works. Thanks to the increased accuracy made possible by advances in bibliometric software, direct citation (the citation documents receive from other citing documents) can be disaggregated to count specialised citation separately (that is, Local Citation). Thus, and following Cobo *et al.* (7) and Beliaeva *et al.* (8), Global Citation represents the total number of citations received by a document from all publications indexed in a source (Scopus, WOS, Google Scholar…), while Local Citation refers to the number of citations a document received from other documents in the specific search performed (that is, in the sample of highly specialised papers under review).

This differentiation when applied to the review of the literature on a topic makes it possible to distinguish the real impact of a work or author in the specific area of research under study, *i.e.*, it makes it possible to know which documents represent an important intellectual base in the research field and which documents attract multidisciplinary attention (8). For this reason, the present paper offers some additional key elements that have been overlooked in previous literature reviews and bibliometric research.

This paper deals with a standalone review of the literature for a specific topic (9), adopting a scientometric approach, which extends the ambition of bibliometric analyses (10) by adding qualitative analysis of the literature (11). It provides scholars on this topic with some reflections based on the main findings that scientometric techniques offer using direct citation –*i.e.*, Global and/or Local Citation-, to bring to light this exciting topic of study. Our purpose is precisely to offer an up-to-date overview of this subject, providing researchers with a map showing the different paths, and a new perspective and insight into the area of study.

To this end, following Zupic and Cater (12), to make visible the invisible threads that build the *research front* within EI, scientometric analyses will be conducted. This work aims to carry out a literature review of the last 50 years using the Scopus database to retrieve the research knowledge on this topic. Therefore, the present paper responds to the following objectives: (i) to summarise the main systematic literature reviews and bibliometric analyses on EI carried out to date, and (ii) to provide new information on the scientific foundations of this area, identifying the papers, journals, and authors that have made the greatest contribution to this topic, as well as major themes and the emerging interests in this research topic, while revealing some gaps in the literature on this topic.

As we have already mentioned, the reviews analysed do not discriminate between Local Citation (LC) and Global Citation (GC), whereby the second objective is achieved by exploiting indicators such as LCR –Local Citation Rate- and the h-index calculated for the highly specialised selection of papers on EI. These indicators have not been used to date by researchers in this area, perhaps because not all bibliographic software help to calculate them. To delve deeper into the highly specialised literature on EI, this paper complements the main conclusions formulated by other literature reviews, some of them only focused on the use of Global Citation. This approach allows us the opportunity to highlight the genuine intellectual base in this research field, and the role this body of knowledge plays in other areas of research (8,13).

With these objectives in mind, this paper is structured as follows: in section 2 we compile some of the most relevant literature reviews and bibliometric analyses related to the topic of EI and summarise their research findings, while assessing their scientometric nature; section 3 then describes the methodology for conducting our research. Section 4 explains the results and finally, we present the discussion, conclusions and limitations in section 5.

Bibliometric Analyses and Systematic Literature Reviews on EI

A research field can become complex and confusing (14,15) when it constantly generates a large amount of information, particularly when it happens in a short period of time, leading inexorably to information overload (16). In this sense, systematic literature reviews are important for classifying and analysing the academic results of an area of knowledge to summarise the literature, examine the state of a field, make original contributions to theory testing and development, identify research gaps, and establish a future research agenda (6,17,18). In addition, bibliometric analyses reveal the characteristics and dynamics of a subject by applying statistical methods (2). It is a tool that identifies 'invisible colleges', patterns, and trends (12,19,20) with an objective approach depending on the unit of analysis –*e.g.*, document, journal, authors…- (15,21). Thus, systematic literature reviews summarise the existing literature on a topic, while bibliometric analyses help to understand how the information generated by a research area or topic is interrelated in a descriptive manner. Both are an essential part of the scientometrics analysis, and determine the research output, qualitatively and quantitatively, of an academic field or topic (19,22) helping to track knowledge and uncover *hot spots* for future lines of research.

Therefore, scientometrics focus mostly on the analysis of citations to understand the scientific structure of an area (10,23), acting as a "magnifying glass" at the service of scientific and technological surveillance. As Callon *et al.* (11) point out, this discipline involves not only quantitative but also qualitative analysis. In this sense, it is important not only to quantify science but also to understand scientific production in the context of its "theoretical significance of methods or findings" (p. 104). Thus, as these same authors point out, qualitative and quantitative analysis must support each other in order to gain an in-depth understanding of the dynamics of science.

It is perhaps because of the usefulness of bibliometric analyses and systematic literature reviews, that their application to the study of scientific journal content (24–26) and research

topics (17,27,28) have become increasingly popular, occupying an important part of research time on academics' agendas.

In Table 1 we summarise some of the most important systematic literature reviews and bibliometric analyses of EI addressed so far, and their main findings. Here, we have also considered the literature reviews that have been carried out on the Theory of Planned Behaviour as applied to EI (29,30), and Entrepreneurial Self-Efficacy –ESE- (31) given their undeniable relationship with the study of EI. We also include those reviews that relate EI with other topics –see among others: self-efficacy (31); academic entrepreneurship (32); social EI (33); personal values (34); women's EI (35). The articles included in this table are the result of the database search carried out for the development of this work. This search was renewed in March 2022 to incorporate new reviews on this topic. In this case, in addition to Scopus, Google Scholar, and WOS were also consulted.

We notice that, to date, these reviews have covered unequal periods between 1987 and 2020. Thus, the shortest review in number of years is that by Donaldson (17), which in turn builds on the one by Liñán and Fayolle (5), accounting for a total of 13 years between the two works. The longest review is by Patra and Lenka (35) with 32 years of analysis, from 1987 to 2019. In terms of the number of articles included in the review, the average volume of articles reviewed is 238, with a minimum of 22 articles in the work of Hueso *et al.* (34), and a maximum of 1,393 in the work of Dohley (4). Studies have been multi-sourced, with Scopus being the most used data source for studies (9 out of 15 studies considered it a main data source), followed in importance by WOS (6 studies) and Google Scholar (3 studies).

The main objective of all these systematic literature reviews and bibliometric analyses was to carry out an updated review that would make it possible to assess the knowledge accumulated so far and provide a clearer picture of the research field. This has allowed them to establish the state of the art of this research topic, highlighting opportunities for further research. In methodological terms, different units of analysis have been used. Documents and keywords have been the elements that have attracted the most attention from researchers in trying to find the future path of this research field. We find different types of reviews: Thematic analysis (5,31,32,36), Meta-analysis (29,30,37) or Co-occurrence of keywords (4,35,36,38), among the most prominent. Only Patra and Lenka (35) state that their study is scientometric in nature, the other papers listed in Table 1 either do not state this or make an unsubstantiated statement of its nature. What is true is that some papers are essentially scientometric, but they

do not declare it. In order to reveal this fact, we delve into disciplines of fuzzy boundaries that are not without controversy as to what they offer and what they are used for.

An in-depth analysis of the specialised works in this area allows us to understand that scientometric is a tool of scientology, considered the science of science, which focuses on the study of the quantitative and qualitative (11) aspects of science as a discipline or economic activity and whose purpose is to support the definition of scientific policies (39). However, and following McGrath (40), in order for scientometrics to be operationalised, it relies on bibliometrics, which applies statistics and mathematics to document management in any of its forms, and informetrics, which focuses on the words and content communicated by documents.

Thus, to catalogue the studies incorporated in Table 1, three criteria were adopted: (i) check whether the review used statistical, mathematical and/or artificial intelligence methods that allow mapping of research area in EI; (ii) check whether an in-depth analysis of the research papers contained in the databases compiled for the analysis of the scientific production for the period chosen by the authors was carried out, and (iii) analyse the purpose of the review, distinguishing the purely descriptive from the explanatory one. Only the works of Silva Martins *et al.* (36), Neves and Brito (32), Tan *et al.* (33), and Ruiz-Alba *et al.*(38) could join Patra and Lenka (35) in this definition, as they meet the three criteria set out above. In other words, 5 papers out of the 14 analysed can be classified as scientometric. The criteria applied to determine the nature of each literature review listed in Table 1 can be found in Appendix 1 of this paper.

However, direct citation analysis, on which scientometrics is based, is one of the most basic of all the possible analyses that serve different purposes in the review work. Thus, for example, Liñán and Fayole (5) initially use it to locate the set of most cited papers that would allow them to categorise the main areas of specialisation and then reclassify the rest of the papers among the groups they initially found. In addition, the analysis of direct citations (12,14,15) allows us to know the quality and impact of research by identifying the most influential documents, the journals with the greatest impact or the authors who have most contributed with their scientific production to the development of the field (15,16,22). Direct citation allows analysis of the *research front* of a topic, providing relevant information for researchers, being the cornerstone on which a field of knowledge stands (12).

In these reviews, we note that those that have used direct citation in their analyses have not made any distinction between LC and GC. Our paper attempts to delve deeper into the

direct citation in this research topic to complement the analyses performed by other authors, offering a more accurate view of the field of study, by distinguishing LC and GC, especially useful for those who need a quick and precise update on this research topic. This greater precision is achieved by looking at the set of documents studied and highly specialised in EI. The aim is to consider the intra-citation or direct citation that occurs within the selection of highly specialized papers (*i.e.*, Local Citation), as complementary information to the citations that each document receives from bibliometric sources (*i.e.*, Global Citation) –8,13,41.

Scientometric Analysis

The present work is an independent literature review for a specific topic (9) and, as Paul and Criado (10) point out, it should be classified as a domain-based review, specifically as a bibliometric review. This means that it involves analysing a large amount of published research using statistical tools to identify trends and citations on a particular topic, among other issues. However, as we have previously noted, its scientometric nature also requires us to delve deeper into the papers selected for this research.

Data collection

This analysis focuses on EI articles published between 1977 –the year we found the first article on EI- and the first quarter of 2021. Scopus was chosen as a suitable database and source of research articles due to our interest in quantitative analysis (12,24), having access to over 26,000 indexed journals and more than 77.8 million records dating back to 1788 (42). In addition, Scopus covers specific knowledge areas (12,26), which provides us with rich information to find out the provenance in the citation of the articles, allowing for more accurate scientometric research. In this sense, the use of a broad and rich database is particularly important for the analysis based on the LC vs GC indicators. This is due to the need to have more detailed information on each article, as well as to have access to the largest volume of specialised works in this area. On a purely technical consideration, *Scopus* is the most suitable database for analysis with *Bibliometrix* (*RStudio*) and *Bibexcel* scientometric programs (12).

In our search, we initially obtained 2,871 articles that were inspected by the authors, one by one, to check whether they addressed EI, discarding those that did not explicitly refer to the topic under review, that is, the paper did not have as a central focus the purpose of explaining what an individual's EI is and how it is formed and developed. The final number of papers was 1,920, which is what we call here ‘the collection’. The search criteria filters were as follows: the research articles must be written in English, containing the terms *intent** and *entrepr**, in

all areas of research, and without year restriction. As Ruiz-Alba *et al.* (38) stated, and like other reviews prior to the present one, the exclusion of other formats of academic work is motivated by the fact that articles better reflect original scientific production, and are generally subject to peer review process (34), something that grey literature and other academic documents do not ensure. Figure 1 summarises the steps followed in this systematic literature review.

Figure 1 Steps and processes involved in this literature review
Source: own elaboration

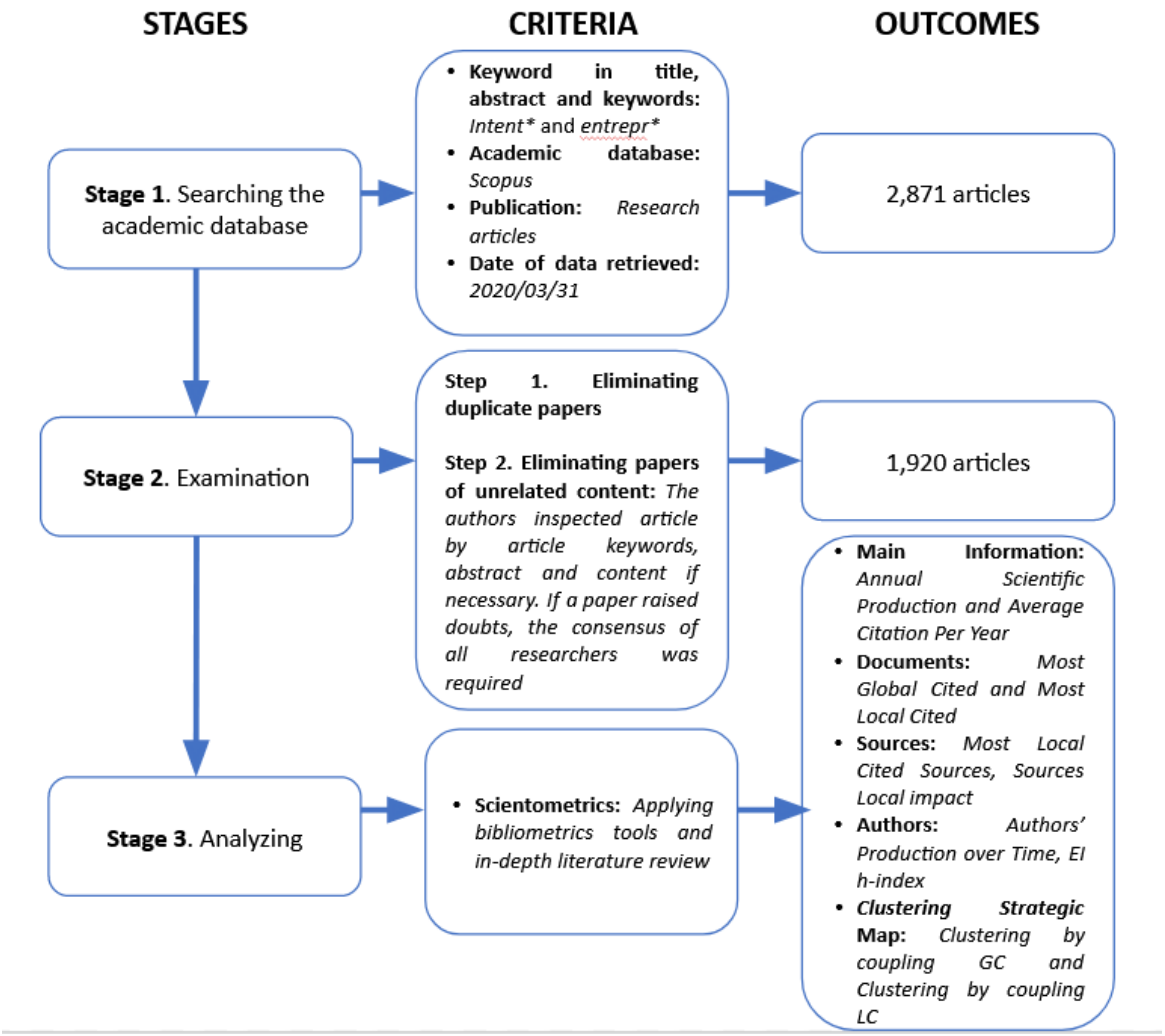


Table 1 Systematic literature reviews and bibliometrics on EI

Articles	Period	Data source	Analysis	Unit of analysis	Docs	Software tool	Review output (Number of documents)
Determinants of Entrepreneurial Intent: A Meta-Analytic Test and Integration of Competing Models (Schaegel, and Koenig 2014) (30)	1990-2014 (25 years)	ABI-Inform global/ProQuest, EBSCO, Science Direct, Business source premier	M	Document	98	-	**The TPB and EEM models were examined:** the TPB determinants (42), and EEM determinants (17), subjective norms and main EEM determinants (10), ESE plus EEM determinants (6), parallel predictors (TPB and EEM) (7), structural models (10), and mediation of EEM determinants (10). An integrated model is proposed.
A systematic literature review on Entrepreneurial Intentions: Citation, Thematic Analyses, and Research Agenda (Liñán and Fayolle 2015) (5)	2004-2013 (9 years)	Scopus, ABI-Inform/ProQuest, WOS and Science Direct	DC T	Document	409	-	**EI topics:** basic model, methodology and theory issues (65); the influence of EI and personal level variables (148); EI and entrepreneurship education (68); the role of context and institutions (72); intention-behaviour relationship and entrepreneurial process (39); and new areas of research (17).
The theory of planned behaviour in entrepreneurship research: what we know and future directions (Lortie and Castogiovanni 2015) (29)	1993-2011 (18 years)	WOS, ABI-Inform/ProQuest	M	Document	42	-	**TPB issues:** attitudes (16); subjective norms (14); perceived behavioural control (27 papers); intention (67); behaviour (13); complete model (1).
Weight- and meta-analysis of empirical literature on entrepreneurship: Towards a conceptualisation of entrepreneurial intention and behaviour (Alferaih 2017) (37)	-	Scopus, WOS, EBSCO and Google Scholar	M W	Document	123	-	The author identified the **EI predictors** (independent and dependent variables), their relationship and significance, the correlation between variables, sample size, type of analysis, data collection, constructs variance, path-coefficient, and effect size were examined. An integrated proposed model of EI was developed.
Entrepreneurial Intention: Categorisation, Classification of Constructs and Proposition of a Model (Silva Martins,	1999-2017 (18 years)	WOS	CO T	Keyword	164	Iramuteq	**Essential elements of the discourse of EI texts:** theoretical component (17.4% of the content of the selected studies); accessories and contextualisation (26.4% of the content of the selected studies); profile and characteristics (27.5% of the content of the selected

Articles	Period	Data source	Analysis	Unit of analysis	Docs	Software tool	Review output (Number of documents)
Almeida Santos, and Silveira 2018) (36)							studies); data structure (28.6% of the content of the selected studies).
Entrepreneurial self-efficacy: A systematic review of the literature on its theoretical foundations, measurement, antecedents, and outcomes, and an agenda for future research (Newman, Obschonka, Schwarz, Cohen, and Nielsen 2019) (31)	1998-2017 (18 years)	WOS, Google Scholar	DC T	Document	128	-	To analyse the construct of ESE by identifying the theoretical perspectives; measurement scales; antecedents: individual-level antecedents, firm and macro-level antecedents; outcomes of ESE; and ESE as a moderator.
A bibliometric analysis of research on entrepreneurial intentions from 2000 to 2018 (Dolhey 2019) (4)	2000-2018 (18 years)	Scopus	DC NP CoA CO	Document Author Journals Countries Institutions Author Countries Keyword	1,393	VOSviewer	This work conducted a **conceptual and social analysis**. The IJESB accounts for the highest number of publications; 2007 is the year with the most publications overall, and *Competing Models of Entrepreneurial Intentions* by Krueger *et al.* (2000) is the most cited document. Francisco Liñán is the most prolific author. The USA accounts for the highest number of publications, and University of Seville (Spain) is the institution that has contributed the most papers. EI, entrepreneurship, entrepreneurship education, and gender are the keywords that appear more frequently.
Intentions resurrected: a systematic review of entrepreneurial intention research from 2014to 2018 and future research agenda (Donaldson 2019) (17)	2014-2018 (4 years)	SJR	T	Document	163	Nvivo	**EI priority themes:** career choice (13); context (16); corporate intent (9); education (31); process (32); intention models (27); individual (25); others (10). All priority themes were classified by secondary themes considering their theoretical perspectives.

Articles	Period	Data source	Analysis	Unit of analysis	Docs	Software tool	Review output (Number of documents)
Academic entrepreneurship intentions: a systematic literature review (Neves and Brito 2020) (32)	2007-2018 (11 years)	Scopus and WOS	DC	Document	66	-	**Descriptive analyses** were made to identify the number of documents and the articles' distribution by sources (37 different journals) and country (Germany -12; the UK and Spain -11, Italy -10, USA -9, Sweden -5, Other Europe -10, Other countries -9). **Systematic Literature Review** identified <u>independent variables (drivers)</u>: Economic (individual, organisational and institutional), and psychological (TPB); and <u>dependent variable</u> (intentions): Spin-off creation, Patent and licensing and collaboration with industry. The drivers behind the intentions are multiple: context-dependent, hierarchy-dependent, heterogeneous, and, at the same time, dependent on each other and against each other. The individual factors, directly and indirectly via TPB, strongly impact the academics' intentions.
			T	Variables			
			NP	Journal			
A Systematic Literature Review on Social Entrepreneurial Intention (Tan, Le, and Xuan 2020) (33)	2010-2018 (10 years)	Scopus, WOS and Google Scholar	NP	Document Countries	36	-	**Descriptive analysis** to identify the number of documents and their distribution by country (Asia -16, Europe -7-, America -4, Multi-region -4, Unspecified -3, Africa -2). **Thematic analyses** resulted in four categories: core model, methodological and theoretical issues (12); personal-level variables (19); context and institutions (4); and the social entrepreneurial intention-to-behaviour process (1).
			T	Document			
From personal values to entrepreneurial intention: a systematic literature review (Hueso, Jaén, and Liñán 2021) (34)	1992-2020 (28 years)	Scopus, ABI-Inform and WOS	T	Document	22	-	Personal values, conceptualised from the Theory of Basic Human Values, are antecedents of the EI studied from the TPB. This effect is differentiated by considering social EI or general EI, as well as basic human values, work values, Rokeach values, and other personal values. An integrative conceptual framework and future lines of research are proposed.
Analysing the past to prepare for the future: a review of	1994-2017	Scopus	NP	Journal	177	-	**Narrative analysis** of the topic of EI regarding the factors that influence individuals' EI. **Antecedents** (personal-level variables, entrepreneurship education

Articles	Period	Data source	Analysis	Unit of analysis	Docs	Software tool	Review output (Number of documents)
literature on factors with influence on entrepreneurial intentions (Pérez-Macías, Fernández-Fernández, and Vieites 2021) (1)	(23 years)		T	Variables			(EE), and contextual factors and institutional variables), and **topics of analysis (**cognitive factors such as self-efficacy; personality and psychological variables such as propensity/adversity to risk; and socio-demographic variables such as age, gender, and human capital) were identified to summarise the literature. Recommendations and new lines of research, linking antecedents and topics, are the final contribution of this paper.
Entrepreneurial intentions: a bibliometric analysis (Ruiz-Alba, Guzmán-Parra, Vila Oblitas and Morales Mediano 2021) (38)	1993-2016 (23 years)	Scopus	DC	Document	377	VOSviewer	**Bibliometric techniques** (co-authorships, co-word analysis, research topics, and cluster of themes) are applied to highlight: the most influential authors (Liñán, Fayolle, Urbano, Guerrero, Santos and Nabi), and the most productive ones (Liñán -12; Kautonen -8; and Fayolle -7). The most productive journals in terms of the number of publications (IJESB -34, IEMJ -20, E&T -19, MJSS -12) and terms of the number of citations (JBV). The main subject areas (BMA -286, EEF -139, SS -105, Psychology -33), the most productive universities (University of Seville -13, University Putra Malaysia -8) and countries (certain polarisation between the USA and Europe). The analysis of keywords identified six clusters of themes: EI, age, role models, entrepreneurship education, Malaysia, and higher education; business development, culture, perception, innovation, university sector, South Africa, and university; students, entrepreneurialism, universities, and Ukraine; TPB, social capital, China, Spain, barriers, entrepreneurs, and family business; University students, gender, TPB, attitude, GEM, and creativity; and education, intention, entrepreneurial attitude, engineering, and entrepreneurial education. Prevailed keywords: gender-related, TPB, age, culture and entrepreneurship education.
			NP	Journal Institution Countries			
			CoA	Author			
			CO	Keyword			

Articles	Period	Data source	Analysis	Unit of analysis	Docs	Software tool	Review output (Number of documents)
An AHP analysis of scientometrically derived factors of entrepreneurial intentions of women and constructing a conceptual research framework (Patra and Lenka 2021) (35)	1987-2019 (32 years)	Scopus, Proquest, EBSCO	DC	Document	129	Biblioshiny for Rstudio	**Scientometric analysis** to identify the number of articles, authors, journals, citations, and keyword network. The co-occurrence network resulted in 2 main clusters of keywords: the first with decision-making, career choice, motivation, self-concept, risk-taking ability, locus of control, entrepreneurial education, desire for achievement, personality, and psychological aspect; and the second related to social stigma and family support. An analytic hierarchy process using NGT and AHP ranked the factor by weighting: level 1 with primary variables of EI of women, and level 2 with secondary variables on social, personal and circumstantial factors. The final result was an integrative conceptual framework.
			NP				
			NGT	Variables			
			AHP	Ranking of variables			
			CO	Keyword			

AHP: Analytic Hierarchy Process; **CO**: Co-Ocurrences; **CoA**: Co-Authorship; **DC**: Direct Citation; **M**: Meta-analysis; **ND**: Number of Documents; **NGT**: Nominal Group Technique; **NP:** Number of Publications; **T**: Thematic; **W**: Weight-analysis. *IJESB: International Journal of Entrepreneurship and Small Business; IEMJ: International Entrepreneurship and Management Journal; E&T: Education and Training; JBV: Journal of Business Venturing; MJSS: Mediterranean Journal of Social Sciences. BMA: Business, Management, and Accountant; EEF: Economics, Econometrics, and Finance; SC: Social Science.*

Methodology

We use scientometric analyses to structure EI research objectively by analysing documents, journals, and authors through statistical indicators and in-depth literature review. To carry out some of these analyses we have followed the work of Cobo *et al.* (7) and Aria and Cuccurullo (43).

This paper is focused on the direct citation, in some analyses it will apply Local Citations (LC) and in others Global Citations (GC) because it is not always possible to get LC. In a broad sense, a direct citation could be defined as the relationships that are established between documents. These relationships are established in different ways depending on the method applied (41,44): (i) bibliographic coupling which helps to reveal the 'invisible colleges' and current research lines; (ii) co-citation analysis that allows to extract the literature basis of the field, and (iii) pure direct citation (Global or Local) to uncover the citations coming from inside a research field or from global sources. Related to the last one, it is used in an aggregated manner to count the references cited in documents by establishing connections between them, and it enables a more detailed examination of the research front (12,45). But direct citation also identifies interdisciplinarity between areas, among other aspects (8,46). However, a bias attributed to pure direct citation is that it drops recent work that has not had enough time to be cited (12), an unresolvable issue because the time frame counts in this analysis.

Hence, to measure the productivity of the research field we refer to the Number of Publications (NP) and the author's production over time, and to know the impact index we use the Direct Citation (DC), considering Local vs Global Citation (LC vs GC), Average Citation (AC), Local Citation Rate (LCR), and h-index (Scopus vs EI h-index). In this research, the former index is calculated for the collection of EI papers (*EI h-index*), to be compared with the Scopus h-index for the authors or journals -see the h-index guide in Hirsch and Buela-Casals (47)-. Table 2 summarises the main indicators and the way we have calculated them using different units of analysis and managing software.

Table 2 Key indicators, unit of analysis, software used in each analysis and key procedures

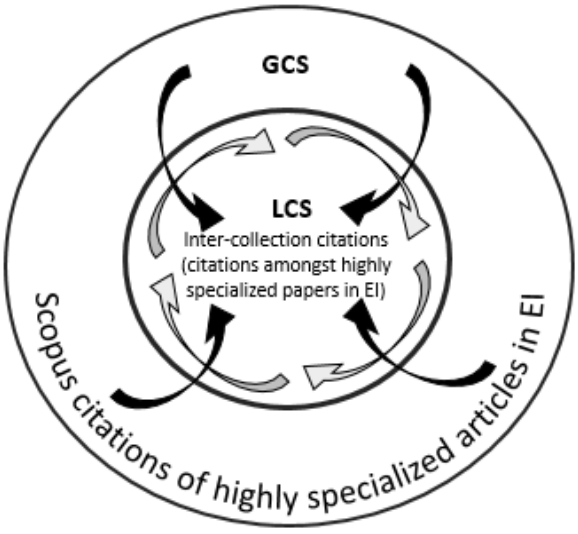
Indicator		Definition	Unit of analysis (Software and procedure/Source)
DC: Direct Citation	GC: Global Citation	Counts the number of citations that an article in the collection has received from all the publications indexed in the source (In this paper: Retrieved from *Scopus*)	Documents (*Bibliometrix* - Most Global cited documents); Clustering by coupling by GC
	LC: Local Citation	Counts the number of citations a document received from other articles in the collection (Calculated by *Bibliometrix* based on the references cited by the papers within the collection)	Documents and Journals (*Bibliometrix* - Most Local cited documents/sources); Clustering by coupling by LC
LCR: Local Citation Rate		Local Citations over Global Citations (%) – Calculated by authors	Documents and Journals (*Bibliometrix*)
EI *h-index*		Author and journal h-index calculation from the EI articles collection	Journals (*Bibliometrix* - Sources Local Impact) and authors (*Bibexcel*- Analysis h-Index)
Scopus h-index		Author and journal h-index retrieved from *Scopus*	Journal (*SJR)* and authors (*Scopus*)
Author's Production overtime		Global Citation over the number of years since its publication	Authors (*Bibliometrix* - Authors' production over time)

There is an invisible network knitted around journals, universities, countries, authors and keywords that shape the conceptual, intellectual and social structure of a research field (24,26). By the use of science mapping tools, it is possible to analyse these structures quantitatively and/or qualitatively depending on the unit of analysis (48) to extract the past, present, and future conversations held within the topic under review. By analysing large volumes of data, scientific mapping provides a macro view that helps to identify what trends researchers are following, thus, contextualising scientific progress is possible (9,12). To this end, we found a variety of scientometric tools that enable us to analyse large amounts of data and do not require programming skills (2). For our purposes, the authors have chosen *Bibexcel* (v.2016.02.20) (49) designed to analyse textual bibliographic data, and the *Bibliometrix R-package*, integrated into *Rstudio* (v.Rx64.4.1). The latter includes a series of quantitative analysis tools to conduct bibliometrics and scientometrics -see, Aria and Cuccurullo (43)-. Both are open-source statistical programmes that can process large amounts of information and are widely used in Social Sciences. Moreover, by combining them, we got more accurate and reliable results than if we had used only one bibliometric software. In this sense, we were able to check the stability of the results using *Bibexcel* and other alternative software such as *Scimat* for the strategic map with Global Citation, or *VOSviewer* for bibliographic coupling.

The documents, as a unit of analysis, were analysed considering Number of Publications, Average Citation, Local Citation (LC) and Global Citation (GC) indicators provided by *Bibliometrix*. Most of these indicators are widely known in scientometric and bibliometric

works (2). However, since the added value of this research is based on the use of LC in some analyses, we consider the need for further explanation of the LCR, as limited software give us the opportunity to calculate it, and therefore it has been hardly used. For the calculation of the LCR, we use the *Bibliometrix* output of LC and GC. This software distinguishes between Local and Global Citations. The former measures how many times a document included in a collection that results from a searching process on a specific topic or research area have been cited by other authors also in the collection. While the latter considers citations of the same document in the search source (Figure 2). If we consider the collection as the highly specialised literature on a topic, using LC and GC -see, Aria and Cuccurullo (43); Kraus *et al.* (13)- we can learn not only how a document contributes to this research literature, but also its contribution to other connected fields of research (8). LCR, which shows the percentage that LC represents over GC, lets us discover the contribution of every document to the research topic according to its real relevance in this research area.

Figure 2 Local Citation Score vs Global Citation Scores
Source: own elaboration



All these indicators lead us to the most cited documents at present, both "locally" (*i.e.*, inside de collection) and "globally" (*i.e.*, in Scopus). To do so, we have compiled the information provided by Scopus on the number of citations an article has received annually from 2006, the first year in which Scopus reports the annual citations of each paper, till October 2021, the month in which this analysis was carried out. To analyse them properly we have ranked papers, journals, and authors. We also include thematic strategic maps using bibliographic coupling and author's keywords.

Regarding the journals, we have used the LC to rank the 20 most cited journals. We have also calculated the distance between their *EI h-index* and h-index to determine the journals' level of specialisation within the topic. Using *Bibliometrix*, we obtained the calculated *EI h-index* from our collection of articles, while *Scimago Journal Rank* (SJR) provided us with the journal h-index. Finally, to rank the journals according to their area of knowledge, general information was obtained from the SJR. The information obtained allowed us to visualise the journals and research areas that show the most specialisation in EI.

The authors were analysed by their productivity (NP) and impact (AC, LC, GC, *EI h-index* and Scopus h-index). We compiled the top-ten most-cited authors' h-index to compare with the *EI h-index* calculated by using *Bibexcel*. Comparing the authors by h-index provides a picture of their contribution to the subject by balancing the weight of the most cited, the oldest and the least frequent publications (16). Finally, the author's production over time has been calculated with the *Bibliometrix.* The resulting picture will give us information about the research career on this topic, of the most prolific authors in the last decades considering their GC.

Finally, strategic thematic maps were constructed. To this end, using the *Bibliometrix* "Clustering by Coupling" by LC procedure in Figure 10, and by GC in Figure 11, the following was carried out: (i) firstly a bibliographic coupling was conducted, which groups the papers that converge in the same conversation according to the references cited in those papers, making it possible to trace the path of the central themes that make the scientific dialogue up to a given date, also indicating the trends of future research (44), and (ii) secondly, to help characterise each cluster, the programme was asked to take the 5 most representative keywords of each group.

The final clusters are placed by the software on a strategic map generating four quadrants defined according to the criteria of Cobo *et al.* (7) based on research by Callon *et al.* (50), which *Bibliometrix* places on a Cartesian axis of Centrality-Impact (43). Thus, quadrant 1 (top right) shows clusters dealing with issues of high centrality and high impact in the field. The clusters located in this quadrant are motor themes of the speciality, which are usually related to concepts that may come from other conceptually closely related fields of well-established knowledge, and with high implications for the research area analysed. These are very important scientific conversations to structure the field of research. Top left, Quadrant 2, would show clusters with high centrality but low impact in the research area, known as basic and general themes. Quadrant 3 (bottom right) would show clusters that are peripheral to the field of study

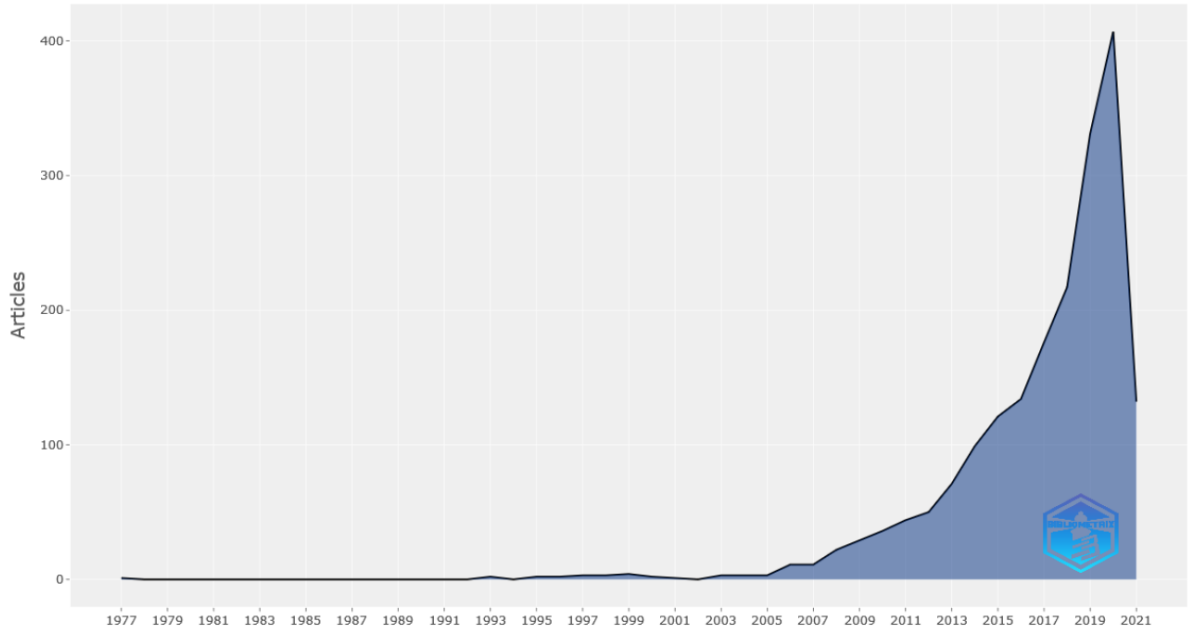
but have a major impact on it. These are highly specialised topics, but not core themes. The lower left, Quadrant 4, brings together those groups that so far remain marginal and peripheral. These are well-connected scientific communities but with little impact on the field at the time of our analysis, so they may represent both emerging and disappearing themes that the analyst must interpret in the context of the research area being analysed.

Results

Number of publications

Figure 3 highlights the year-on-year trend in publications on the topic of EI. EI research experienced an exponential increase since 2006, showing a pattern of sustained growth. Extrapolating from the 102 articles published in the first quarter of 2021, it appears that the upward trend continues, suggesting that the field maintains its research potential by resisting entering the plateau phase.

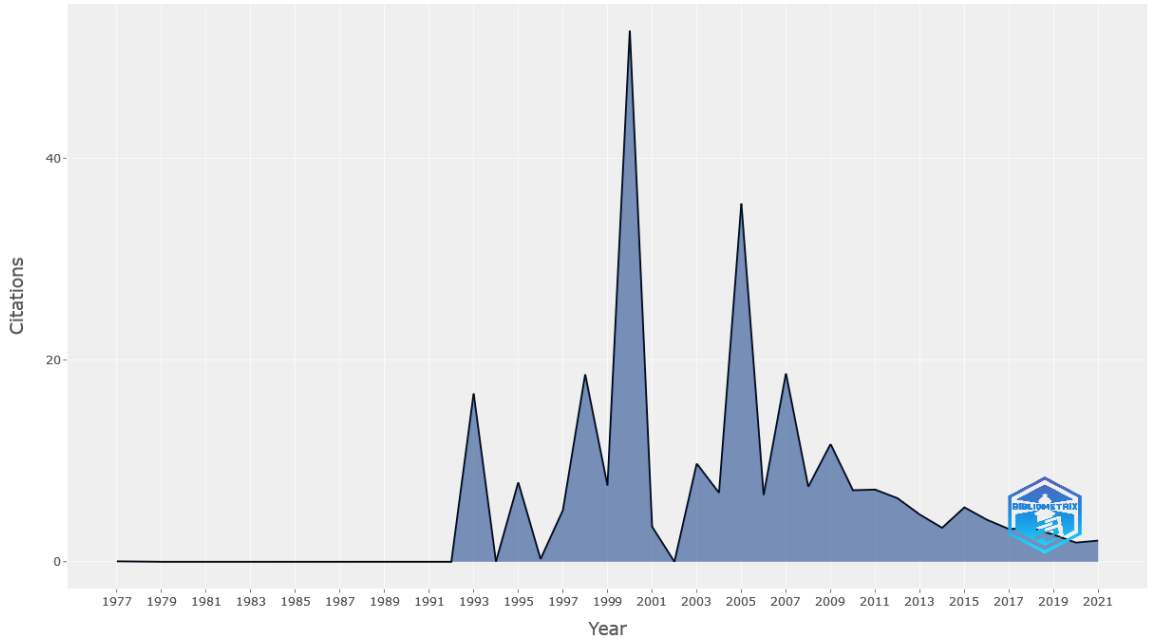
Figure 3 Total number of documents published up to March 2021
Source: RStudio



The most relevant documents

Figure 4 shows the average number of citations generated by the documents analysed. The results highlight the year 2000, with 55.4, as the year with the most GC on average of the papers published in that year, followed by 2005, with 37.8 citations on average. A preliminary analysis of the years with the highest average number of citations reveals the most relevant documents whose contribution to the field of research has generated the greatest impact.

Figure 4 Average article citation per year on EI
Source: RStudio



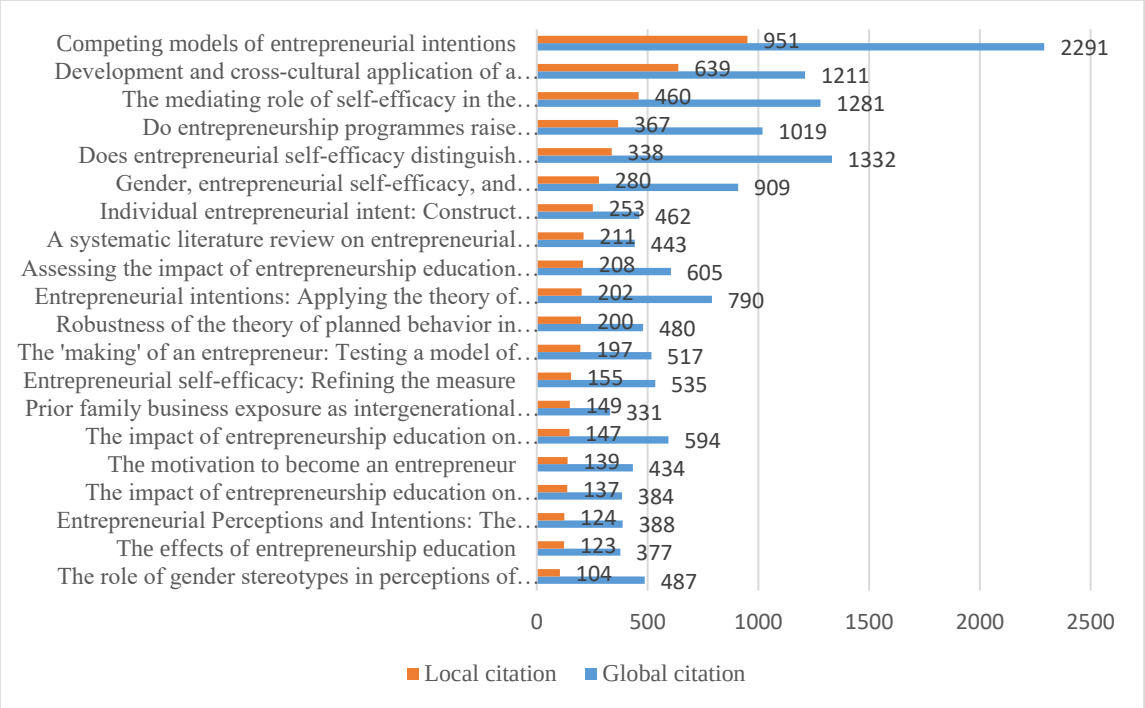
Hence, Figure 5 shows the top twenty most 'locally' cited documents. They have been key documents for the advance of the EI topic largely. Among them, the three key papers in the EI literature to date are, in descending order:

(1) *Competing models of entrepreneurial intentions* were published in 2000 by Krueger *et al.* (51) (LC 951; GC 2,291). The paper uses a competing models approach to compare two models of intention. They apply Chamberlin's approach of multiple working hypotheses via regression analysis to assess Ajzen's model (TPB) and Shapero's model (EEM). Their conclusions revealed that both intention models offer researchers a useful tool for understanding EI, although Shapero's model appears, as specified at the time of the research, slightly superior when assessing EI. In addition, they propose as lines of future research, to build a test of competing models of intention versus alternative models of attitudes, and to explore how intention precipitates behaviour.

(2) *Development and cross-cultural application of a specific instrument to measure entrepreneurial intentions* by Liñán and Chen in 2009 (52) (LC 639; GC 1,211). The authors use a sample of university students in business administration from two countries that differ in history and culture (Spain and Taiwan) to develop, based on Ajzen's Theory of Planned Behaviour, an Entrepreneurial Intention Questionnaire (EIQ). Their research responded to the need for a tool that allowed comparing the work carried out on EI and, in addition, incorporated the consideration of the differences in the perception of the samples obtained from different cultural environments.

(3) *The mediating role of self-efficacy in the development of entrepreneurial intentions* by Zhao *et al.* in 2005 (53) (LC 460; GC 1,281). The authors apply structural equation modelling to a sample of MBA students to study the mediating role of self-efficacy in the intention of university students to become entrepreneurs. The results indicate that the ESE construct is related to EI directly and, in addition, provides a theoretical explanation for the relationship between three of the most frequently identified individual-level antecedents of entrepreneurship -Perception of formal learning, Entrepreneurial experience and Risk appetite- and the intention to become an entrepreneur. It highlights the evidence that there is no difference in terms of ESE between genders, the disparity lies in the lesser intention of women to become entrepreneurs. Finally, the authors suggest the need to study the role of stress tolerance in the relationship between ESE, EI, and entrepreneurial behaviour (EB).

Figure 5 Top twenty most cited documents on EI
Source: own elaboration



However, if we consider the most cited paper in the Global context –that is, counting the number of citations in Scopus-, we must highlight also: *Does entrepreneurial self-efficacy distinguish entrepreneurs from managers?* by Chen *et al.* in 1998 (54) (LC 338; GC 1,332) that rank in second place by GC and in the fifth position of LC. This position highlights the interest of researchers outside EI research in this work. In this paper, the authors demonstrate that ESE is a distinctive characteristic of the entrepreneur. They developed two studies, one

with students and the other with small business executives, in both of which they distinguished factors characteristic of entrepreneurial self-efficacy, although these factors were different in each study. Thus, entrepreneur students emphasised the factors of marketing, management and financial control, while business founders showed higher self-efficacy in innovation and risk-taking. Furthermore, they were able to demonstrate that ESE was positively related to the intention to set up one's own business as well as convergent and discriminant validity between the ESE construct and the more general construct of locus of control. The paper provides two approaches to reinforce ESE, one at the micro-level, through training, and the other through intervention in the environment, to create available and visible resources. The authors conclude by confirming the need to use the ESE construct in research, education and public policy models to foster entrepreneurial potential.

The first three works are seminal in the study of EI. With a special interest in adapting the generic model that explains how intention is formed to the specific case of EI while developing the measurement instruments and refining the constructs, they are the cornerstone on which this area of research has been built. On the other hand, the work of Chen *et al.* (54), which highlights the interest of ESE in distinguishing the entrepreneurial person, attracts the attention of EI researchers because of the precursor character of this construct in the formation of EI. However, many of the top 20 ranked papers in this area of the study conclude that there is still a need to demonstrate the relationship between EI and EB (IE-EB). Thus, when searching in the collection analysed for how many of the papers have followed this research path, it is surprising to note that it remains an underexplored area with 24 papers focusing on the EI-EB relationship of the 1,920 papers focusing on EI. In addition, these works receive only 19 citations in the collection (LC 19), while externally 528 (GC 547) –see Figure 6-, which makes one wonder whether, as such, the seed of a new research topic has been created that is well-differentiated from the literature only focused on EI.

The Theory of Planned Behaviour (TPB), developed by Ajzen (55), is one of the most widely used models in social sciences for predicting human behaviour when it is intentional and planned. This model proposes that intentions, in general, depend on attitudes towards behaviour, social norms, and perceived behavioural control. On the other hand, Shapero and Sokol's (56) Entrepreneurial Event Model (EEM) was developed specifically for the field of entrepreneurship. The authors argue that EI depends on perceptions of personal desirability, feasibility, and action propensity. As the latter model states, human behaviour is guided by inertia until a disruptive event, positive or negative, interrupts or "shifts" that inertia, triggering

a change in the individual's behaviour. If we consider the recommendation of Krueger *et al.* (51), in which the EEM presented evidence of better assessment of EI over the TPB, the specific search on the set of papers analysed reveals that only 14 articles, with an overall citation of 76, meet the challenge of that evidence. This contrasts with the 425 articles, with 10,188 GC, that the TPB accounts for –see Figure 6-, following the recommendations made by Armitage and Conner (57), and Schaegel and Koenig (30).

Figure *6* The main challenges raised in the literature on EI, through direct citation, at a glance
Source: own elaboration

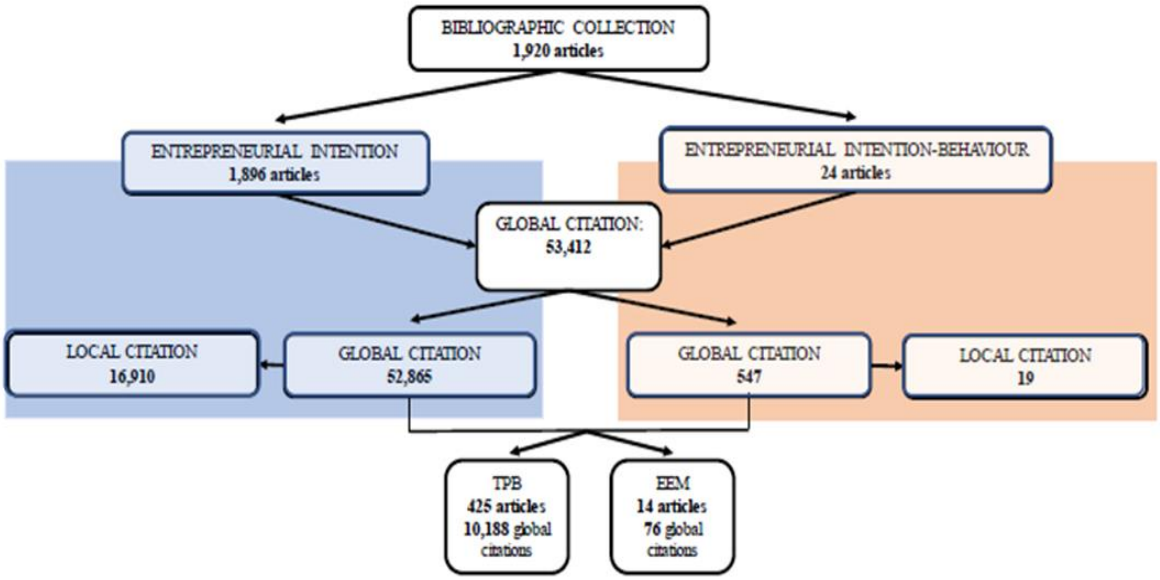


Figure 7 shows the trend of the three most influential documents to date, in terms of GC. Data on the year-on-year evolution of citations were retrieved from Scopus in early October 2021. These data help to contextualise the evolution of the first three papers in the LC and GC ranking. It can see how the paper by Krueger *et al.* (51) has progressively gained interest since 2008 -*i.e.*, some 8 years after its publication-, followed in importance by the paper by Liñan and Chen (52), written 9 years after the foundational paper of Krueger *et al.* (51).

Figure 7 Evolution of the top three EI papers in terms of Global citations according to Scopus
Source: own elaboration

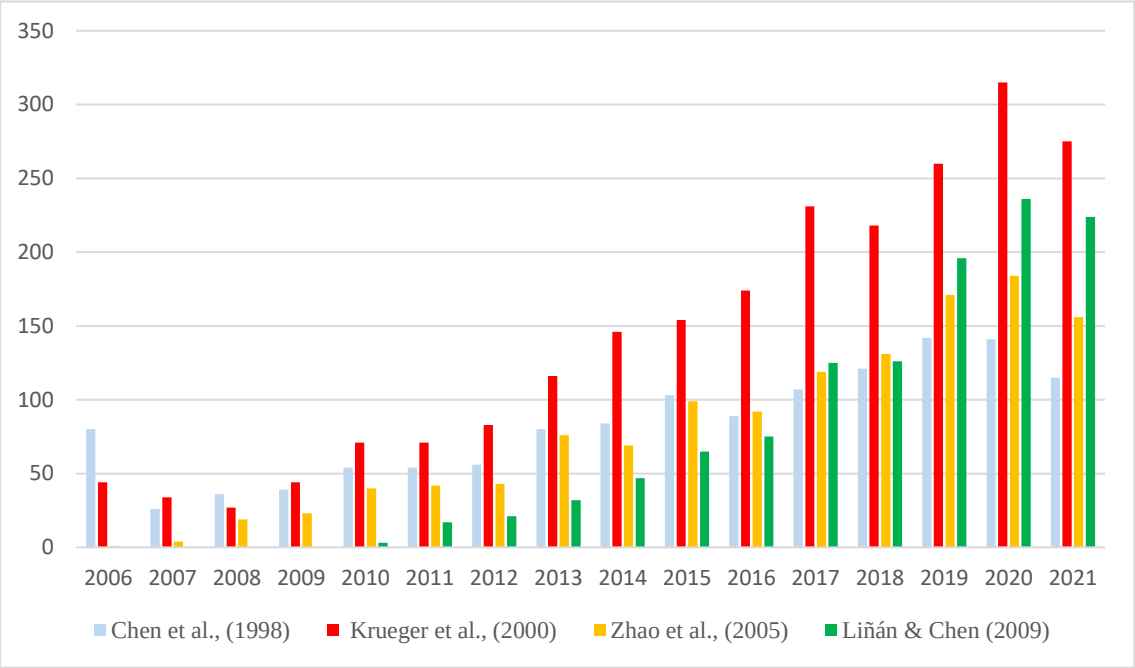


Table 3 lists the articles that have a higher specialisation in EI, in light of the LCR results. The article by Thompson (58) entitled *Individual entrepreneurial intent: Construct clarification and development of an internationally reliable metric* ranks first with 54.76%, indicating its very high level of specialisation in the area of study. Second place goes to the article entitled *Development and cross-cultural application of a specific instrument to measure entrepreneurial intentions* by Liñán and Chen (52) with 52.77%. These papers were published in *Entrepreneurial: Theory & Practice* and developed a metric to measure EI. Thompson (58) developed and validated an internationally applicable individual EI scale, while Liñán and Chen's contemporaneous paper, as we have already seen, constructed an EI questionnaire (EIQ) based on the TPB, and analysed its psychometric properties. Thirdly, *A systematic literature review on entrepreneurial intentions: citation, thematic analyses, and research agenda* by Liñán and Fayolle (5), with 47.63%, conducted an in-depth literature review to structure the fragmented research on EI.

Table 3 Top ten most contributed articles on EI (papers sorted by LCR)

Article	Journal	Local Citations (Rank)	Global Citations (Rank)	LCR % (LC/GC)
Individual entrepreneurial intent: Construct clarification and development of an internationally reliable metric (Thompson 2009) (58)	ET&P	253 (7)	462 (10)	**54.76**
Development and cross-cultural application of a specific instrument to measure entrepreneurial intentions (Liñán and Chen 2009) (52)	ET&P	639 (2)	1,211 (4)	**52.77**
A systematic literature review on entrepreneurial intentions: citation, thematic analyses, and research agenda (Liñán and Fayolle 2015) (5)	IEMJ	211 (8)	443 (11)	**47.63**
Robustness of the theory of planned behaviour in predicting entrepreneurial intentions and actions (Kautonen *et al.* 2015) (59)	ET&P	200 (11)	480 (9)	41.67
Competing models of entrepreneurial intentions (Krueger *et al.* 2000) (51)	JBV	951 (1)	2,291 (1)	41.51
Do entrepreneurship programmes raise entrepreneurial intention of science and engineering students? The effect of learning, inspiration and resources (Souitaris *et al.* 2007) (60)	JBV	367 (4)	1,019 (5)	36.02
The mediating role of self-efficacy in the development of entrepreneurial intentions (Zhao *et al.* 2005) (53)	JAP	460 (3)	1,281 (3)	35.91
Assessing the impact of entrepreneurship education programmes: A new methodology (Fayolle et al. 2006) (61)	JEIT	208 (9)	605 (8)	34.38
Gender, entrepreneurial self-efficacy, and entrepreneurial career intentions: Implications for entrepreneurship education (Wilson *et al.* 2007) (62)	ET&P	280 (6)	909 (6)	30.80
Entrepreneurial intentions: Applying the theory of planned behaviour (Krueger and Carsrud 1993) (63)	ERD	202 (10)	790 (7)	25.57
Does entrepreneurial self-efficacy distinguish entrepreneurs from managers? (Chen *et al.* 1998) (54)	JBV	338 (5)	1,332 (2)	25.38

ET&P: Entrepreneurship Theory & Practice; IEMJ: International Entrepreneurship and Management Journal; JBV: Journal of Business Venturing; JAP: Journal of Applied Psychology; JEIT: Journal of European Industrial Training; ERD: Entrepreneurship and Regional Development.

Most cited journals, their impact and specialization in EI

The 1,920 articles included in this study have been published in 530 journals. Table 4 presents the top twenty journals ordered by the number of Local Citations. In addition, the Number of Publications, GC, and the area of knowledge in these journals are shown. In this research area, the prominence of Business, Management, and Accountant is undeniable, followed by Economics, Econometrics, and Finance, as research areas interested in this topic. We see that the two journals leading the ranking by both LC and GC, are the *Journal of Business Venturing*

(JBV) and *Entrepreneurship Theory & Practice* (ET&P), accumulating the highest LC percentage of this selection (20.1% and 19.9%, respectively) –Table 4-. According to the number of articles published, *Education and Training* (E&T), with 73 papers, and the *International Journal of Entrepreneurial Behaviour and Research* (IJEBR), with 67, are in the top positions followed by *International Entrepreneurship and Management Journal* (IEMJ). JBV and ET&P have an interdisciplinary vocation and cover the entrepreneurial phenomenon broadly, both theoretically and empirically. The core research focus of E&T and IJEBR is employability, education and human, and social dynamics, among others. Some of the most cited papers from the research front have been published in these journals.

Table 4 Top twenty journals publishing on ei ranked by local citations

Journals publishing on EI	Number of Papers	LC	LC (%)*	GC (RANK)	GC (%)**	Area		
JBV	20	2,297	20.1	6,707 (1)	21.1	BMA	--	--
ET&P	22	2,122	19.9	6,052 (2)	19.0	BMA	EEF	--
IEMJ	64	1,537	14.4	3,795 (3)	11.9	BMA	--	--
E&T	73	826	7.7	2,314 (5)	7.3	BMA	--	SC
JSBM	36	760	7.1	2,380 (4)	7.5	BMA	--	--
IJEBR	67	729	6.4	2,260 (7)	6.6	BMA	--	--
E&RD	12	707	6.6	2,310 (6)	7.3	BMA	EEF	--
JSBED	34	523	4.9	1,288 (8)	4.0	BMA	--	--
JBR	21	376	3.5	1,186 (10)	3.7	BMA	--	--
SBE	23	235	2.2	1,192 (9)	3.7	BMA	EEF	--
IJESB	48	222	2.1	687 (12)	2.2	BMA	EEF	--
ISBJ	20	207	1.9	803 (11)	2.5	BMA	--	--
JDE	20	188	1.8	492 (13)	1.5	BMA	EEF	--
IJGE	16	128	1.2	431 (15)	1.4	BMA	EEF	SC
JEE	52	110	1.0	425 (16)	1.3	BMA	EEF	SC
SS	47	105	1.0	450 (14)	1.4	--	--	SC
SHE	19	99	0.9	404 (17)	1.3	--	--	SC
IJME	17	84	0.8	354 (18)	1.1	BMA	--	SC
JEEE	29	78	0.7	343 (19)	1.1	BMA	EEF	--
JSBE	22	67	0.6	236 (20)	0.7	BMA	--	--
TOTAL OF THIS LIST	662	11,400	100.0	34,109	100.0	90%	40%	30%

**% of total Local Citations of this list; **% of total Global Citations of this list*

Journals- JBV: Journal of Business Venturing; ET&P: Entrepreneurship Theory & Practice; IEJM: International Entrepreneurship and Management Journal; E&T: Education and Training; JSBM: Journal of Small Business Management; IJEBR: International Journal of Entrepreneurial Behaviour and Research; E&RD: Entrepreneurship and Regional Development; JSBED: Journal of Small Business and Enterprise Development; JBR: Journal of Business Research; SBE: Small Business Economics; IJESB: International Journal of Entrepreneurship and Small Business; ISBJ:International Small Business Journal; JDE: Journal of Developmental Entrepreneurship; IJGE: International Journal of Gender and Entrepreneurship; JEE: Journal of Entrepreneurship Education; SS: Sustainability (Switzerland); SHE: Studies in Higher Education; IJME: International Journal of Management Education; JEEE: Journal of Entrepreneurship in Emerging Economies; JSBE: Journal of Small Business and Entrepreneurship; BMA: Business, Management, and Accountant; EEF: Economics, Econometrics, and Finance; SC: Social Science

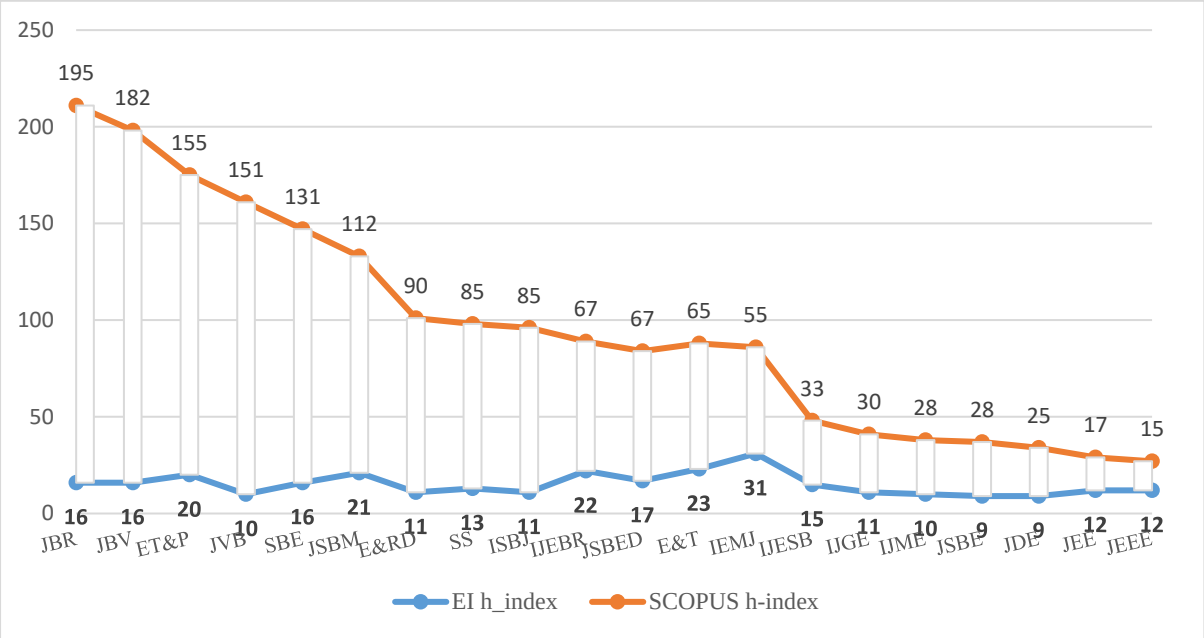
The journals' level of specialisation within the topic is shown in Figure 8. This figure indicates the calculated g*ap* between h-indexes –*i.e.*, *Scopus* h-index for the journals publishing about EI, and *EI h-index*-. The shortest distances fall on seven journals: JEEE, with a gap of 3, reporting its high level of specialisation in EI, followed by JEE (gap: 5), JDE (gap: 16), IJME and IJESB (gap: 18), JSBE and IJGE (gap: 19). The former journal, which was released in 2014, has published 186 articles, 137 of which focus directly or indirectly on IE, accounting for 70% of its publications on this topic. Regarding the others, after examining the article titles published in the journal, we found that almost 3% of them explicitly referred directly or indirectly to EI. Conversely, two top-ranked journals (Table 4), JBR (gap: 179) and JBV (gap: 166), have the greatest calculated *gap*, indicating a low specificity in IE. However, the most cited document to date, *Competing models of entrepreneurial intention* by Krueger *et al.* (51) was published on JBV. These results show that research on EI is not limited to specific journals and is widely dispersed.

The calculated gap positioned IEMJ in the middle of the interval (gap: 24). This journal has a broad focus on entrepreneurship, and it has published two of the most highly cited EI literature reviews to date: *A systematic literature review on entrepreneurial intentions: citation, thematic analyses, and research agenda*, by Liñán and Fayolle (5), and *Intentions resurrected: a systematic review of entrepreneurial intention research from 2014 to 2018 and future research agenda*, by Donaldson (17).

Authors' productivity and their scientific production overtime

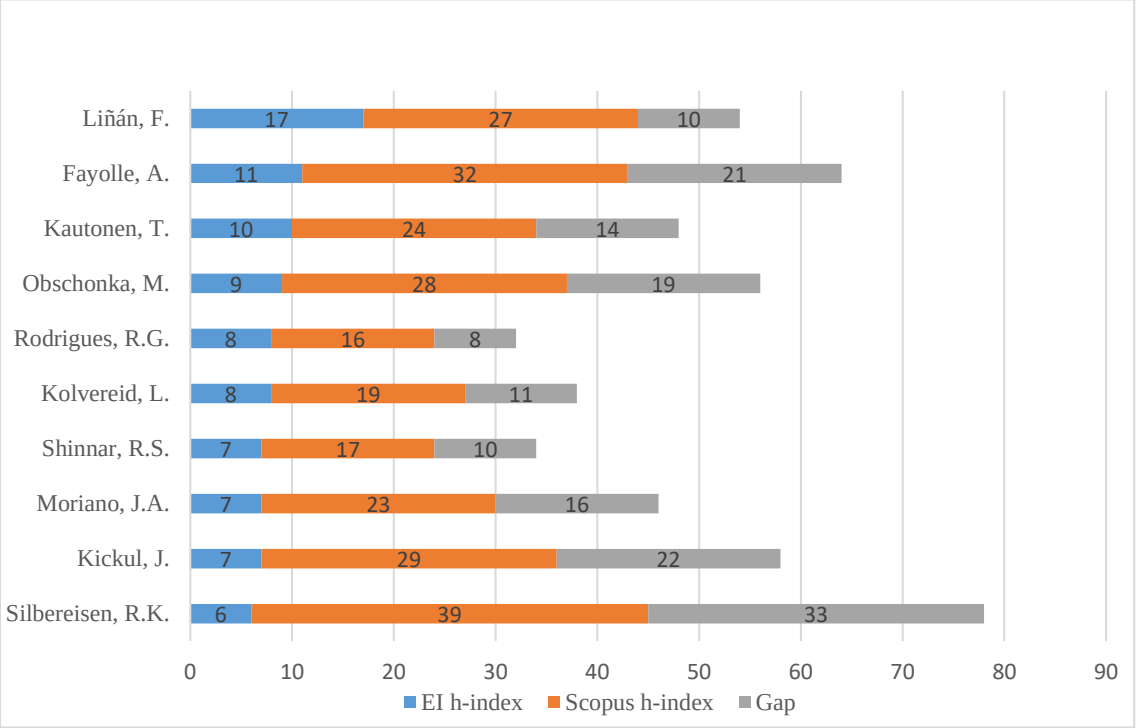
Tables 5, 6 and 7 outline the top ten most-cited authors who have contributed to this topic with their works. In total, this group of authors has published 118 publications from the seventies to date, with Liñán making the main contribution with 22 papers, followed by Wibowo (16 papers) -see Table 5-. Liñán tops the list by GC with 3,593 citations followed by Carsrud (63) with 2,922 citations -see, Table 6-. Two reference articles for the EI topic that accumulate a high number of citations place Carsrud in the first position with the highest Cites Ratio -see Table 7-. It is noteworthy that European authors are leaders in the number of publications while those from the USA lead in the number of citations. Moreover, the calculated gap resulting from subtracting the h-indexes –*i.e.*, Scopus h-index and *EI h-index*-, shows in Figure 9 that Francisco Liñán is the author with the highest *EI h-index*, whereas Ricardo G. Rodrigues has a smaller gap, denoting the high level of specialisation of his production on this topic.

Figure 8 Sources EI h-index and Scopus h-index
Source: own elaboration



Graphic 1 summarised the EI top authors' production. This graph shows the authors who have contributed to a greater or lesser extent to the scientific production of the research topic. Lines link the production on EI where the author is the first to sign. The graph shows, for example, that Liñán has published 22 articles with 3,593 GC for his entire research output. However, if we go into detail thanks to the software, in any given year, see for instance 2007, we can see that this same author published an article that has received 191 citations since its publication. This information is represented in the graph by circles that vary in size and colour by counting the number of articles published in a year, and the number of citations they have received. Thus, the total number of citations per year is the annual average number of citations calculated by dividing all citations received by articles published in a year by the number of years these articles have been published. This graph also shows that, although scientific production has not stopped since the nineties, 2007 seems to have been the trigger for many authors. Liñán stands out as the most productive author in the area, with Lars Kolvereid and Jill Kickul being highlighted as the authors with the longest research career on EI (17 years), and Wibowo with the shortest but most intense career. Finally, the 20 most productive authors on EI come from all continents, with Europe (4) and Asia (7) standing out.

Figure 9 Authors h-index: EI h-index and Scopus h-index gap (ranked by EI H-Index)
Source: own elaboration



Graph 1. Top authors' production over time
Source: RStudio

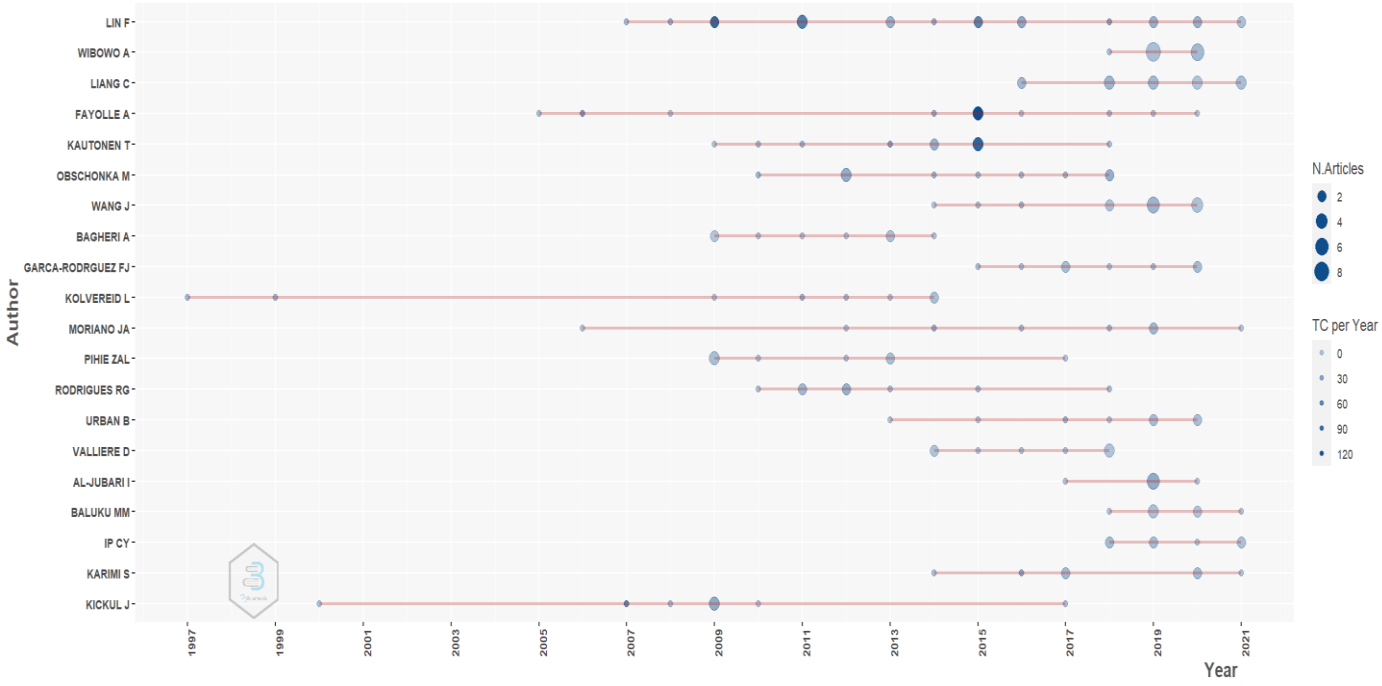


Table 5 Top ten authors ranked by number of publications

Rank	Author	Country	Number of Publications (NP)	Global Citations (GC)	EI h-index	Cites ratio (GC/NP)
1	Liñán, F.	Spain	22	3,593	17	163.3
2	Wibowo, A.	Indonesia	16	43	3	2.3
3	Liang, C.	Taiwan	14	141	6	10
4	Fayolle, A.	France	12	1,980	11	165
5	Kautonen, T.	Finland	10	1,278	10	127.8
6	Obschonka, M.	Germany	10	655	9	65.5
7	Wang, J.	Taiwan	10	76	4	7.6
8	Kolvereid, L.	Norway	8	915	8	114.4
9	Rodrigues, R.G.	Portugal	8	477	8	59.6
10	Moriano, J.A.	Spain	8	270	7	33.8

Table 6 Top ten authors ranked by cites

Rank	Author	Country	Global Citations (GC)	Number of Publications (NP)	EI h-index	Cites ratio (GC/NP)
1	Liñán, F.	Spain	3,593	22	17	163.3
2	Carsrud, A.	United States	2,922	4	4	730.5
3	Fayolle, A.	France	1,980	12	11	23.8
4	Kickul, J.	United States	1,291	7	7	184.4
5	Kautonen, T.	Finland	1,278	10	10	127.8
6	van Gelderen, M.	Holland	1,182	6	5	197
7	Marlino, D.	United States	1,011	3	3	337
8	Wilson, F.	United States	1,011	3	3	337
9	Kolvereid, L.	Norway	915	8	8	114.4
10	Gailly, B.	Belgium	896	2	2	448

Table 7 Top ten Authors ranked by cites ratio

Rank	Author	Country	Cites ratio (GC/NP)	Number of Publications (NP)	Global Citations (GC)	EI h-index
1	Carsrud, A.	United States	730.5	4	2,922	4
2	Gailly, B.	Belgium	448.0	2	896	2
3	Sequeira, J.	United States	415.0	2	830	2
4	Marlino, D.	United States	337.0	3	1,011	3
5	Wilson, F.	Unites States	337.0	3	1,011	3
6	Franke, N	Austria	325.0	2	650	2
7	Gupta, V.	United States	303.0	2	606	2
8	Turban, D.	United States	303.0	2	606	2
9	Mueller, S.	United States	302.0	2	604	2
10	Miao, C.	United States	255.5	2	511	2

Strategic thematic analysis

In contrast to previous bibliometric analyses, in this paper we present thematic strategic maps on EI research using bibliographic coupling and taking into account the LC and GC of the analysed papers (Figures 10 and 11). As already mentioned in the methodological part of this study, Figure 10 shows the strategic map generated through the analysis of the bibliographic references contained in the papers in the collection and which are grouped and labelled according to author keywords. The size of the circles reflects the number of documents clustered by bibliographic coupling. The 5 clusters that have been generated are thus presented, which show the main scientific conversations that have been established between researchers in the area over the years analysed. Figure 11 replicates the analysis but taking into account in this case the Global and not only the Local Citation, showing a similar pattern of development but differentiated in one main aspect: the position of the blue cluster in this map with respect to the previous one.

Figure 10 Strategic map using Local Citation Scores: Bibliographic coupling and authors' keywords
Source: RStudio

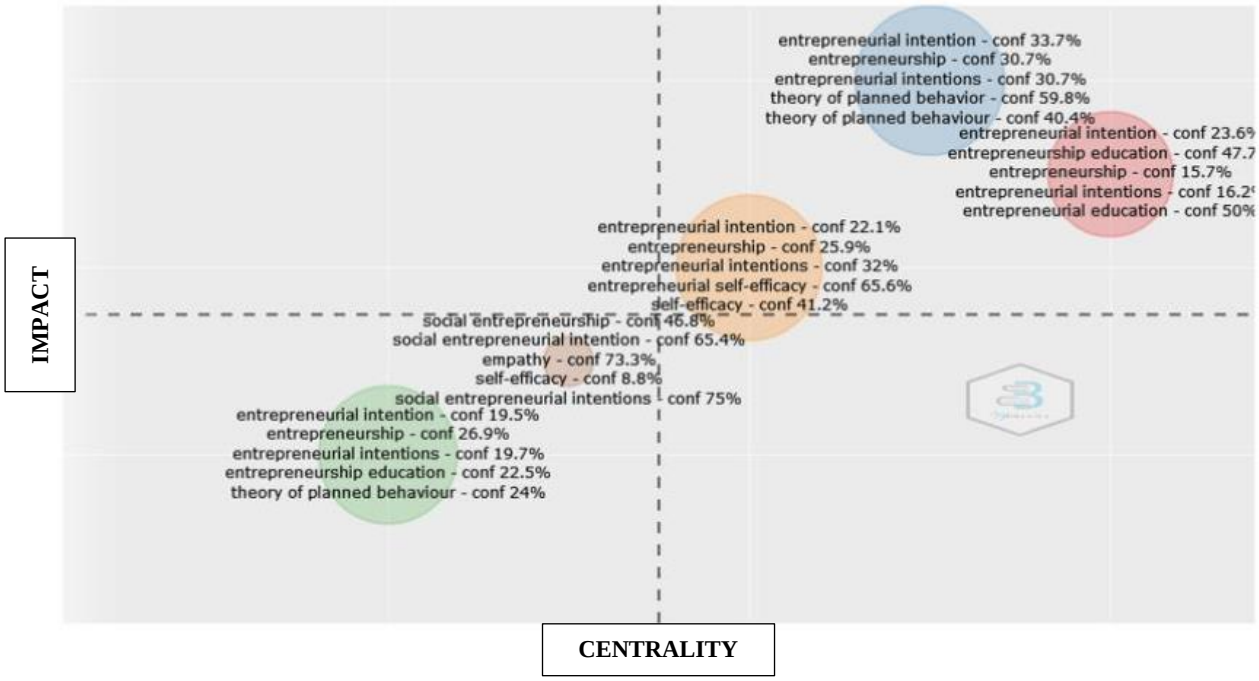
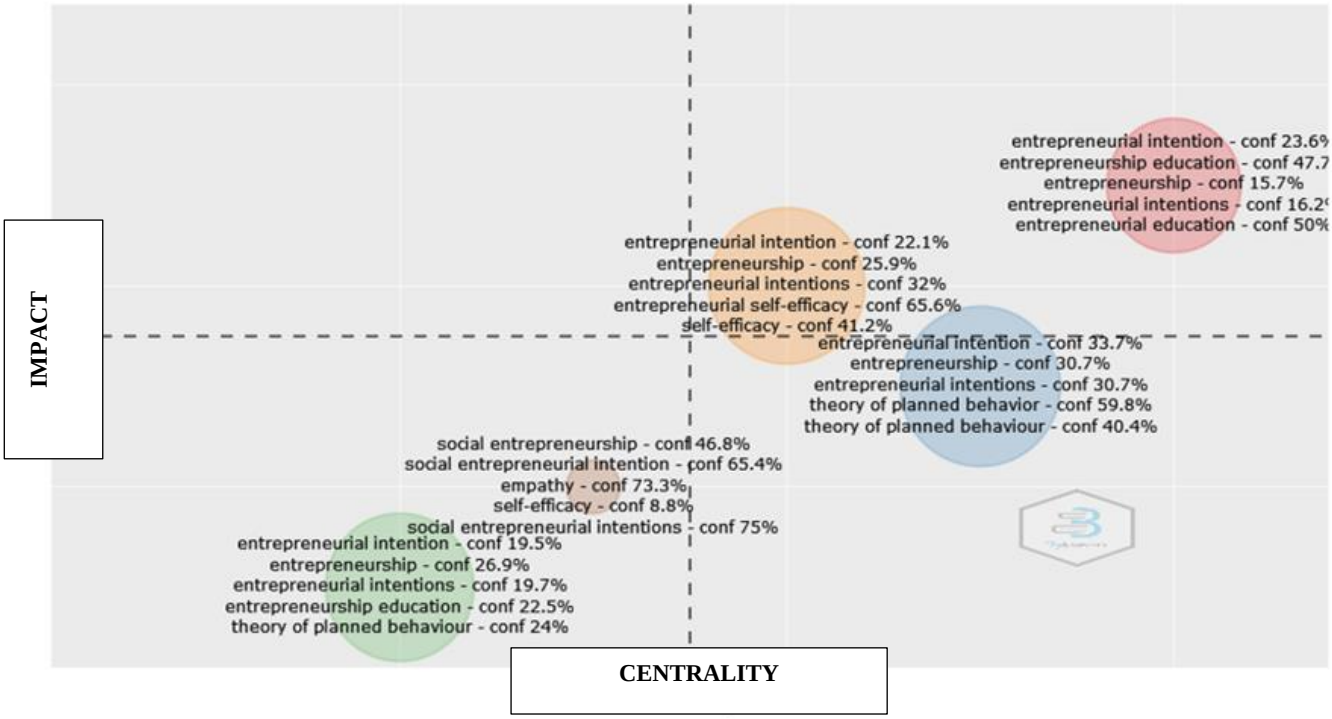


Figure 11 Strategic map using Global Citation: Bibliographic coupling and authors keywords
Source: RStudio



In the clusters, the keywords that characterise each cluster are overprinted together with their percentage of occurrence over the total number of terms found in each cluster, indicating the 5 terms that appear most often in the clusters. Thus, given the specialisation of the topic in the area of entrepreneurship and the term being analysed, EI, the 4 main clusters point to "entrepreneurial intention" (plural and singular) and the term "entrepreneurship" as common to all research in this area. In the fifth and last cluster, the words "social entrepreneurship" and "social entrepreneurial intention" are very representative, a theme that has its scientific basis in EI, but for initiatives that are not necessarily for business purposes. As Silva Martins *et al.* (36) point out, the emergence of these terms confirms the goodness of the inclusion criteria in the systematic analysis of the literature.

But in addition, specific words that give the cluster its main character stand out: in the blue cluster the terms Theory of planned behavio(u)r (conf. 100.2%), in red "entrepreneurial (entrepreneurship) education" (conf. 97.7%), in yellow "(entrepreneurial) self-efficacy" (conf. 106.8), in green "entrepreneurship education" (conf. 22.5%) and "theory of planned behaviour" (conf. 24%) and, finally, in brown the term "empathy" (conf. 73.3%) accompanying the main terms of the cluster. It should be borne in mind that in some cases the cumulative percentage of terms, if we do not distinguish their spelling, exceeds 100% of the total number of papers

grouped in a cluster, as in some cases the terms may appear in their different versions in the keywords of the same paper.

In order to be able to properly characterise and differentiate one cluster from another, distinguishing the scientific interest of each cluster, the researchers had to read the papers contained in each cluster in depth, especially those with the highest number of citations (Local or Global, as the case may be). This led us to clearly differentiate between red and green clusters, both of which had an important configuration (conf) of entrepreneurial education, and with a keywords load of 97.7% in the red cluster, and 22.5% in the green cluster.

Bibliometrix gives an added value over those maps that can be built by other bibliographic software, as it can be configured considering either the LC (Figure 10) or the GC (Figure 11). Thus, it not only generates the clusters but also shows us the relative position of each cluster with respect to the others, assigning it a role in the scientific dialogue that is taking place in the field and depending on whether the Local or Global Citation is considered. The in-depth analysis of the map, as the software allows to know each and every paper included in a cluster, reduces the subjectivity of interpretation of the clusters, but it also makes it possible to know the moment at which each group is in the field, making it possible to time the conversations.

Five different clusters were thus found. A detailed analysis of the works contained in a cluster leads to the following characterisation of each cluster: (i) cluster blue brings together papers that are very much focused on EI conceptualisation, the discussion of the models explaining EI, especially the TPB-based model, the methodology associated with its development, and the discussion of its components, with Esfandiar *et al.* (64), Kautonen *et al.* (59), Fayolle and Gailly (65) and Liñan and Chen (52) being those which count the most in this cluster; (ii) cluster yellow, with Hsu *et al.* (66) and Nowiski *et al.* (67) the documents characterising this cluster the most, grouping works whose central concern is the conceptual and measurement development of the construct of self-efficacy and its relationship with EI; (iii) cluster green groups those papers interested in entrepreneurship education, but mainly focused on the contextual factors that could influence EI such as institutional, cultural, regional, and economic environment factors surrounding the educational context, with Fayolle *et al.* (61), Urban and Kujinga (68), and Oosterbeek *et al.* (69) as leaders of this group; (iv) cluster red is also centred on entrepreneurial education but mainly related with individual characteristics and personal context, dominating Liñan and Rodríguez-Cohard (70), Barba-Sánchez and Atienza-Sahuquillo (71), Nowiski and Haddoud (72), and Maresch *et al.* (73); and

(v) cluster light brown, with Hockerts (74) and Zaremohzzabieh *et al.* (75) as representatives, groups documents interested in social entrepreneurial intention (SEI), and empathy as a remarkable personal antecedent of SEI. A total of 22 documents remained unclassified. Table 8 provides additional information on the characterisation and morphology of each cluster. In the same table we have also reflected the articles, authors, and journals highlighted in the preceding sections in the light of the bibliometric analysis previously carried out.

The highest number of citations, both Global and Local, are observed in the yellow and blue clusters, those that use universal concepts shared by a good number of areas. However, if we consider the weight of GC over LC, it is the yellow and red clusters that receive more attention at the global context than at the local one, with the former receiving 3.5 GC for every LC, and 3.3 GC for every LC, respectively.

The maps generated considering LC and GC are very similar, with blue, red and yellow clusters as motor themes, and light brown and green as emerging and with symptoms of exhaustion themes, respectively. If one considers the citation of these papers in other EI and non-EI research areas, GC retract the blue cluster to a position of peripheral theme (Figure 11). In this sense, not being a core theme when global context is considered, the EI research area has a prolific production on TPB, helping other research areas to apply this theory and to build up their arguments not always related to EI. On the other hand, if we only take into account the citation within the specialised collection of EI documents, this same cluster becomes a motor theme of this field of study with an impact of 35.2% of LC with respect to GC.

Discussion, Conclusions and Limitations

This paper complements other previous literature reviews and bibliometric studies on the EI literature summarised here. The active use of LC, which delves deeper into the more specialised EI literature, as a complement to GC, leads us to interesting conclusions not highlighted by other literature reviews to date. Furthermore, the scientometric approach adopted in this work obliges us to analyse the papers included in the review not only from a purely bibliometric perspective, which maps and explores the mathematical and statistical results of the citations, but also from an in-depth analysis of the papers included in the review to reveal weaknesses and strengths of the research conducted so far about this topic. Therefore, in this results discussion section we also summarise the main conclusions drawn from the in-depth analysis of the papers contained in each cluster.

Table 8 Summary of research poles and clusters in the development of EI research

		RESEARCH POLES ON ENTREPRENEURIAL INTENTION				
		Modelling EI and discussing its antecedents and relationships	**Self-efficacy as an antecedent of EI**	**Social EI**	**Effect of Education on EI**	
Cluster Morphology	Cluster	Blue	Yellow	Light brown	Red Personal Factors	Green Educational context
	Strategic position in the research area	Motor theme (LC) Peripheral topic (GC)	Motor theme (LC, GC)	Emerging theme (LC, GC)	Motor theme (LC,GC)	Symptoms of exhaustion theme (LC,GC)
	Number of documents(% of the total clustered papers)**	537 (28.3%)	501 (26.4%)	83 (4.4%)	341 (18%)	436 (23%)
	Keywords labels (% of total keywords in a cluster)	Theory of Planned Behavior:**59.8**% Theory of Planned Behaviour:**40.4%** Entrepreneurial intention:33.7% Entrepreneurial intentions:30.7% Entrepreneurship: 30.7%	Entrepreneurial Self-Efficacy:**65.6%** Self-Efficacy:**41.2%** Entrepreneurial intentions:32% Entrepreneurship: 25.9% Entrepreneurial intention:22.1%	Social Entrepreneurial Intentions: **5%** Empathy:**73.3%** Social Entrepreneurial Intention:**65.4%** Social Entrepreneurship:46. 8% Self-efficacy:8.8%	Entrepreneurial Education:**50%** Entrepreneurship Education:**47.7%** Entrepreurial Intention:23.6% Entrepreneurial intentions:16.2% Entrepreneurship: 15.7%	Entrepreneurship: **26.9%** TPB:**24%** Entrepreneurship Education:22.5% Entrepreneurial Intentions:19.7% Entrepreneurial Intentions:19.5%
	Clusters' key papers	Esfandiar *et al.* (2019) Kautonen *et al.* (2015) Fayolle and Gailly (2015) Liñan and Chen (2009) (52,59,64,65)	Hsu et al. (2019) Nowiski *et al.* (2019) (66,67)	Hockerts (2017) Zaremohzzabieh *et al.* (2019) (74,75)	Liñan and Rodríguez-Cohard (2015) Barba-Sánchez and Atienza-Sahuquillo (2018) Nowiski and Haddou (2019) Maresch et al. (2016) (70–73)	Fayolle *et al.* (2006), Urban and Kujinga (2017) Oosterbeek et al. (2010) (61,68,69)
	Local Citations	5,690	5,444	267	1,593	3,843
	Global Citations	16,138	19,036	852	5,212	11,605
	LCR	35.2%	28.6%	31.3%	30.6%	33.0%
	GC/LC	2.8	3.5	3.2	3.3	3.2
Cluster Key Characteristics*	Key papers considering LCR (Table 3)	Liñán and Chen, 2009; Kautonen *et al.* 2015; Souitaris *et al.* 2007; Krueger and Carsrud 1993 (52,59,60,63)	Thompson, 2009 Zhao *et al.*, 2005 Chen *et al.*, 1998 (53,54,58)		Liñán and Fayolle 2015 (5)	Krueger *et al.* 2000 Fayolle *et al.* 2006 Wilson *et al.* 2007 (51,61,62)
	Key journals (Table 4)	IEMJ; IJESB; E&T	IJEBR; ET&P; IEMJ	IJEBR; IJESB SS	E&T; SS; JEE	E&T; IJESB; JEE
	Key authors (Tables 5,6,7)	Liñán, F. Kautonen, T. Fayolle, A. Kickul, J.	Moriano, J.A.	Liang, C. Obschonka, M.	Wibowo, A.	Fayolle, A., Rodrigues, R.G.

* Characterisation of each cluster according to the bibliometric results of this paper, shown in previous sections.

***22 papers remain unclassified. ESE: Entrepreneurial Self-Efficacy; SEI: Social Entrepreneurial Intention; Journals- ET&P: Entrepreneurship Theory & Practice; IEMJ: International Entrepreneurship and Management Journal; E&T: Education and Training; IJEBR: International Journal of Entrepreneurial Behaviour and Research; IJESB: International Journal of Entrepreneurship and Small Business; JEE: Journal of Entrepreneurship Education; SS: Sustainability (Switzerland).*

Thus, with the help of LC, four major poles of attraction for researchers in this field have been identified. Entrepreneurial education, with 41% of the EI papers published (Table 8), is a fundamental area of interest, although, concerning this area, researchers have positioned themselves on two well-differentiated work fronts: (i) contextual factors surrounding the educational environment and their impact on EI (green cluster), counting for 23% of the total EI papers published, and (ii) the individual characteristics and personal context that influence EI (red cluster), counting for 18% of the EI papers (Table 8). If we consider the timeline, the papers in the first group emerged before the papers focusing on individual characteristics, and probably did so as a way to test the models previously analysed by Krueger *et al.* (51) in the university context. Now, close to the first quarter of the 21st century, this cluster shows some signs of exhaustion by evolving towards the analysis of personal characteristics grouped in the red colour. Research in this area sees entrepreneurship education as a way of positively influencing EI, and as a means of promoting and changing behaviour at both the individual and collective levels. However, as Kautonen *et al.* (76) have pointed out, it is time for researchers to move beyond the proximity of their undergraduates to discover EI at different life stages and to seek the generalisability of the results. Moreover, by jumping out of their classrooms in looking for EI at the vocational levels, they can find as much or more EI than that of the university students. In contexts of crisis, the EI is rooted in different groups, and it is not unusual to find it, for example, at the base of the silver economy –*i.e.*, senior entrepreneurship- or in social groups such as women or immigrants. It is perhaps from this that the flourishing of social entrepreneurship has been taking shape as we have verified with the emergence of light brown cluster.

Methodology and model discussions, strongly linked to the TPB-based model and its components, represent the driving force of the research area in terms of LC, counting for 28.3% of the total number of EI papers published (Table 8). This research focus has generated special attention outside this area of study (GC), in not necessarily related areas, where this cluster plays a peripheral role. But what seems necessary is to continue to approach the study of EI from as many perspectives as possible. Despite the results of Krueger's *et al*. (51) work, the most cited and seminal work-related to the EI topic, which found the EEM to be more appropriate for analysing EI, researchers have embraced the use of the TPB model following the Armitage and Conner (57), and Schlaegel and Koening (30) recommendations. Probably driven by the need to contrast and discuss the previous results of other colleagues, they avoided finding new results with Shapero and Sokol's alternative EEM as we have seen when

considering its GC (Figure 6). However, Azjen's recent reflections finding the EEM highly convergent with the TPB (77) due to the versatile nature of Perceived Behavioural Control antecedent, give us the opportunity of exploiting the event triggering as part of the enablers of entrepreneurship. But, can we find out more about that booster event? Is this a necessary step to drive the entrepreneurial process? What role does this event play in forming the implementation intention? These, among others, are some of the questions that highly specialised researchers in EI should try to answer.

This last cluster is followed by those papers interested in self-efficacy and its relationship to EI, accumulating 26.4% of the total EI papers published. Although the debate on the antecedent or moderating character of the ESE does not yet seem to be over (78,79), there is no doubt that it is still necessary to verify its stability throughout the different stages of the entrepreneurial process and, especially, in groups other than those analysed so far. Finally, with a modest 4.4% of the total EI papers, an emerging subfield is attracting researchers' attention to social entrepreneurial intention, connected in many cases with the concept of empathy highlighted by Mair and Noboa (80), recently studied by Packard and Burnham (81) in the context of entrepreneurship. The application of the concept of empathy as an antecedent of perceived desirability seems well justified in the context of social entrepreneurship. However, it has been scarcely investigated for non-social EI where it can certainly play an important role given the greater sensitivity of businesses to sustainable development objectives.

On the other hand, despite repeated calls from both a literature review and pure research papers on the topic of EI insisting on the need to demonstrate the relationship between EI and EB, the truth is that few have taken up the challenge, and those that do are tackling it outside the area of influence and progress in the EI research as the contrast of LC *vs* GC has shown. The research topic resists entering the plateau phase and continues to rise. It is still a good moment to invest time and effort in the topic of EI, especially if the new researcher focuses his(er) interest on the EI-EB relationship. In this sense, the paper by Kautonen *et al.* (59) was a pioneer in this particular research area, and it is highly recommended reading. To have a better update about this EI-EB relationship, it is also recommendable the recently published work of Kallas and Parts (82), with a context approach; Baluku *et al.* (83), interested in family support to entrepreneurship; or Bogatyreva *et al.* (84) who analyse the cultural role in this process.

All this knowledge has been collected in 1,920 articles, published in 530 journals in which 4,239 authors have contributed their works from 1977 to 2021. Ninety per cent of the

publications were concentrated between 2006-2021, with 2020 being the most productive year to date. We agree with Dohley (4) and Ruiz-Alba *et al.* (38), whose work was based on GC, that Krueger *et al.* (51) is the most cited work in this research area even from LC. Nevertheless, we highlight the foundational role played by this paper together with those of Liñán and Chen (52), and Zhao *et al.* (53). They together account for 2,050 LC (38% of the most important EI papers' LC). But if it were not for the analysis of the LC, we would not know the role played by Thompson. This author develops an interesting metric that has had limited significance, showing 462 GC (Table 4), despite his paper being published in a very high impact journal. The reality is that more than half of its citations come from researchers specialising in the area of EI (LCR: 54.76%) and this information is relevant. The metric suggested by this author for EI, in relative terms, achieves, for each GC, 0.58 LC compared to the 0.52 LC achieved by Liñán and Chen's intention measurement instrument. While a paper with similar global impact, such as Kautonen *et al.* (2015), with 480 GC, gains its popularity outside this field of study, as more than half of its citations are obtained out of this area of research (LCR: 41.51%).

We qualify the result of Ruiz-Alba *et al.* (38) by finding that the majority contribution to the topic comes from the *Business, Management, and Accountant* area, while *Economics, Econometrics, and Finance*, and *Social Science* play a lesser role. However, and contrary to what these authors claim, it is European researchers who lead in the number of publications, while US researchers lead in the number of citations, without losing sight of the prominence of the Asians. Moreover, Dohley (4) and Ruiz-Alba *et al.* (38) rank Francisco Liñán as the most prominent author, and he certainly is, but we have also been able to reveal the long career of Lars Kolvereid and Jill Kickul in this topic, the high level of specialisation of Ricardo G. Rodrígues, and the productive capacity of Agus Wibowo. Regarding the journals, if we go deeper into LC, seven journals are highly specialised in EI: JEEE, JEE, JDE, JSBE, IJME, IJGE, and IJESB –see acronyms in Table 4.

What is certain is that direct citation added value to bibliometrics by discriminating between LC and GC, and its inclusion in future review papers is therefore advisable. However, although our methodological decisions were inspired by good practices and other bibliometric reviews (15,21), we encourage future researchers to conduct up-to-date bibliometric reviews on EI. Even though, the previous reflections should be taken with the necessary caution imposed by a study of this nature, which, like all studies, has limitations. First, in this paper, the bibliometric study has been carried out using direct citation, considering LC and GC separately, as a means of study, complementing these results with those presented by other

authors in their reviews is important. Therefore, we invite the reader to analyse the results of the papers listed in Table 1. Secondly, it is important not to lose sight of the fact that our results were based on a search of published papers on EI with no date limit, but restricted in language, and the eventuality that these papers were published in a Scopus-indexed journal. In this sense, and although Scopus presents an important indexing scope, not all journals are always included throughout all the years analysed. This means, for example, that an article of some relevance to the field, such as that of Barbara Bird (85), published in the year 1988 in the *Academy of Management Journal*, was not found by our systematic search, although this author was one of the first to put a theoretical approach to the EI concept on the table. *Scopus* keeps an annual record of the citations received by the articles since 2006. Although references in Scopus go back as far as the 1970s, indexing is progressive and up-to-date citations for an author, let alone a paper, are not always available.

Another limitation has to do with the keywords selected for the search engine. Although the decision was made based on other similar works (4,5,17,34), it could leave out papers where keywords such as *entrepreneurial orientation* are used to refer to EI. It is also a limitation related to the development of bibliometrics that researchers cannot control, the formatting errors in citations that affect all papers indexed in a database. This aspect will gradually be minimised thanks to the popularisation of the use of bibliographic software by researchers, as well as the adoption of the DOI as a document identifier, among other measures.

We believe that one of the main contributions of the paper is precisely to show how the consideration of direct citation, distinguishing LC from GC, can significantly change the position of a paper or the relevance of an author in the research area under study. In addition, calculations based on LG over GC allow us to know, in the relative position of an author or journal in a ranking, whether or not they are more specialised in this specific area of research. This allows an interested researcher to know who is who in the field and the real relevance of their work within the specific topic under study, as well as the degree of specialisation of a journal in a topic.

Our results provide a satellite view useful for both junior and senior researchers interested in EI who will surely continue to grow this topic of study to new heights. This knowledge will contribute not only to the development of more precise and accurate policies to foster entrepreneurship, but also to fighting unemployment generated by the successive crises we have suffered in the last decade. Without any doubt, EI is still alive: Long live Entrepreneurial Intentions! (86).

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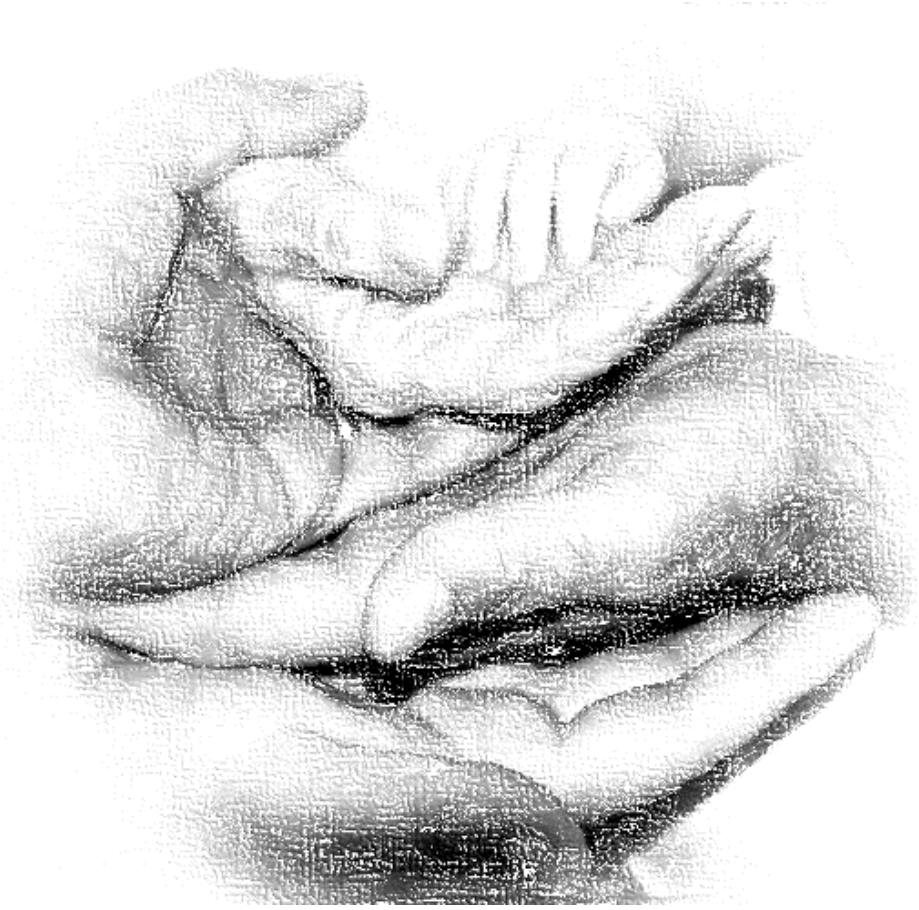
Appendix 1 Criteria for determining the scientometric character of the literature reviews included in Table 1 of this paper

PAPER	CRITERIA 1	CRITERIA 2	CRITERIA 3	Scientometric review
	Statistics, Math, AI	In depth review of papers	Research purpose	Yes/No
Determinants of Entrepreneurial Intent: A Meta-Analytic Test and Integration of Competing Models (Schaegel and Koenig 2014) (30)	No	No	Yes	No
A systematic literature review on Entrepreneurial Intentions: Citation, Thematic Analyses, and Research Agenda (Liñán and Fayolle 2015) (5)	No	No	Yes	No
The theory of planned behaviour in entrepreneurship research: what we know and future directions (Lortie and Castogiovanni 2015) (29)	No	No	Yes	No
Weight- and meta-analysis of empirical literature on entrepreneurship: Towards a conceptualisation of entrepreneurial intention and behaviour (Alferaih 2017) (37)	No	No	Yes	No
Entrepreneurial Intention: Categorisation, Classification of Constructs and Proposition of a Model (Silva Martins *et al.* 2018) (36)	Yes	Yes	Yes	Yes
Entrepreneurial self-efficacy: A systematic review of the literature on its theoretical foundations, measurement, antecedents, and outcomes, and an agenda for future research (Newman *et al.* 2019) (31)	No	Yes	Yes	No
A bibliometric analysis of research on entrepreneurial intentions from 2000 to 2018 (Dolhey 2019) (4)	Yes	No	No	No
Intentions resurrected: a systematic review of entrepreneurial intention research from 2014to 2018 and future research agenda (Donaldson 2019) (17)	No	Yes	Yes	No
Academic entrepreneurship intentions: a systematic literature review (Neves and Brito 2020) (32)	Yes	Yes	Yes	Yes
A Systematic Literature Review on Social Entrepreneurial Intention (Tan *et al.* 2020) (33)	Yes	Yes	Yes	Yes
From personal values to entrepreneurial intention: a systematic literature review (Hueso *et al.*, 2021) (34)	No	Yes	Yes	No
Analysing the past to prepare for the future: a review of literature on factors with influence on entrepreneurial intentions (Pérez-Macías *et al.* 2021) (1)	No	Yes	Yes	No
Entrepreneurial intentions: a bibliometric analysis (Ruíz-Alba *et al.* 2021) (38)	Yes	Yes	Yes	Yes
An AHP analysis of scientometrically derived factors of entrepreneurial intentions of women and constructing a conceptual research framework (Patra and Lenka 2021) (35)	Yes	Yes	Yes	Yes



CAPITULO IV

Exploring The Socio-Cognitive Theory of Entrepreneurship Using a Bayesian Learning Approach[*]

[*] This article is under review in a JCR Q1 ranked scientific journal. Submission date: May, 8th 2023. Co-authors: Batista-Canino, R.M. & Navarro-Mesa, J.L.

Sinopsis y justificación del capítulo en el contexto de la línea de investigación sobre el enfoque generacional en el estudio del emprendimiento

Esta parte del trabajo representa una tentativa empírica que trata de indagar en la metodología idónea para el estudio de amplias cohortes de individuos como unidad de análisis y un importante volumen de datos que las técnicas estadísticas tradicionales no facilitan. Así, uno de los principales inconvenientes del estudio de cohortes generacionales considerando un número no pequeño de factores para su caracterización, es enfrentarse con una ingente cantidad de datos, tanto para la modelización de las predicciones como para la determinación de los factores explicativos bajo estudio. Además, el inconveniente de trabajar con muestras no equilibradas nos obligó a repensar la forma en que los análisis debían realizarse para llegar a conclusiones válidas. Si a ello se unen las reflexiones de un buen número de investigadores en el campo del emprendimiento que observan cómo los métodos estadísticos tradicionales, especialmente los basados en las hipótesis de normalidad, arrojan resultados en los que las singularidades de los individuos analizados, los emprendedores, se desdibujan, el reto estaba servido.

Es así como llegamos a la conclusión de que todas estas particularidades para los trabajos sobre emprendimiento en general, y con un enfoque de generaciones en particular, nos conducían al uso de la estadística Bayesiana que queda justificada convenientemente en el presente trabajo. Para operativizar la misma se barajaron diferentes métodos basados en la inteligencia artificial (IA).

Aunque no se ha concluido el análisis para testar sus bondades en las cohortes generacionales desagregadas, las pruebas realizadas a modo de tentativa nos permitieron llegar a resultados que merecía la pena dar a conocer a los investigadores del campo, revelando además el interés de una teoría aún poco explorada en el ámbito de investigación que nos ocupa: la *Teoría del Aprendizaje Sociocognitivo* de Bandura. Con el propósito de revelar sus resultados ha visto la luz el presente *paper*.

No obstante, aún hay interrogantes por resolver pues la diversidad de técnicas de IA que pueden ser activadas en los estudios de enfoque generacional es amplia (*e.g.*, árboles de decisión, redes neuronales, cadenas ocultas de Márkov…), y deja abiertas muchas puertas para el estudio que nos ocupa. Esta es, por tanto, una mera aproximación empírica que facilita el camino a esta línea de investigación.

ABSTRACT

Grounded in the Socio-cognitive Learning Theory of Bandura (1986,1999), this research aims to reveal the explanatory and predictive power of the individual's aggregate socio-cognitive attitudes on entrepreneurial behaviour, even beyond the start-up phase, and at both micro and macro levels. This research applies Informed Supervised Machine Learning using a Bayesian Learning Approach on 16 socio-cognitive patterns of attitudes, over almost 300,000 individuals both involved and not involved in the entrepreneurial process. Data from the Global Entrepreneurship Monitor (GEM) were collected over 14 years, including the turbulent period of 2008. The findings suggest that for the same entrepreneurial behaviour, there may be different socio-cognitive patterns underlying it and that those patterns are not resilient to the turbulence of the environment. These results are particularly relevant for predictive models and theories related to entrepreneurial intention and behaviour, which consider these attitudes as precursors without any consideration of their true nature. This paper contributes to developing the Socio-cognitive Theory of Entrepreneurship shaping a theoretical framework to explain the interaction between entrepreneurial mindset, action, and context at the individual and collective level that summarises and amplifies our findings.

Plain English Summary The use of Artificial Intelligence techniques supported by the Bayesian Learning algorithm leads us to discover the aggregate effects of the individuals' socio-cognitive attitudes -*i.e.,* how individuals process and use information in the social context- to explain and predict their entrepreneurial behaviour. This paper reveals that there is no single pattern to explain and predict the entrepreneurial intention and behaviour of the population and that these socio-cognitive patterns do not remain unaffected by changes in the environment. A model to explain the interaction between entrepreneurial mindset, action, and context is proposed at the individual and social levels in this paper.

Keywords Socio-cognitive Theory; Bayesian Learning; Machine Learning; Global Entrepreneurship Monitor.

Introduction

Over the last decade, the study of the human mind has become a big concern in scientific work and has been of highly interest to those studying entrepreneurial activity. A search with the intersection of cognition and entrepreneurship in journals indexed in the main databases yields 1,600 papers published in the last 15 years, representing a large scientific production on entrepreneurial cognition. In this area, Grégoire *et al.* (2011) point out a research challenge the need to better capture the dynamic relationships between the mind, the environment, and entrepreneurial action, recognising the interest of simultaneously considering the role and interaction of different cognitive variables at different levels of analysis. This call has been recently reinforced by Shepherd (2015) and Daspit *et al.* (2023) who demand more nuanced studies that theorise and test the interactions of the environmental dynamism and sociocultural context to alter the entrepreneurial mindset outcomes. Such challenges have been addressed in different ways by recent papers such as those of Boudreaux *et al.* (2919, 2022), Graham & Bonner (2022), and Meoli *et al.* (2020), among others.

In this context, the research on entrepreneurial intention (EI) and how it is transformed into entrepreneurial behaviour (EB) has been strongly linked to the analysis of the individual's cognitive attitudes. The literature on this area has advanced positively by riding on Ajzen's Theory of Planned Behaviour (TPB). However, the research area has barely risked testing new perspectives of analysis that can add value to that model, especially as far as the intention-action relationship is concerned (Kautonen et al., 2015). Although entrepreneurship scholars are still proving this link (Meoli *et al.*, 2020), intention models are indeed particularly catalytic in incorporating socio-cognitive attitudes (SCA) as precursors of intention and presumably of EB. But because intention usually highly correlates with attitudes, intentions should not always moderate the relationship between attitudes and individual behaviour (Bentler & Speckart, 1979, 1981). Thus, attitudes exert a dynamic influence on behaviour (Jain, 2014), organising and guiding complex behaviour towards an object (Pratkanis & Greenwald, 1989).

However, despite these theses, the true nature of these attitudes and their degree of sensitivity to environmental instabilities, an issue that can affect both EI and EB, has hardly been analysed in this theoretical framework. The present work seeks to highlight a set of antecedents undervalued in their capacity to predict EB without the mediated role of intention. We refer to the individual's SCA present in the entrepreneurial process (EP) and beyond the start-up phase, thus explaining the EB. With these inspiring ideas in mind, this research attempts to answer two main questions: (1) what SCA pattern of individuals best explains and predicts

EB, both at individual and collective levels? and, (2) how stable are these SCA patterns in response to general environmental conditions?

One prominent theory helps us in our mission: the Social-cognitive Learning Theory (SCLT) of Bandura (1986, 1999). Despite its relevance, this theory has underdeveloped its full potential to explain not only EI but EB. Scholars have considered the contextual effect of the relationship between SCA and EI (Boudreaux *et al.*, 2019; Camelo-Ordaz *et al.*, 2020; Meoli *et al.*, 2020), but its influence on the entrepreneurial process (EP) -that is, on the EB- have hardly been researched. This approach is one of the recent challenges of entrepreneurship research (Donaldson, 2019), and it helps to answer the reasonable doubt that Mickiewicz et al. (2017) raise when considering the impact that these SC exert on later stages of the start-up process.

Given that entrepreneurial decisions are taken under the constant pressure of a context and in a complex network of relationships, which gives a strong systemic (Fredin & Lidén, 2020) and multi-level (Audretsch *et al.* 2021) character to the phenomenon, we work on two levels of analysis: individual, at the micro level, and collective, at the macro level. But in addition, the study is approached by considering the *who*, *when* and *where*, as a way of understanding the results in their context, responding to Newbert *et al.* (2022) concerns. Related to *who*, nascent entrepreneurs are contrasted with both the general population and the entrepreneurs at other decisive moments in their projects: whether they are considered consolidated, or whether they are discarded or eliminated from their investment portfolio, leaving the entrepreneurial activity (Daspit *et al.*, 2023). *When* leads us to evaluate the SC in a context of high uncertainty, while the *where* prompts us to consider a single country to avoid institutional differences not under control in this research.

The nature of the study, considering its purposes, requires working with a significant volume of data. Furthermore, the information collected comes from a population that is heterogeneous in its behaviour -Davidsson (2003), Douglas *et al.* (2020), Kerr *et al.* (2018)-, leading us towards inference methods that do not require any distribution of the data as a starting assumption. In addition, this enables us to work with a large volume of information and imbalanced data (Chae, 2023; Matikonis & Gobey, 2023), considering Bayesian Learning (BL) approach useful for these purposes. With this in mind, this research uses Supervised Machine Learning (SML) -an Artificial Intelligence (AI) tool- (Schwab & Zhang, 2019) to be combined with expert knowledge –*i.e.*, Informed ML (IML)- (von Rueden et al., 2021) in the development of good models.

Obschonka & Audretsch (2020) reveal the importance of AI for entrepreneurship, offering researchers new tools capable of working with a greater volume of information *(Mahmoodi et al.*, 2017), and of discovering patterns that might not be apparent in smaller samples (Kosinski *et al.*, 2016; Prüfer & Prüfer, 2020). This is critical to deal with variables that play a central role in cognition-, action-, and environment-based use in our research field (Crawford *et al.*, 2015; Douglas *et al.*, 2020). However, this paper falls in the 'safe zone' proposed by Lévesque *et al.* (2020) –*i.e.*, integration of AI in theory testing-, using a data-driven approach (Kar & Dwivedi, 2020) to reinforce the theory proven. Then, using Global Entrepreneurship Monitor (GEM) data from 14 years and almost 300,000 individuals we try to explain the EI and EB through the SCA that underlie the entrepreneurs' behaviour, in building a Socio-cognitive Theory of Entrepreneurship (SCTE). To accomplish our purpose, this paper has an initial section where the theoretical background is discussed. Next, we present the context and methodological framework of the study, and finally, we discuss our results and present the SCTE shaping a theoretical framework proposed prior to the conclusions and limitations of this research.

2 Theoretical Background

2.1 Antecedents of EI and EB

In the attempt to explain the influence of SCA on EB, we apply Bandura's SCLT (1986, 1999). This theory uncovers the cognitive process that the individual follows when learning and acting. Its approach is well summarised in the Principle of Triadic Reciprocality by which behaviour is the result of reciprocal interaction of personal factors, behaviour -own and others-, and environment. This theory highlights the process of learning by observing, modelling, and imitating other attitudes, reactions, and behaviours. It is the individuals' cognitive capacities, and their perception of the context, that will allow them to visualise the foreseeable consequences of their actions, redirecting their future behaviour. The SCTE will be the application of these principles to the EB.

In this context, social cognition refers to how individuals process and use information in the social context –*i.e.*, about other people, themselves, and social events- to behave (Fiske & Taylor, 2017; Hamilton, 2005). According to Ajzen (2020), attitude is a disposition to respond favourably or unfavourably to an object, person, or event, and it has an evaluative character affecting individual intention and behaviour. Thus, interest is growing among scholars in the use of SCA to learn more about the factors that explain EI -understood as the prelude to the

business venture (Fayolle & Liñan, 2014)-, and EB in which the use of Social Cognitive Career Theory (Lent & Brown, 1994) increases significantly (Meoli *et al.*, 2020; Camelo-Ordaz *et al*., 2020). In these studies, a cognitive-behavioural approach has been consolidated (Fayolle & Liñán, 2014) concerned with revealing the cognitive factors that influence and explain an individual's interest in becoming an entrepreneur. The models developed in this domain have been diverse, but most of them have converged on two theories: Ajzen's TPB (1985,1991), and Shapero & Sokol's Entrepreneurial Event Model (1982).

Thus, cognitive psychology emphasises that everything the individual thinks, says, or does is strongly influenced by mental processes through which information is acquired, transformed, and used (Baron, 2006) shaping personal attitudes. Therefore, the effect of context on the individuals is evident in their SCA and behaviours. This cognitive capacity is predictable (Bandura, 1978), and has a great influence on the EP -Boudreaux *et al.*, 2019; Elfving, 2009-. Thus, the knowledge structures from which the individual values, judges, and makes decisions concerning opportunities, to create a company or make it grow, are key to understanding the EP (Mitchell *et al.*, 2002). Therefore, the potential entrepreneur captures and processes information from the environment and then, through a significant cognitive effort, transforms the perceived opportunities into viable business proposals (Krueger, 1993; Camelo-Ordaz *et al.*, 2020). Hence, the main models of EI have incorporated certain SCA as precursors. The most important of those are outlined below.

Perceived self-efficacy. Many theoretical models on EI incorporate perceived control over behaviour (Bandura, 1977), labelled as perceived feasibility by Shapero & Sokol (1982). Self-efficacy is a mechanism of personal control (Krueger *et al.*, 2000) that can be affected by individual expectations and negative environmental signals inhibiting entrepreneurial action (Mauer *et al.*, 2009). A high degree of self-efficacy, because of education and job experience, would affect the EP, especially beyond the start-up phase (Mickiewicz *et al.*, 2017).

Social capital. Norms and networks knitted around an entrepreneurial project generate the conditions for opportunities recognition and business growth (Nieto & González-Álvarez, 2016). Family, friends, investors, and other entrepreneurs influence the entrepreneur's decision-making (Arenius & Minniti, 2005), this is why they never disconnect from their network, but rather keep it growing (Hormiga *et al.*, 2011). However, this relationship is positive in the nascent stage, and perceived as part of business competitiveness at later stages (Mickiewicz *et al.*, 2017).

Opportunity Recognition. Alertness and opportunity recognition (Shane, 2000; Shane & Venkataraman, 2000) are significant in the EP, as they increase the probability of becoming an entrepreneur motivated more by opportunity rather than necessity (Boudreaux *et al.*, 2019). Alertness is high in those involved in EB (Minniti, 2004). Nevertheless, changes in the individuals' cognitive framework, because of continuous learning, led the entrepreneur to become more sensitive to the environment (Wyrwich *et al.*, 2016) and to opportunity.

Fear of Failure. It exerts a powerful influence on decision-making (Arenius & Minniti, 2005) becoming a real barrier to entrepreneurial activity (Cacciotti *et al.*, 2016; Ahmadi, & Soga, 2022). The individual's attitude towards failure is key to facing uncertainty related to the results of actions (Boudreaux *et al.*, 2019). Its negative effects on EB can be reduced if the potential entrepreneurs perceive an energising environment in which they can acquire knowledge (Wyrwick *et al.*, 2016). There is no doubt that risk aversion, and fear of failure, are key in the EP. Those showing a greater entrepreneurial initiative manage better the fear of failure compared to others.

2.2. Multidimensionality of the SCA

All these SCA are relevant, to a greater or lesser extent, in the EP, both at an individual and at the collective level. In this regard, Mickiewicz *et al.* (2017) express reasonable doubts about the impact of some SCA beyond the start-up phase. We try to cover this gap in the literature, bearing in mind the multidimensional nature of cognitive structures (Knockaert *et al.*, 2015), differently than others to whom hierarchical status matters (Graham & Bonner, 2022-. This cognitive structure, analysed in an aggregate manner at an individual level, could be explaining why perceived self-efficacy and motivation do not seem to be sufficient to cope with the fear of failure (Arenius & Minniti, 2005), or why skills acquisition together with role models seem to be effective in dealing with the feeling of failure or even reducing fear (Ahmadi & Soga, 2022). Collectively, we consider the degree of stability that these SCA show in response to changes in the environment (Ahmadi & Soga, 2022).

2.3 Informed Supervised ML and BL Approach

ML uses data to search for patterns in an automated way. It is a group of computer algorithms intended to improve prediction accuracy as they process and learn from vast amounts of data. It is focused on prediction accuracy rather than on searching for a causal relationship between a set of presumably related variables (Chae, 2023). ML methods have been characterised by their usefulness in many domains but in some cases the limitation of being "black boxes" that

do not help researchers in deciding the more significant predictors of all of those included in a training process shows. In this regard, this disadvantage is solved when the learning algorithm is based on IML (von Rueden *et al.*, 2021). "Informed" means that raw data is introduced into the ML pipeline considering pre-existent expert knowledge, independent from the learning algorithms and related to the issue under study. Moreover, in our work, we adopt a Supervised learning approach which involves applying an algorithm to learn the relationships between input data and target outcomes (Cherkassky & Mulier, 1998; Fukunaga, 1990; Hastie *et al.*, 2001). Given the research design adopted in this paper, as we will see below, the adjectives applied to ML are extremely useful.

Inspired by the combination of data- and knowledge-driven approaches provided by the entrepreneurship literature (Lévesque *et. al*., 2020) we adopt an Informed Supervised ML (von Rueden *et al.*, 2020; Roscher *et al.*, 2020). In some way, we assume a holistic vision in which ML can be seen as an interplay between four factors: the data, the hypothesis space, the utility, and the algorithm (Jakulin, 2005; Russell & Norvig, 1995). The data are examples of some or all the random variables describing the domain of attributes. The hypotheses are probabilistic theories of how the domain works and are essential "intermediaries" between the raw data and the predictions.

A primary objective of learning is to predict outputs, using the information provided by the predictive variables. The hypothesis space is the internal 'language' in which the models are described. Considering our data and domain knowledge, the "best hypothesis" is the most probable one from that space. In our work, the learning algorithm chooses a single hypothesis (model) that has the highest utility. The utility may be the simplicity of the hypothesis, and its ability to discover associations between inputs and outputs. We say that the utility of a hypothesis is high when it generalises well, that is, it correctly makes predictions from novel examples. The model is then expressed in terms of the hypothesis space, conforms to the data, which is generated by procedures, priors, and rules of the algorithm, and is judged by the utility. It only remains to decide on the appropriate algorithm for the learning process, with BL being selected over other alternatives.

2.3.1 Appropriateness of Bayesian Reasoning to our research problem

Uncertainty is present in our research, and ML can manage it by using probability and decision theory methods. These methods must learn their probabilistic theories from experience, by formulating the learning task as a process of probabilistic inference. In this context BL is

extremely powerful, providing general solutions to the problems of noise -*e.g.*, missing data-, overfitting, and optimal prediction (Russell & Norvig, 1995; Webb, 2002). This learning algorithm calculates the probability of each hypothesis, given the data, to make predictions –*i.e.*, using all the hypotheses, weighted by their probabilities, instead of just a single "best" hypothesis-. A characteristic of BL is that prediction eventually agrees with the true hypothesis: under certain technical conditions, a repeated experiment in which examples of a class are given sequentially, the *a posteriori* probability of any false hypothesis will eventually vanish. A fixed prior–*i.e.*, the *a priori* probability- about the classes does not rule out the true hypothesis. Moreover, the Bayesian prediction is optimal, whether the data set is small or large. These are some of the reasons why it is being used recently in entrepreneurship research –*e.g.*, Ayalew (2020), Sohn & Lee (2013)…

3 Methodology

3.1 Data: Source and characteristics

The scientific considerations in this study about the relation of SCA and EB (states) can be tested using relevant data in terms of both quality and volume. Global Entrepreneurship Monitor (GEM) meets both requirements becoming one of the greatest efforts in the field of Social Sciences to investigate the economic and social role of entrepreneurship, and it is useful for the development of scientific improvements based on AI (Lévesque *et al*., 2020).

In line with Newbert *et al.* (2022), this research has a context in which the results are significant. Regarding the *where*, it uses single-country data obtained from the Adult Population GEM Survey, excluding other countries to avoid institutional bias as much as possible (Boudreaux *et al.*, 2019, 2020), which is not under control in this research. Thus, information has been collected from almost 300,000 individuals, over more than 14 years, while maintaining an overall annual sample error of up to 2.5%. Appendix 1 shows the sample description and the final data set.

As far as *when* is concerned the study uses data collected from 2002 to 2015. The sample has not been preserved from the world's socioeconomic downfall in the Great Recession of 2008 (Krugman, 2009). Time is a key subject in this research, and as such, we agree with Gaddefors & Anderson (2017) on the need not to take the context as an external factor, but rather as part of the EP. Thus, context must be part of the unit of analysis when looking at the long-term phenomenon. In this sense, the context is the temporal and spatial framework in

which the entrepreneurs develop their project and makes decisions about the future (Arenius & Minniti, 2005).

3.2 Variables

The dependent variables are the different states the individuals can find themselves in. These states constitute (S_j) the *who* in this research. According to GEM: S_0 non-entrepreneurial (no EI); S_1 individual showing EI; S_2 nascent entrepreneur (operating 3-42 months-EB); S_3 owner-manager of a consolidated company (operating for more than 42 months-EB) and, finally, S_4 owner-manager involved in the exit from EP (EB).

SCA jointly considered as codewords are the independent variables or observables (o_{ik}) *i* being the individual, and *k* each observable analysed. Since attitudes cannot be observed directly (Jain, 2014), we use as proxies of attitudes the following GEM items: (1) the individual's social capital (o_{i1}=*knowent*), which corresponds to the item "Do you know someone personally who has started a business in the past 2 years?"; (2) the perceived self-efficacy (o_{i2}=*suskill*), measured by "Do you have the knowledge, skills, and experience required to start a business?"; (3) the fear of failure (o_{i3}=*fearfail*), measured using "Would fear of failure prevent you from starting a business?", and (4) the entrepreneurial alertness to opportunity (o_{i4}=*opport*), considering the item "In the next six months, will there be good opportunities for starting a business in the area where you live?". Then, the SCA were organized in codewords O_i = [o_{i1}...o_{iN}], adopted here as follow O_i=[o_{i1}=*knowent*, o_{i2}=*suskill*, o_{i3}=*fearfail*, o_{i4}=*opport*] (Appendix 2).

The literature recognises that education can affect EI and EB but its impact is ambiguous (Arenius & Minniti, 2005; Ertuna & Gurel, 2011). However, our approach considers the fact that education affects cognition and social processes and how individuals interpret the world, enabling them to impact it in searching for competitive advantages. To this end, as a moderator, *Gemeduc* was dichotomised to distinguish 1 post-secondary and higher education, or 0 lower levels.

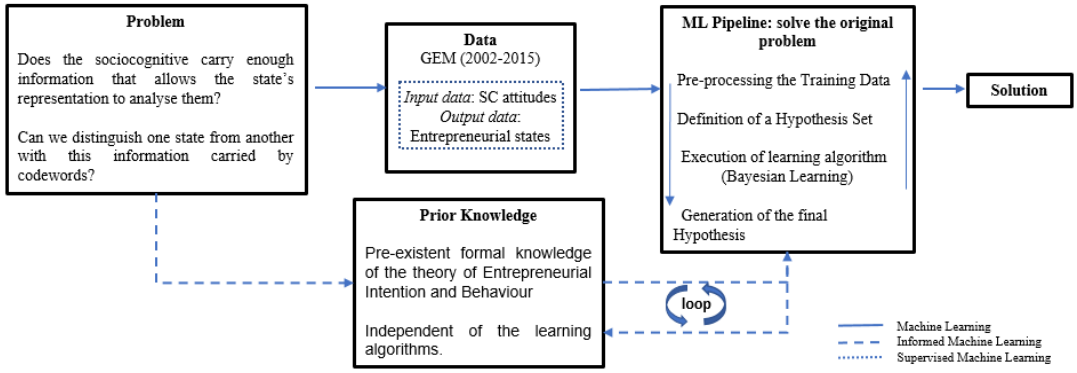
The variables used in this research are dichotomous where 0 indicates the absence of the feature, and 1 is its presence. When considering SCA it is necessary to note that whatever the answer is in the form of 0 and 1 both represent beliefs rooted in the individuals' minds that influence their behaviour. Therefore, the absence of an SC is relevant to the pattern of behaviour, as relevant as its presence. In addition, everyone is involved in one state (S_j), excluding those involved in more than one and those showing incomplete information from the

dataset. (Appendix 1). The statistical package SPSS PC (version 26) was used, and for the experiments, *Matlab* (version RD2019b) was run.

3.3 Informed Supervised ML applied to this research

Figure 1 summarised how Informed Supervised ML was performed in this research. A primary objective of learning is to predict labelled attributes S_j, using the information provided by the predictive ones o_{ik}. Our aim falls on interpretation and prediction: (1) gaining insight and understanding of to what extent the SCA and states are related, and (2) studying how such a relation can be used to predict each S_j and identify behaviour patterns that otherwise might be hidden. We need to make data mining (Cherkassky & Mulier, 1998; Fukunaga, 1990; Hastie *et al.*, 2001) in the base –where ML is the mining tool-, and predictive analytics (Kuhn & Johnson, 2013) at the top of our research. Predictive analytics is used to refine data, integrating formal theoretical knowledge from EI and EB to make valid interpretations of discovered patterns (IML). GEM dataset provides per-person labelled and predictive attributes, enabling us to adopt SML to search in the space of possible hypotheses for one that will perform well on training examples beyond the training set. Using this type of learning, we can search for possible hypotheses that perform well on both training and testing data.

Figure 1 Machine Learning Research Framework
Source: Adapted from von Rueden *et al.* (2021)



Particularly, BL is used to manage uncertainties about the SCA-states' relation, discover patterns, and construct predictive models. How to allocate data to our task -*e.g.*, model building, evaluating performance- is an important issue, because our primary interest is to make interpretations and predictions from data. The data used to build the models does not need to be the same population as to test them, that is why the models' evaluation is important to be extrapolated to a different population.

In a set of experiments, we have evaluated the suitability of BL. Therefore, a binary hypothesis testing was defined in which state S_j conforms to class 1 and the rest states compose class 0. The classes are highly imbalanced which may bias the predictions towards the majority class. By down-sampling the majority class, this impact was reduced.

3.3.1 Bayesian Reasoning to Model SCA-Sj Relations and test sensitivity

Let S_j be the hypothesis about which state belongs to a given codeword 'd'. A very common approximation adopted in science is to make predictions based on a single most probable hypothesis, that is, the one that maximises $P(S_j|d)$. This is often called a maximum *a posteriori* or MAP hypothesis. Predictions made according to a MAP hypothesis are approximately Bayesian to the extent that $P(S_j|d) \approx P(X|h_{MAP})$. As more data arrive, the MAP and Bayesian predictions become closer, because the competitors to the MAP hypothesis become less and less probable. Three issues must be considered: (1) finding MAP hypotheses is much easier than BL; (2) the hypothesis prior to $P(S_j)$ plays an important role, in both BL and MAP learning; and (3) MAP and BL methods use the prior to penalise complexity.

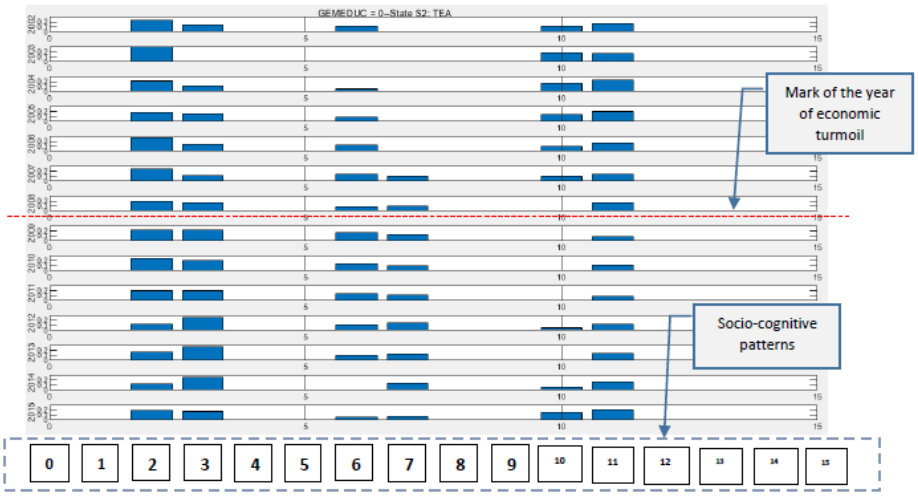
Let's make two insights into the trade-off: (1) MAP is the simplest logical theory that is consistent with the data, therefore, maximum *a posteriori* learning provides a natural embodiment of Ockham's razor, and (2) choosing h_{MAP} to maximise $P(d|S_j)\ P(S_j)$ is equivalent to minimising $-[\log_2 P(d|S_j)+\log_2 P(S_j)]$. Using the connection between information encoding and probability (Shannon, 1948), we see that the $-\log_2 P(S_j)$ term equals the number of bits required to specify the hypothesis S_j. Furthermore, $-\log_2 P(d|S_j)$ is the additional number of bits required to specify the data, given the hypothesis. Hence, MAP learning is choosing the hypothesis that provides maximum compression of the data. We can simplify by assuming a uniform prior over the space of hypotheses. In that case, MAP learning is reduced to choosing an S_j that maximises $P(d|S_j)$. This is called a maximum-likelihood hypothesis, h_{ML}. For our purposes, maximum-likelihood learning is a reasonable approach when there is no reason to prefer one hypothesis over another *a priori*.

3.4 Diversity and Relevance Map Construction

Averaging the $-\log_2 P(d|S_j)$ over all possible values of the codeword 'd' in state S_j provides the Entropy (H) of that state: $H(P(d|S_j))$. In the definition of H, every term $-[\log_2 P(d|S_j)+\log_2 P(S_j)]$ is the contribution to the total information. Therefore, each term can be seen as a constituent element of what we call an 'entropygram', which we use to analyse graphically each state in terms of the information carried by the codeword 'd'. The set of entropygrams generated in this

study is what we have called the *Diversity and Relevance Map* (DRM) (Appendix 3). This graphical representation identifies, at a macro level, the most important codewords in terms of information carried, and their ability to reflect turbulence around the year 2008, facilitating our analyses. Figure 2 shows an example of a detailed entropygram for Total Entrepreneurial Activity state (TEA) and individuals with lower education, that represents the codewords that contribute to 60% of the information in H(P(d|S_j)). As we will see, codewords carry different amounts of information richness and it varies over the years, thus, suggesting that MAP learning for SCA patterns analysis and state classification is appropriate.

Figure 2 Entropygram: GEMEDUC=0; State= TEA



4 Results and Discussion

4.1 Entrepreneurial state predictability

In each experiment, classes were previously balanced, and the samples were randomly selected, 70% for training with the remaining 30% being used for testing the prediction potential of the models. We have carried out 500 experiments on the models to reflect the variety of situations we might encounter.

To evaluate the goodness of the observables o_{ik} as predictors of the different states (S_j), we verified that all the *p*-values obtained in the 500 experiments were lower than 0.05. We also evaluated the goodness of the observables as predictors in terms of an R^2 score and accuracy. The averaged R^2 values are shown in Appendix 4.1. Though, for states S_1 to S_4 the scores are very high, and for states S_0 are high. We conclude that the models accurately replicate the individuals' SC profiles. These results are significant considering that predicting human behaviour is complex. Appendix 4.2 shows the average accuracy rates obtained largely over

60%. However, there are few years in which the states are hardly predictable (<50%). This decreased predictability is mainly due to low specificity rates in those years (Appendix 4.3), while sensitivities are high in all years (Appendix 4.4).

4.2 Observables' predictive power on States

Appendix 5 displays observables' predictive power on states to be analysed horizontally. The results show the following:

Non-intenders (S_0): Dominant SCA pattern among this group is 4 (0-0-1-0=F): they do not have a network of inspirational entrepreneurs, lack self-efficacy, show fear of failure, and do not find opportunities in their environment, regardless of their educational level. Particularly among more educated individuals, even if they show self-efficacy and no fear of failure (Pattern 2: 0-1-0-0=S), entrepreneurship is not an attractive career as they may consider it to have a high opportunity cost.

Entrepreneurial Process (S_1 to S_4): Patterns 11, 3, and 2 –except for higher educated individuals- are key to explaining the EB, from EI to exit. At lower levels of education, within the S_1 (EI), 11 is the dominant pattern (1-1-0-1=KSO), *i.e.*, they are fearless, recognise opportunities, are driven by self-efficacy, and enjoy inspirational models. The perception of opportunities is less strong and takes second place in their entrepreneurial desire for the educated (Pattern 3: 1-1-0-0=KS). Nascent entrepreneurs (S_2, less than 3.5 years) show a different dominant pattern according to their education. Opportunity does matter to leap into the EP, dominating pattern 11 (1-1-0-1=KSO) among the most educated, while for the less is number 2 (0-1-0-0=S) the prevailing, *i.e.*, self-efficacy and fearless drive them to start up. This same pattern dominates among consolidated entrepreneurs (S_3), to whom self-efficacy guides their actions, regardless of their education. This is also confirmed even if fear of failure is added to the pattern as we see in pattern 6 (0-1-1-0=SF). It is precisely the fear of failure that is responsible for company exit (S_4) (Pattern 7: 1-1-1-0=KSF), no matter the level of education. However, despite the perception of self-efficacy and fear of failure inhibition (Pattern 2: 0-1-0-0=S), the lack of role models and opportunities neutralises the desire to continue entrepreneurship at both educational levels.

4.3 DRM: codewords turbulence sensitive

We have defined a *DRM* that helps to analyse the entrepreneurial context at a collective level. To preserve relevant information carried by codewords highlighting their ability to reflect turbulence (the year 2008), we apply a filtered version of the Entropy, using a moderate

threshold μ=0'6 as explained earlier. This map shows the 5x14x2 = 140 entropygrams -*i.e.*, 5 states, 14 years, and splitting the map by *Gemeduc*. Appendixes 6.1 and 6.2 show SCA patterns with the highest economic turmoil sensitivity.

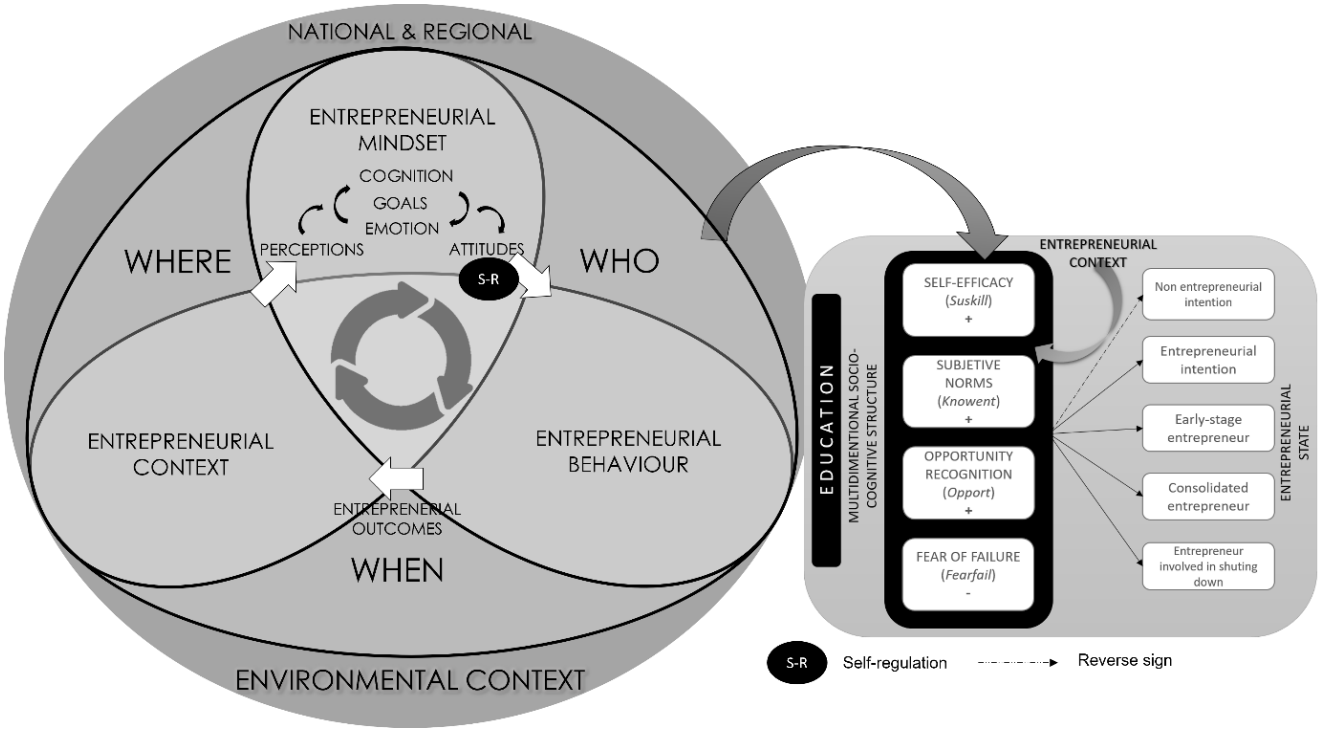
Thus, whether the SCA patterns gain or lose strength just before or after the economic turbulence reflects their sensitivity to changes in the environment. Then SCA patterns exhibit instability over time. Given the impact that context can generate on an individual's perception and beliefs at any moment, SCA patterns can be affected, leading to changes in behaviour. Tracking these changes is interesting but outside the scope of this paper.

4.4 Theoretical implications: Toward an SCTE

Bandura's (1986, 1999) SCLT has been used to explain human behaviour and, recently, EB. Some of its concepts, such as self-efficacy, have added insight into how EI emerges and EB develops (Newman *et al.*, 2019). This theory supports the well-established Social Cognitive Career Theory (Lent & Brown, 1994) widely used in EI-EB research to explain individuals' career choices. However, a holistic view of SCLT has so far not been developed in entrepreneurship research. Based on both, our findings and Newbert's *et al.* (2022) concern, Figure 3 summarises the theoretical framework underlying this paper and shows a research path to construct the SCTE. This is based on a feedback loop in which three key elements support each other:

- *Entrepreneurial mindset*: perceptions and attitudes play a central role in driving cognition and emotion toward action (Kuratko et al., 2021), and individual goals are also important. At a collective level, for entrepreneurship, this is the collective cognitive pathway/mental model (Boudreaux et al., 2019; Gregórie et al., 2011).
- *Entrepreneurial behaviour*: in any of its forms, including non-intenders. At a collective level, it is comprised of the general population and business community. Since people are also their actions, together with the previous element, they represent the *who*.
- *Entrepreneurial context* collects the entrepreneurs' and non-entrepreneurs outcomes in a socio-economic context highly influenced by *when* and *where*. This context is created by all actors operating within it –*e.g.*, adding innovation, growth, employment generation, and bankruptcies, but product demand and workforce as well-. It also feeds back the entrepreneurial mindset to drive actions.

Figure 3 Socio-cognitive Theory of Entrepreneurship



This model is aligned with others in which general framework conditions together with the entrepreneurial context are underlying the business activity. The novelty here is the role played by the entrepreneurial mindset, which perceives, interprets, and arranges a set of attitudes that can lead to entrepreneurial activity. At a collective level, when non-EB dominates, the entrepreneurial context is poor giving less room to activate the entrepreneurial mindset. But even in this context, some individuals behave in an entrepreneurial manner because of how they perceive and process information.

Bandura (1986, 1999) highlights important aspects of learning based on social cognition: individuals learn from events but will not necessarily act on what they learn as cognition and self-regulation play an important role. This is why, presenting the same basic attitudes, some individuals decide to start or maintain their entrepreneurial activity, but not others, this being an important reflection to researchers modelling the EI-EB relationship. Decisions are affected by other factors, such as access to resources or the enjoyment of government incentives. Even in these circumstances, individual perceptions, attitudes, and self-regulation are important in shaping behaviour and feeding back the created environment.

Although at the risk of being too reductionist, the model is useful to better understand the entrepreneurial context feedback through the actual or potential entrepreneurial mindset.

What this research has demonstrated is that the SCA patterns behind entrepreneurial action, in any of the states, are not unique and that they are affected by environmental events. As such, we can better understand how this "turbine" makes the process work.

4.5 Practical implications

Our findings give us useful information for supporting policies that seek to favour the impact usually attributed to entrepreneurial activity in the form of employment, innovation, growth, and wealth generation (Ács *et al.*, 2008; Audretch *et al.*, 2006; Bosma *et al.*, 2018; Xu *et al.*, 2021). In this sense, AI together with marketing strategies has been actively used recently to modify peoples' behaviours: Consumers, voters, or even the environmental feelings of the population are the target groups and objectives of these strategies. Then it can also be used to influence the entrepreneurial mindset of the population and to modify behaviours, not in vain cognitions are malleable and intervention strategies can be used to change how information is processed (Knockaert *et al.*, 2015). These findings are also important for trainers who can know how to improve perceptions and attitudes and reinforce self-regulation strategies in fostering that entrepreneurial mindset, especially among the young population.

On the other hand, this research, based on data mining and inductive approaches to adapt well-known theoretical frameworks to other interests, has allowed us to test the benefits of BL. The researchers' job is thus to design the procedure correctly and to interpret the outputs according to their intellectual background to reach new conclusions. We agree with calls questioning the way we have been conducting our research in this area -Crawford *et al.* (2015), Mahmoodi *et al.* (2017), Newbert *et al.* (2022)…-. AI method gives us an opportunity for entrepreneurship scholars to "jump out of our comfortable chairs" in order to be more entrepreneurial in our research methods.

5 Conclusions and Limitations

The present work seeks to highlight the set of antecedents of EI that have been undervalued in their capacity to predict EB without the mediated role of intention. Few have understood that these same attitudes are latent in the process of maintaining and consolidating a firm, not in vain, a company can be understood as a chained sum of entrepreneurial projects (Guzmán-Cuevas, 1994), and the entrepreneur as the fuel of these projects. What is undoubtedly clear is that entrepreneurship is a process, not a one-time event (Shane, 2012), and an ongoing function rather than "a once-for-all, or possibly intermittent activity" (Casson, 1982:25).

This research shows that, for the same EB, there may be different SCA patterns, and they are not stable over time due to environmental events. At a collective level, the 2008 crisis provoked a devastating socio-economic effect, increasing the number of bankruptcies and entrepreneurs forced to retreat. This affected people's entrepreneurship desirability -*i.e.*, affecting both K and F-. The same context closed off some opportunities but opened up others for those sensitive to them, affecting O. However, it could also provoke mistrust in one's abilities, affecting S. Thus, these results raise doubts about the appropriateness of including attitudes as precursors of EI and EB, with any other consideration. It is necessary to consider their nature and the time at which they are measured to introduce them into the models.

Knowing more about human cognition is a difficult task but not impossible. We must not give up just because it is difficult. "A black box is the antithesis of scholarship" (Shepherd & Majchrzak, 2022:15). However, further progress is needed to overcome the limitations imposed by the excessive contextualisation of samples and the associated problem of sample heterogeneity when analysing EB. In this regard, we strongly believe that BL as an AI provide useful theoretical and empirical frameworks for entrepreneurship research, thus opening new scientific perspectives.

Finally, some limitations must be highlighted, and further effort will be needed in future research projects on some important aspects. Although it is common in SC literature to use single items (Cacciotti *et al.*, 2020), it is important to pay more attention to the constructs we use to measure these attitudes to get into multidimensional scales (Camelo-Ordaz *et al.*, 2020). It is also important to test the stability of our results in other institutional frameworks -*i.e.*, other countries and/or regions- (Boudreaux *et al.*, 2019), over longer periods, and in other downturn contexts. Like Sohn & Lee (2013), future studies should control time-lagged causal relationships, especially as regards the change in SCA patterns underlying EI and EB.

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Appendix 1. Gross and net sample size

Age	Gross sample	Control variable	Observables				Entrepreneurial stage					Net sample
		Gemeduc	Knowent	Opport	Suskill	Fearfail	No entrep.Int.	Futsup	TEA	Estbbuso	Discent	
2002	2000	2000	1872	1580	1924	1924	907	1930	2000	2000	1964	1198
2003	2000	2000	1941	1584	1900	1918	1161	1955	2000	2000	1997	1425
2004	16980	16980	16743	13181	16217	16321	9696	16691	16980	16980	16945	12043
2005	19384	19384	11498	8768	11132	11202	5443	19113	19384	19384	19360	8032
2006	28306	28306	27858	21086	26922	27087	15241	27855	28306	28306	28286	19233
2007	27880	27880	27468	19684	26366	26553	14103	27378	27880	27880	27865	17708
2008	30879	29780	30599	23553	29329	29817	16294	30285	30879	30879	30870	20850
2009	28888	28660	28708	25194	28015	28171	19811	28622	28888	28888	28879	23611
2010	26388	26282	26260	23551	25777	25883	18365	26158	26388	26388	26381	22383
2011	17500	17386	17386	15132	16868	17013	10476	17005	17500	17500	17494	13839
2012	21900	21687	21735	19823	21221	21283	13526	21174	21900	21900	21888	17923
2013	24600	24462	24323	21868	23820	23720	15429	23856	24600	24600	24589	19895
2014	25000	24862	24850	21439	24285	24253	15695	24330	25000	25000	24988	19707
2015	24300	23968	24130	20697	23648	23749	15228	23583	24300	24300	24268	19006
TOTAL	**296005**	**293637**	**285371**	**237140**	**277424**	**278894**	**171375**	**289935**	**296005**	**296005**	**295774**	**216853**

Appendix 2 List of codewords: Individuals' socio-cognitive patterns

* SCA highlighted by our findings are shadowed

Code	***Knowent*** **K**	***Suskill*** **S**	***Fearfail*** **F**	***Opport*** **O**	**Behaviour patterns associated**
0	0	0	0	0	Fearless individuals who recognise a lack of entrepreneurial skills and a supportive network, and who are unable to detect opportunities in the environment
1	1	0	0	0	Fearless individuals who recognise a lack of entrepreneurial skills and that are unable to detect opportunities in their environment but recognise a supportive network
2	0	1	0	0	Fearless individuals who have entrepreneurial skills but that are unable to detect opportunities and do not have a supportive network
3	1	1	0	0	Fearless individuals who have entrepreneurial skills, and a supportive network, but are unable to detect opportunities
4	0	0	1	0	Individuals who recognise a lack of skills and a supportive network, who are unable to recognise opportunities in the environment and who express fear of failure
5	1	0	1	0	Individuals who have a supportive network but recognise a lack of skills and that are unable to detect opportunities in the environment, and who recognise the fear of failure
6	0	1	1	0	Individuals who have skills but are unable to detect opportunities in the environment, do not have a supportive network and express fear of failure
7	1	1	1	0	Individuals who have entrepreneurial skills and a supportive network, but who are unable to detect opportunities, and present fear of failure
8	0	0	0	1	Fearless individuals who detect opportunities in the environment, but who recognise a lack of skills and a supportive network
9	1	0	0	1	Fearless individuals who have a supportive network, detect opportunities, and do not show entrepreneurial skills
10	0	1	0	1	Fearless individuals who have skills and detect opportunities in the environment, but do not have a supportive network
11	1	1	0	1	Fearless individuals who have skills and a supportive network, and that can detect opportunities in the environment
12	0	0	1	1	Individuals who detect opportunities in the environment, express fear of failure but lack skills and a supportive network
13	1	0	1	1	Individuals who can detect opportunities but lack skills, have a supportive network, and recognise the fear of failure
14	0	1	1	1	Individuals who have skills and who can detect opportunities in the environment, but do not have a supportive network and express fear of failure
15	1	1	1	1	Individuals who have skills and a supportive network, and who can detect opportunities in the environment, but express fear of failure

Appendix 3 Diversity and Relevance Map filtered by *Entropy* criterion μ=0'6

Appendix 4.1 R^2-values rates for the Bayesian Classifier

YEAR	S_0	S_1	S_2	S_3	S_4
2002	0.62	0.95	0.98	0.94	0.97
2003	0.72	0.97	0.95	0.96	0.99
2004	0.67	0.96	0.97	0.92	0.99
2005	0.30	0.96	0.96	0.87	0.99
2006	0.73	0.97	0.97	0.94	0.99
2007	0.75	0.97	0.97	0.95	1.00
2008	0.73	0.96	0.97	0.94	0.99
2009	0.83	0.98	0.98	0.95	0.99
2010	0.80	0.96	0.98	0.94	0.99
2011	0.67	0.95	0.97	0.93	0.99
2012	0.65	0.94	0.95	0.94	0.99
2013	0.71	0.95	0.96	0.94	0.99
2014	0.75	0.96	0.96	0.95	0.99
2015	0.73	0.97	0.95	0.93	0.99

Appendix 4.2 Accuracy rates for the Bayesian Classifier

YEAR	S_0	S_1	S_2	S_3	S_4
2002	66.39	52.73	58.97	57.31	54.66
2003	69.89	60.26	64.93	63.22	52.94
2004	72.83	66.14	60.27	64.49	57.26
2005	70.08	59.13	51.85	59.65	49.50*
2006	62.96	58.97	51.76	55.27	54.59
2007	61.19	62.79	51.62	52.79	51.07
2008	60.70	62.07	56.30	52.34	53.02
2009	59.70	61.12	53.18	55.97	53.86
2010	60.33	69.25	52.61	55.21	51.34
2011	61.46	48.06*	60.48	53.40	48.41*
2012	63.44	48.77*	76.04	55.88	53.68
2013	61.82	48.52*	69.75	55.78	53.15
2014	61.62	47.39*	68.65	54.82	58.67
2015	65.48	54.66	66.70	59.70	62.64

*****Accuracy < 50%

Appendix 4.3 Sensibility rates for the Bayesian Classifier

YEAR	S_0	S_1	S_2	S_3	S_4
2002	65.64	59.83	70.73	83.57	62.75
2003	69.44	59.41	70.38	81.43	76.00
2004	71.97	75.68	84.27	84.92	68.58
2005	65.09	77.72	79.85	82.24	62.24
2006	59.24	74.50	95.83	97.98	68.05
2007	58.10	69.43	91.93	86.32	66.78
2008	57.49	70.92	79.72	84.55	70.56
2009	57.65	75.38	89.44	81.38	76.05
2010	57.83	63.93	87.73	87.00	84.95
2011	57.64	74.53	75.18	88.78	69.21
2012	60.65	74.59	67.42	80.88	70.03
2013	59.14	74.63	74.86	79.07	76.09
2014	59.45	75.10	75.52	80.32	76.30
2015	64.09	61.13	80.37	80.54	61.61

Appendix 4.4 Specificity rates for the Bayesian Classifier

YEAR	S_0	S_1	S_2	S_3	S_4
2002	70.64	52.57	58.85	56.56	54.53
2003	74.35	60.27	64.84	62.91	52.86
2004	80.57	66.02	59.96	63.87	57.23
2005	81.77	58.79	51.26	58.37	49.43*
2006	92.93	58.77	51.08	54.07	54.56
2007	87.00	62.70	50.92	52.03	51.03
2008	84.39	61.94	56.01	51.42	52.98
2009	85.86	60.99	52.82	55.35	53.78
2010	86.82	69.32	52.29	54.26	51.23
2011	83.30	47.42*	60.32	52.19	48.32*
2012	79.03	47.92*	76.14	55.14	53.62
2013	80.16	47.85*	69.69	55.11	53.07
2014	79.77	46.81*	68.57	54.18	58.60
2015	77.67	54.56	66.48	59.11	62.64

*****Specificity < 50%

Appendix 5 Observables' predictive power on states: Average probabilities. H(p), μ=0.6

	0	2	3	4	5	6	7	10	11	15
	None	S	K-S	F	K-F	S-F	K-S-F	S-O	K-S-O	K-S-F-O
I. LOW AND NO EDUCATION	**S_0-NO ENTREPRENEURIAL INTENT (No EI)**									
	0.1920*(0,042)	0.0898	--	**0.2254**(0.046)**	0.0473	0.0770	--	--	--	--
	S_1-ENTREPRENEURIAL INTENTION (EI)									
	--	**0.1063*(0.051)**	**0.1223*(0.028)**	--	--	0.0686	0.0705	0.0556	**0.1361*(0.064)**	0.0445
	S_2-EARLY-STAGE (EB)									
	--	**0.1866*(0.072)**	**0.1632*(0.068)**	--	--	0.0891	0.0773	0.0745	**0.1515*(0.042)**	--
	S_3-CONSOLIDATED (EB)									
	--	**0.2366**(0.045)**	**0.1432*(0.051)**	--	--	**0.1446*(0.074)**	0.0719	--	0.0768	--
	S_4- EXIT (EB)									
	--	**0.1767*(0.042)**	**0.1506*(0.060)**	0.0855	--	**0.1491*(0.089)**	**0.1114*(0.050)**	--	--	--

	0	2	3	4	6	7	10	11
	None	S	K-S	F	S-F	K-S-F	S-O	K-S-O
II.MEDIUM AND HIGHER EDUCATION	**S_0- NO ENTREPRENEURIAL INTENT (No EI)**							
	0.1436*(0,032)	**0.1126*(0.020)**	0.0639	**0.1541*(0.035)**	0.0851	0.0457	--	--
	S_1- ENTREPRENEURIAL INTENTION (EI)							
	--	0.0883	**0.1556*(0.054)**	--	0.0781	0.0905	0.0692	**0.1414*(0.076)**
	S_2- EARLY-STAGE (EB)							
	--	**0.1500*(0.064)**	**0.1942*(0.070)**	--	0.0537	0.0719	--	**0.2169**(0.076)**
	S_3- CONSOLIDATED (EB)							
	--	**0.2470**(0.068)**	**0.1691*(0.052)**	--	**0.1107*(0.076)**	--	--	**0.1321*(0.086)**
	S_4- EXIT (EB)							
	--	**0.1610*(0.092)**	**0.1344*(0.089)**	--	0.0906	**0.1021*(0.050)**	--	--

*Probability higher than 10% and lower than 20% (S.D.); **Probability higher than 20% (S.D.) SC pattern with the highest probability highlighted in black

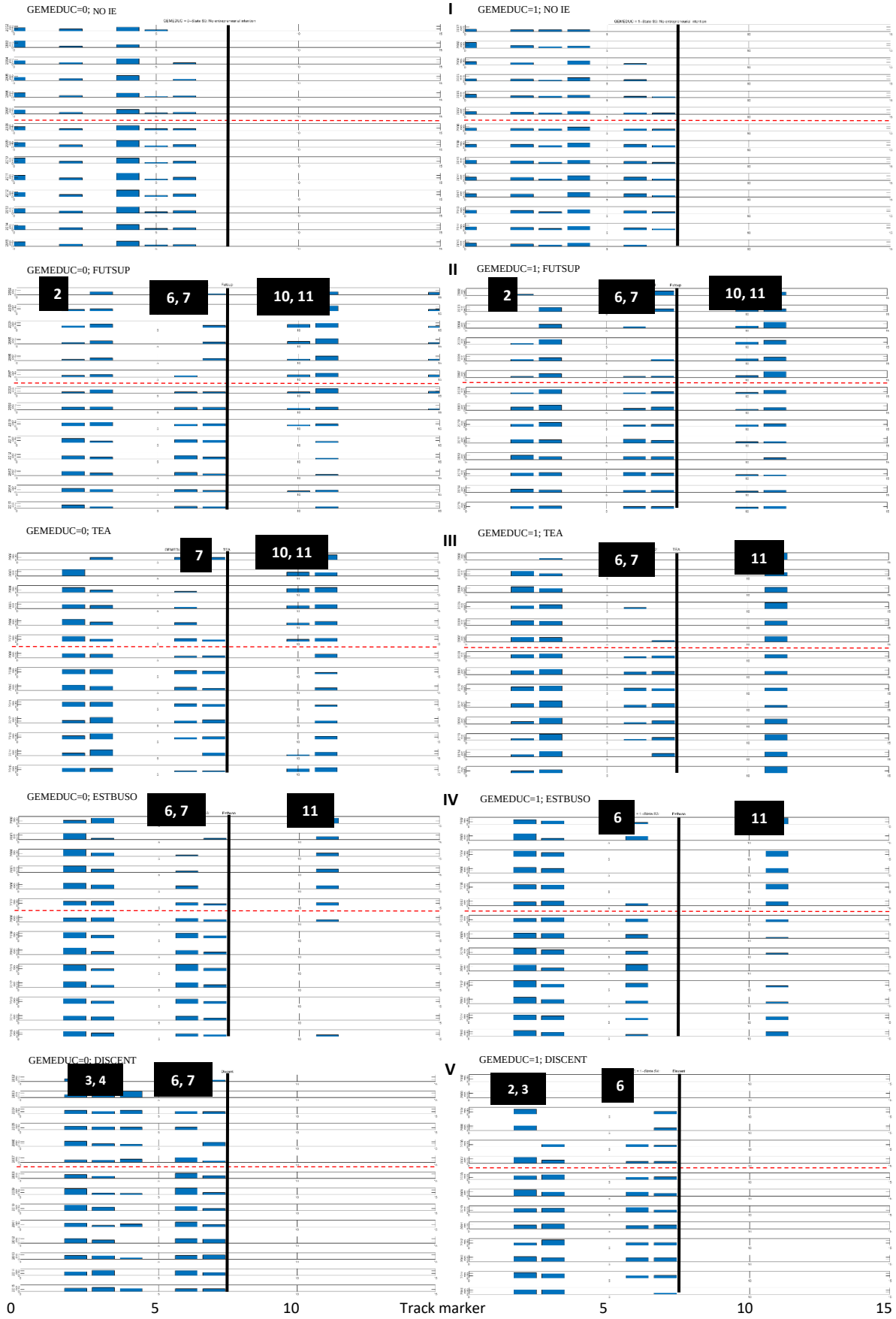
The dotted line squares highlight the differences between those with lower and higher educational attainment. F= *Fearfail*; S=*Suskil*; K=*Knowent*; O=*Opport*

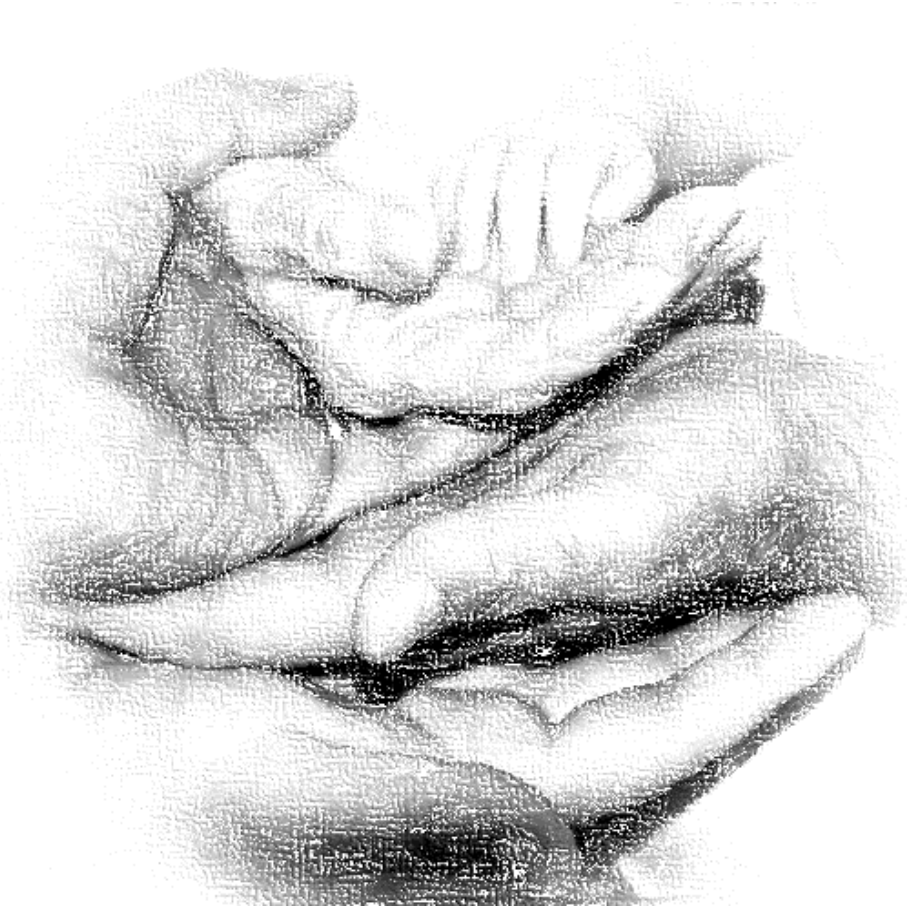
Appendix 6.1 Sensitivity of Observables to economic turbulence

Low levels of education and non-education	
State	**Turbulence sensitivity**
I No entrepreneurial intention	---
II Entrepreneurial Intention	Codeword: 2, 6, 7, 10, 11
III Early stages venture	Codeword: 7, 10, 11
IV Consolidated entrepreneurship	Codeword: 6, 7, 11
V Shut down or transfer of the firm	Codeword: 3, 4, 6, 7
Medium levels of education and higher education	
I No entrepreneurial intention	---
II Entrepreneurial Intention	Codeword: 2, 6, 7, 10, 11
III Early stages venture	Codeword: 6, 7, 11
IV Consolidated entrepreneurship	Codeword: 6, 11
V Shut down or transfer of the firm	Codeword: 2, 3, 6

F= *Fearfail*; S=*Suskil*; K=*Knowent*; O=*Opport.*

Appendix 6.2 Diversity and Relevance Map: Socio-cognitive patterns aff





CAPÍTULO V

Una aproximación generacional
a la Investigación en Emprendimiento

Sinopsis y justificación del capítulo en el contexto de la línea de investigación sobre el enfoque generacional en el estudio del emprendimiento

Este quinto y último capítulo se aborda como reflexión al trabajo que aún queda por hacer en el intento por desarrollar el enfoque generacional en el estudio del emprendimiento como línea de investigación científica. No se ha conformado como un artículo al uso, en la medida en que su propósito es más ordenar las ideas de cara a la investigación que aún ha de desarrollarse, que presentar resultados de una investigación ya concluida. En este sentido, se plantea como un breve ensayo sobre el tema que nos ocupa.

Con este fin, se retoman las ideas ya vertidas en la Introducción de esta tesis, para explicarlas en más detalles, por lo que se profundiza tanto en el concepto de generación como en su utilidad para la investigación en emprendimiento. Pero también apuntamos su relevancia para el estudio de la iniciativa emprendedora, al tiempo que indagamos en los trabajos que, en el área de estudio que nos ocupa, ya han reflejado de alguna forma el interés en este tópico, bien de manera central o tangencial.

Introducción

Ha sido habitual encontrar abundante literatura, tanto divulgativa como académica, que se pregunta por los problemas de diferentes generaciones. Especialmente prolífica ha sido la que se ha cuestionado sobre los conflictos intergeneracionales (Amato & Booth, 1997), pero también aquella que se interesa por los inconvenientes que afrontan las jóvenes generaciones para las que sus problemas de socialización, adolescencia o vocacionales (Eisenstadt, 1971) han sido una constante de estudio. De esta forma, hoy no se discute sobre el sentido mismo de la generación, siendo una noción ampliamente aceptada. De hecho, expresiones como "es un escritor de la generación del 27" o del "98", para demarcar a insignes grupos de poetas y escritores, "eres de otra generación", para distinguir los conocimientos y habilidades de unas personas respecto a otras más jóvenes, pero también sentencias como "estamos ante la generación más preparada de la historia", para referirse a los jóvenes de hoy, muestran que el término está presente en diversas esferas de la vida. Sin embargo, en el ámbito que aquí nos ocupa, como veremos, el concepto de generación se ha utilizado anecdóticamente y especialmente ligado a un interés especial por conocer la próxima generación de emprendedores realzando sus características respecto a la predecesora, hasta tal punto que se habla ya de una segunda generación de emprendedores -Garbuio et al. (2018); Kazmi (1999).

Lo que parece claro, es que en esto del estudio de las generaciones, desde un plano eminentemente social y socio-laboral, dos inquietudes asoman. Por un lado están los preocupados por las virtudes y defectos de los que vienen por delante, probablemente para conocer con qué "armas" se enfrentan a los que ya están. Y por otro, los que observan con admiración a los más jóvenes, normalmente por las destrezas que estos demuestran y de las que aquellos carecen pero desean aprender. En cualquier caso, los mayores suelen escribir sobre las generaciones que les suceden, bien como si una soterrada batalla se estuviera preparando, o bien para encontrar el "hueco" para entenderse o para "negociar" un supuesto acuerdo entre dos partes. Sea como fuere, el estudio de las diversas generaciones y sus características es un tema sin duda, apasionante, y al que merece la pena prestar algo de atención. No es una idea descabellada, pues, tratar de comprender las características más destacadas que diferencian una generación de la sucesora.

En este ensayo abordamos en primer término el estudio de la generación como concepto desde las diversas disciplinas que lo afrontan, para luego considerar la categorización de las principales cohortes dominantes en los últimos 100 años. Este análisis se hace como prolegómeno al análisis del enfoque generacional que se ha venido desarrollando en la

investigación en emprendimiento. En esta última línea, conoceremos cuales son los trabajos de investigación que han prestado atención a este enfoque en el área de investigación del emprendimiento.

Conceptualizando la generación desde un punto de vista social

El concepto de generación en su sentido más amplio, se ha investigado desde diferentes perspectivas, siendo las visiones sociológica, antropológica y humanística las que han dominado su comprensión y definición. Su concepción, sin embargo, difícilmente podemos desligarla, desde un punto de vista práctico, de la propia catalogación de las generaciones, razón por la cual se tratan ambos aspectos en epígrafes sucesivos.

En la Tabla 1 hemos tratado de resumir las principales concepciones según los estudiosos desde las distintas disciplinas. Así, los sociólogos dominan planteando en su concepción cómo la edad de los individuos y los acontecimientos históricos, combinadamente, dan origen a una nueva generación, resultando los dos elementos críticos para la definición del término. Los individuos catalogados dentro de una misma generación comparten una visión común de la vida que les une y les sitúa dentro de la misma cohorte generacional. Si bien algunos sociólogos contemporáneos sostienen que la globalización influye en las generaciones a nivel universal, lo cierto es que similares antecedentes e intenciones, y una manera más o menos uniforme de resolver los conflictos, resultan determinantes en la catalogación de una generación.

Ahora bien, la fecha de nacimiento de los individuos sigue siendo central en la definición de una generación, ya que los jóvenes marcan el tempo de las nuevas tendencias actuando como termómetro de los cambios sociales (Guisado & Argoiz, 2013; Kertzer, 1983; Leccardi & Feixa, 2011; Attias-Donfut, 2016). En este sentido, las relaciones paterno-filiales importan a la hora de conceptuar la generación. La sociedad está en constante cambio provocando un enfrentamiento entre generaciones –*i.e.*, entre padres e hijos-, que da paso a una nueva generación que se distingue de la precedente por los valores que la identifican, como señalan los antropólogos Leccardi y Feixa (2011). En este sentido, Caballero y Baigorri (2019) sostienen que las circunstancias crean consciencia ayudando a los individuos a posicionarse con sus pares.

Tabla 1. El concepto de generación desde diferentes disciplinas: Subrayando los términos clave de las definiciones

Autores	Disciplina	Concepto de generación
Ortega & Gasset (1961:7) citado por Guisado & Agoiz (2013: 12)	Filosofía	"Una generación no es sólo un puñado de hombres egregios, ni simplemente masa: es como un nuevo cuerpo social con su minoría selecta y su multitud, que ha sido lanzado al campo de la existencia con una trayectoria vital determinada. Generación, compromiso dinámico entre masa e individuo, es el concepto más importante de la historia y, por así decirlo, la bisagra sobre la que ejecuta sus movimientos"
Toffler & Toffler (1996: 82)	Sociología	"A few generations are born to create, others to maintain a civilization. The generations that unleashed the second wave of historical change were forced, by force of circumstances**,** to be creative. Montesquieu, Mili and Madison invented most of the political forms that we still accept as natural. Engaged between two civilizations, their destiny was to create"
Abrams (1982: 240) citado por Guisado & Agoiz (2013: 24)	Sociología	"Periodo de tiempo en el que se construye una personalidad en base a los recursos y significados social e históricamente disponibles" "El problema de las generaciones es un problema de ajuste entre dos calendarios diferentes: el ciclo de vida del individuo y el de la experiencia histórica"
Kertzer (1983:20)	Antropología	"[...] conflict that is related to parent-child relations and those that are linked to larger societal processes tied to the age stratification system […] transmission of values from parent to child and the society-level processes of social reproduction"
Mannheim (1993:208) citado por Guisado & Agoiz (2013: 14)	Sociología	"La posición generacional se fundamenta en la existencia del ritmo biológico en el *ser* ahí del hombre: en los hechos de la vida y de la muerte y de la edad. Uno se encuentra en un posición parecida a la de otros en la corriente histórica del acontecer social debido a que pertenece a una generación, a un mismo año de nacimiento"
Donati (1999) citado por Guisado & Agoiz, (2013: 23)	Sociología	"El conjunto de personas que comparte una relación, aquella que liga su colocación en la descendencia propia de la esfera familiar-parental, con la posición definida en la esfera social con base en la edad social…, la generación depende de la interacción entre el status-rol asignado en la familia con el status-rol atribuido por la sociedad con base en la edad"
Beck by Leccardi & Feixa (2011: 28)	Sociología	"The classic notion of generation was obsolete and should be replaced by a new vision based on cosmopolitanism methodology, in a universal vision of the factors that affect the generations"
Leccardi & Feixa (2011: 28)	Antropología	"[…] Three generational constellations: the generation of migration (marked by the processes of transnational migration), the learning generation (marked by precarious employment), and the patchwork generation (marked by processes of cultural hybridization). In these three areas -demographic, economic, and cultural- the younger generation (or any of its fractions) acts as a barometer of the new trends"
Caballero & Baigorri (2019: 351)	Sociología	"[…]We understand that generations are defined by what they do or have done. The socio-structuring marking that occurs in childhood and adolescence is expressed with all its meaning in adulthood, a unique moment in which a generation should be named; so that only since reaching maturity can the identifying character be defined, the *modus operandi* of a generation"
Attias-Donfut (2016: 4)	Sociología	"Feeling of collective consciousness based on age, stages of life, etc., which is interrupted by major historical events that produce a turn that marks an entire generation"

De los elementos manejados para conceptuar el término, parecen incuestionables tanto la edad del individuo y el contexto en que este se desenvuelve, como la cultura que lo rodea, siendo los factores que influyen fuertemente en la definición de una generación, muchos de los cuales son compartidos en la práctica totalidad de estos enfoques. Sin embargo, son los sociólogos los que prestan más atención a las circunstancias únicas y particulares en las que nace una nueva generación, señalándolas como las verdaderas desencadenantes de la aparición de una nueva cohorte generacional (Toffler & Toffler, 1996). Lo cierto es que, a día de hoy, aún no existe un consenso generalizado sobre el concepto de generación, lo que ha llevado a revisar constantemente la forma en que ha de entenderse dado los incesantes cambios de la sociedad (Caballero & Baigorri, 2019).

Es de destacar, no obstante, el pensamiento del sociólogo Mannheim (1893-1947) como padre de la *Teoría de las Generaciones* (Sánchez de la Yncera, 1993), para quien la concepción de la generación tiene mucho que ver con la confrontación de ideas, sobre cómo cada grupo de individuos entiende el mundo y trata de conformarlo según su criterio. Así, las posturas que entre sí compiten no parecen surgir "[…] de la mera suma de elementos de pensamiento, sino, más bien, del encuentro entre aspiraciones básicas, principios formativos e interpretaciones del mundo. La fusión de estos elementos no la logra el sujeto contemplativo (siempre que sea posible separar adecuadamente al sujeto contemplativo y al activo), sino el activo y, primordialmente, el político –por cuanto la actividad orientada a cambiar el mundo es finalmente política"[10]. Esta cita, en esencia, nos hace comprender en cierta medida el interés que este concepto presenta para el estudio de la iniciativa emprendedora por cuanto esta, al fin y a la postre, representa una forma de interpretar pero también de cambiar el mundo de una manera activa, más que meramente contemplativa.

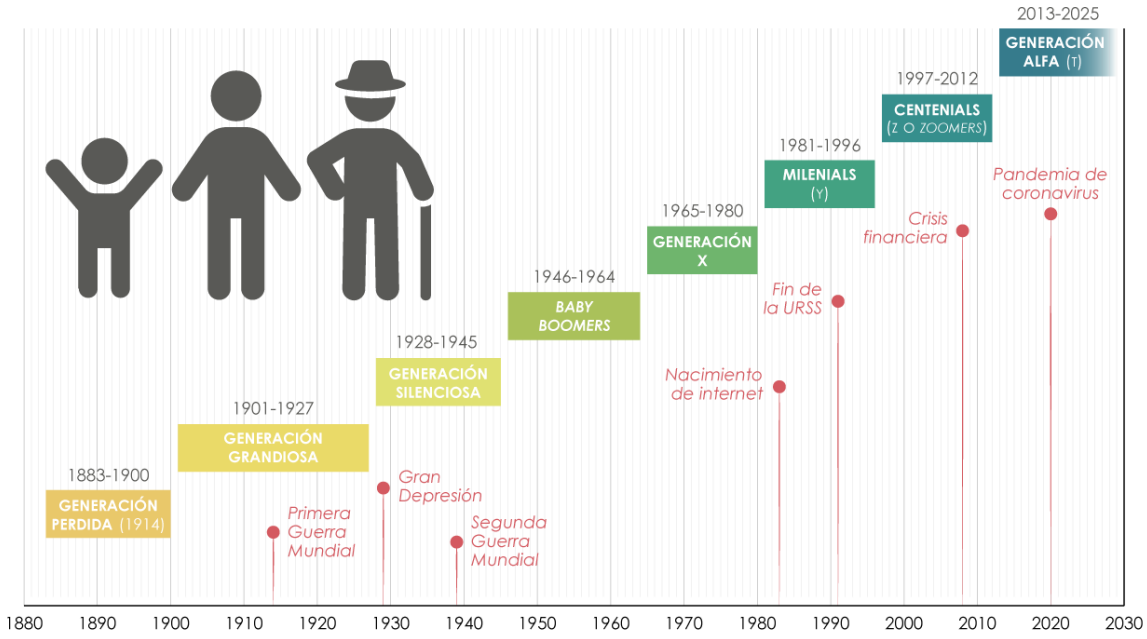
Definición de las cohortes generacionales: Especial referencia a la generación *Z*

En la Figura 1 se muestra una infografía de carácter divulgativo que sintetiza las generaciones aceptadas para el mundo occidental con reseña de los eventos clave que marcan cada generación, y la horquilla de años sobre los que cada cohorte generacional se halla comprendida. Ahora bien, esta clasificación no puede darse por cerrada y universalmente

[10] Citado por Sánchez de la Yncera (1993:34) del texto de Mannheim (1928:195) *Das Problem der Generationen*.

aceptada para el mundo occidental. Como ya apuntáramos en la Introducción de esta tesis, las cohortes pueden diferir sensiblemente según los países o grupos de países, especialmente debido a los eventos que se han sucedido en un determinado contexto y que han supuesto la irrupción de una nueva generación. Y es que los acontecimientos bélicos del siglo XX han marcado considerablemente la configuración de estas generaciones según los países. Hay que tener presente que, aunque el concepto de generación no es nuevo, su seguimiento y catalogación es relativamente reciente, por lo que solo tenemos una perspectiva casi coetánea de las diferentes cohortes.

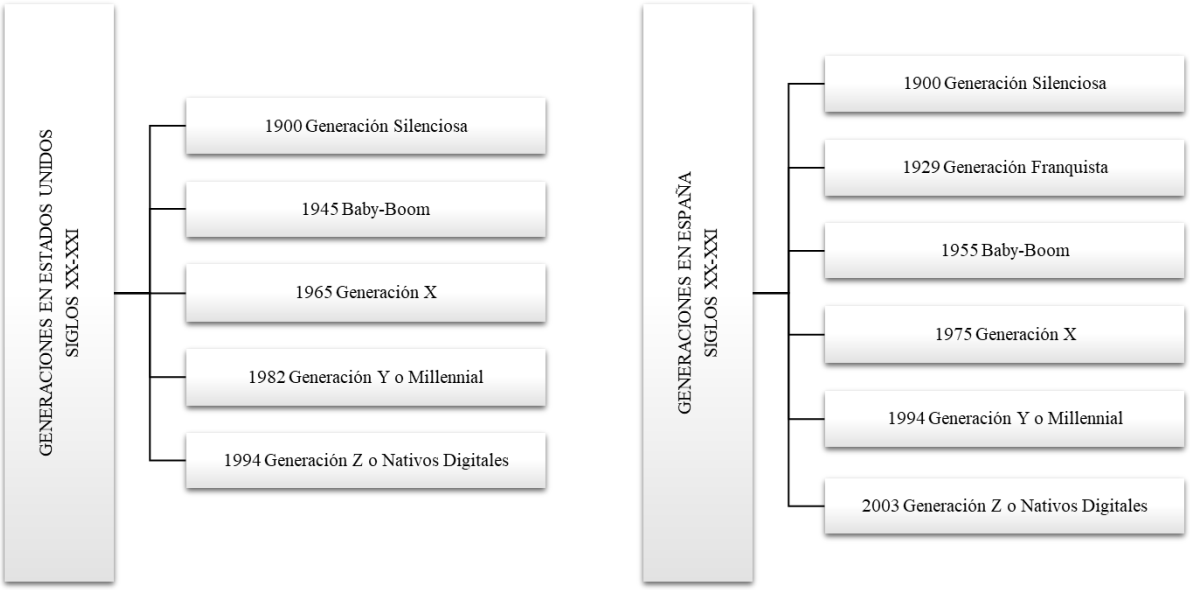
Figure 1. Cohortes generacionales en Occidente
Fuente: Merino (2022)



Así, en la Figura 2 se muestran las diferentes generaciones en dos contextos bien diferenciados: Estados Unidos y España. Para su definición, los autores han tenido en cuenta el año de nacimiento de los individuos, los acontecimientos históricos que envuelven su aparición, y las características que las definen. Sin embargo, como un ciclo generacional puede verse afectado por diferentes circunstancias como se ha mencionado anteriormente, podemos ver cómo la situación política en España, que dio lugar a la denominada generación *Franquista*, retrasó la llegada de los *baby boomers* y, en consecuencia, del resto de generaciones sucesivas. De media, se puede observar cómo surge un ciclo generacional aproximadamente cada veinte años (Guisado & Agoiz, 2013) coincidiendo con el momento en el que los jóvenes reaccionan contra las normas establecidas por la generación predecesora. En cualquier caso, el esquema identifica todas las generaciones existentes desde el siglo XX hasta nuestros días en ambos

países. Lo cierto es que mientras en Estados Unidos en el siglo XX y principios del XXI coexisten hasta cinco generaciones, en España han surgido seis como consecuencia de los 40 años de dictadura. Así pues, el contexto puede impedir que ciertas generaciones surjan plenamente en un país o que, incluso, se generen otras específicas fruto de una situación determinada. En tal sentido, Howe y Strauss (2007:3) argumentaron que "[...] *A generation encompasses a series of consecutive birth years spanning roughly the length of time needed to become an adult; its members share a location in history and, as a consequence, exhibit distinct beliefs, and behavior patterns*". Estos autores basaron su investigación en la historia de Estados Unidos entre los siglos XVI-XX. En la Tabla 2 se muestran sólo los eventos que han marcado la evolución generacional del siglo XX y principios del XXI para ese país según los citados autores. No obstante, su planteamiento es útil al entender que los individuos desempeñan un papel en el tiempo en función de las circunstancias de su vida, y que los patrones de comportamiento de las generaciones constituyen una poderosa herramienta de predicción de tendencias futuras (Howe & Strauss, 2007). Es esta reflexión la que ha sido fundamental para entender nuestro interés por la generación *Z*, justo la que protagonizará laboralmente la segunda parte del siglo XXI y por la que los planteamientos de la Introducción de la tesis son especialmente relevantes.

Figura 2. Cohortes generacionales en Estados Unidos y España
Fuente: Adaptado de Prensky (2001) para USA y de Guisado & Agoiz (2013) para España



Si nos detenemos en la generación *Z*, la que da origen a las inquietudes de esta tesis, y obviamos la incipiente generación *Alfa*, observamos como Prensky (2001) fue el primero en evidenciar que estaba surgiendo una generación de jóvenes puramente digital. Pronto

comprendió que su facilidad de uso y acceso a la tecnología era notable. La tecnología les acompaña desde su nacimiento por lo que dominan el "lenguaje" digital que les ayuda a entender el mundo que les rodea (Dias et al., 2015; Prensky, 2001), manejando casi a la perfección todo tipo de dispositivos, videojuegos o internet (Prensky, 2002). Su versatilidad es alta para realizar muchas tareas simultáneamente, lo que les confiere la capacidad de hablar por el móvil, al tiempo que juegan a un videojuego y escuchan música en un dispositivo también móvil (Bennet et al., 2008). Sin embargo, otros autores han indicado que los *nativos digitales* tienden a abusar de la multitarea, lo que afecta negativamente a su aprendizaje. En consecuencia, ese abuso de la multitarea puede afectar al buen hacer profesional que se fundamenta en el aprendizaje continuado, convirtiéndose en una barrera para el aprendizaje a largo plazo (DiLullo et al., 2011).

Tabla 2. Esquema generacional de Strauss y Howe
Fuente: Adaptado del esquema generacional diagonal de Howe & Strauss (2007)

AÑOS	1929-1946	1946-1964	1964-1984	1984-2005?	2005?-2025?
Eventos Clave	Crisis Crack Del 29	Mccarthyims	Despertar Watergate	Guerras Culturales	Crisis Desarrollo Tecnológico
Juventud Edad 0-21	El Sofoco De Los Silenciados	Feliz Boom	Generación X Abandonada	Millennial Protegidos	El Sofoco De Los *"Homeland"*

Si bien la característica más destacada de los *nativos digitales* es su grado de conexión de forma digital en tiempo real, otras características relativas a la situación social, política o económica también los describe. Una encuesta realizada en 2019 por el *Pew Research Center* en Estados Unidos, destacaba que los jóvenes de entre 13 y 23 años mostraban que su visión sociopolítica difería ligeramente de la de sus predecesores, los *Millennials*. Los *Gen Zers*, como también se conoce a la *generación Z*, abrazan la diversidad racial porque son, con diferencia, la generación más diversa de la historia, la que se "ha topado" con la multiculturalidad y multirracialidad de forma más abrupta que sus antecesores. La globalización extendió sus alas para conectar al mundo tanto física como virtualmente. Ellos han jugado desde casa con coetáneos de otros países, improvisando el idioma y aprendiendo expresiones que no les eran propias en su entorno. Entienden que el concepto de familia y de género ha cambiado radicalmente y lo han incorporado a su estructura de creencias fuertemente afectados por las opiniones de *ticktockers, streamers* y otros *influencers*. Quieren ser líderes en la resolución de problemas reales, por lo que apoyan el activismo gubernamental (Tapscott, 2009). Pero además, tienen una visión optimista y positiva de su entorno. No obstante, como muchos de ellos aún

no han alcanzado la mayoría de edad, puede que sea demasiado pronto para saber qué camino van a tomar (Parker et al., 2019).

Así, la cultura de la tecnología afecta de forma importante a esta generación, si se compara con otras generaciones (Bennett & Maton, 2010; Oblinger et al., 2005). En este sentido, los nativos digitales no conciben el mundo sin tecnología porque las TIC satisfacen todas sus necesidades, tanto de entretenimiento como de comunicación, pero también de información y aprendizaje (Dias et al., 2015; Oblinger et al., 2005). Obtienen información de forma aleatoria (Dias et al., 2015) resultando este hecho fundamental para crear nuevo material al que dan un toque personal que publican en forma de imágenes, vídeos o audios (Bennett & Maton, 2010). Además, y a diferencia de las generaciones anteriores, creen que obtener información a través de las redes sociales es positivo para la sociedad (Parker et al., 2019).

No obstante, aunque la descripción anterior puede percibirse como un estereotipo, Oblinger et al. (2005) creen distinguir diferencias por grupos de edad: los niños, con edades comprendidas entre los 5 y 16 años, y los jóvenes con entre 18 y 21 años. Los primeros, necesitan todo tipo de información para su bienestar personal, visibilidad en las redes sociales para expresar sus opiniones y comunicación con su "vecindad" *online* con quien se mantienen permanentemente comunicados. Los segundos, por su parte, orbitan en torno a un grupo de amigos, valores familiares, creencias que entienden *cool*, y son los que se muestran más multirraciales, multiétnicos, orientados a resultados y repletos de actividades extraescolares por realizar (Oblinger et al., 2005), eso sí, pero siempre conectados a la tecnología.

Según un informe realizado en 2016 por la *Deusto Business School* junto a *Atrevia Global Consulting*[11], la generación *Z* "[...] se prepara para innovar de forma diferente: cada uno creará su caja llena de elementos modificables y alterables que provendrán de fuentes académicas o informales y relacionadas con uno o varios sectores científicos o económicos. Los ganadores serán los más hábiles a la hora de seleccionar y combinar las piezas de información para obtener ideas innovadoras [...] La nueva generación será protagonista de primer orden de la economía colaborativa, es decir, una gran red de trabajadores autónomos unidos por una cadena que generará un gran proyecto. Una gran parte de los *nativos digitales* se acostumbrarán a unirse a proyectos en lugar de ser empleados, por lo que tendrán más libertad y autonomía, aunque la incertidumbre y el riesgo aumentará debido a la inseguridad laboral" (p.13).

[11] Disponible en: https://ethic.es/wp-content/uploads/2016/04/ResumenEjecutivo_GeneracionZ_140315-2.pdf

Lo que no cabe duda es que la *generación Z* atrae el interés del mundo académico, si bien apenas hemos encontrado estudios científicos sobre dicha generación. De esta forma, una primera aproximación a la literatura con un enfoque generacional resultó infructuosa en los primeros compases de esta tesis. Hoy, por suerte, existe un incipiente interés por esta generación, interés que también se ha dejado notar, aunque tímidamente, en los estudios sobre emprendimiento, no en vano está siendo considerada la generación más emprendedora de todas las conocidas (Mahmood et al., 2020).

Emprendimiento y enfoque generacional

La edad, el contexto y los valores compartidos han ayudado a definir a una generación. Así, los marcos normativo e histórico se unen al biológico para conformar las claves sobre las que una generación toma cuerpo (Gielnik et al., 2018). Hasta ahora la literatura en emprendimiento ha trabajado estos elementos de forma aislada e independiente, sin tomar conciencia de la potencialidad que el concepto de generación puede aportar en el estudio del emprendimiento. No obstante, cuando se ha interesado en el concepto lo ha hecho de manera anecdótica, como así lo atestiguan algunos de los recientes trabajos que hemos analizado (Tabla 3). En dicha muestra dominan tres vertientes del concepto de generación: la primera muy vinculada a entender a los jóvenes y sus particularidades para el emprendimiento; la segunda interesada en la emergencia de una nueva generación de emprendedores con características especiales que la distingue de las predecesoras, y la tercera, que entronca la investigación en emprendimiento con la investigación en empresa familiar, para la que el concepto de generación se contextualiza en el paso de una cohorte de padres a otra de hijos o nietos de una casta de fundadores de empresa.

De las tres variables que ayudan a conformar una generación, es quizá la edad una de las que más atención ha recibido en el estudio del individuo emprendedor. Para muchos investigadores la edad no es un simple número derivado de la fecha de nacimiento plasmada en el carnet de identidad de una persona, sino que se ha observado como una variable multidimensional que ayuda a explicar algunas diferencias entre grupos de individuos o cohortes junto al género y otras variables demográficas (Minola et al., 2016).

Tabla 3. Trabajos recientes que refieren a la generación en la literatura sobre emprendimiento

Título	Tipo de investigación	Variables	Objetivos	Conclusiones
Becoming an entrepreneur: A study of factors with women from the tech sector (Kovaleva et a*l.*, 2023)	Cualitativa	Factores sociales y personales	Identificar los factores que influyen en las mujeres para decidir emprender en el sector tecnológico. Identificar qué cuestiones influyen para que el sector sea atractivo especialmente en mujeres en ámbitos como la ciencia, la tecnología y la ingeniería	"[…] In general, the current younger generations are aware of the option of becoming entrepreneurs, and what becoming one requires. Initiatives, such as adding positive examples of females' success, or supporting entry-level opportunities towards full-time entrepreneurship, could have a meaningful impact of reducing the gender imbalance in the STEM fields, and in technology entrepreneurship in general" pp. 1
Sustainable Entrepreneurial Intention of Youth for Agriculture Start-Up: An Integrated Model (Lediana et al., 2023)	Cuantitativa: Modelo de ecuaciones estructurales	Actitudes, normas subjetivas, control del comportamiento, deseabilidad y factibilidad percibida e intenciones	Analizar los determinantes de la intención emprendedora de la juventud enfocada en la sostenibilidad en empresas nacientes de agricultura	"[…] These results can be incorporated into training materials by paying attention to attitude indicators, subjective norms, behavioral control, perceived desires, perceived feasibility, and intentions of the younger generation in entrepreneurship" pp. 14
Aspiring Minds: 'A Generation of Entrepreneurs in the Making' (Rajak & Dolan, 2022)	Cualitativa: Análisis de campañas de fomento del emprendimiento dirigidas a jóvenes		Examinar cómo los intereses corporativos, el estado y los donantes convergen en los intentos por conseguir de los jóvenes sudafricanos un ejército de empresarios como última frontera para el crecimiento en un mundo post-empleo	"[…] Against the pessimistic crisis narratives of generation jobless, entrepreneurship education offers optimistic visions for a new economy of development fuelled by the enterprising dreams of African school children […] The entrepreneurialisation of childhood sits within a broader ideological campaign to unseat (and delegitimise) claims of entitlement and state support, promoting the myth that sapling entrepreneurs will solve the shrinking job market that awaits them [...] This deflection of entitlement defers economic responsibility onto a future generation of entrepreneurs yet to be made, pedalling the notion that even opportunity can be conjured from nothing, given the right mind-set [...] The endurance of hope against the odds makes youngsters such an enticing target for entrepreneurialist agendas, and fertile fodder for discourses of enterprise development. But while this narrative heroises children's capacity to transcend their circumstances, it imputes failure to those who cannot" pp. 818
Training the next generation of translational scientists: The Case Western Reserve University Translational Fellows Program (Thompson, Misko & Chance, 2022)	Cualitativa: Monitorización del desarrollo y lanzamiento del programa		Crear la primera cohorte de científicos emprendedores	"[…] outcomes from our initial cohort are very promising and we are confident that we will see a strong return on our investment. In addition, the deliberate training in a non-academic career will help us attract strong doctoral students interested in translation and innovation" pp. 4

Título	Tipo de investigación	Variables	Objetivos	Conclusiones
Entrepreneurial performance of new-generation rural migrant entrepreneurs in China (Ma et al., 2022)	Cuantitativa: Análisis factorial y modelo de regresión múltiple	Reputación social, participación, redes, confianza, innovación, tendencia al riesgo, autoeficacia, felicidad por emprender	El impacto del capital social y psicológico en el papel de los migrantes retornados a las áreas rurales en China	"[…] This study shows the importance of how a mixture of interrelated social and psychological dimensions influence entrepreneurial performance that may contribute to the success of the Chinese rural revitalization strategy. This has serious implications when attempting to improve the lives of over 100 million rural Chinese citizens" pp. 1
The interplay between identity construction and opportunity structures: Narratives of Turkish migrant women entrepreneurs in the Netherlands (Kacar & Essers, 2019)	Cualitativa: Life story	Políticas, consciencia de clase, posición transnacional y cosmopolita	Explorar la relación entre el proceso de construcción de identidad de las mujeres migrantes y la estructura de oportunidad en su amplio entorno sociocultural y político-institucional	"[…] politics, both in the country of residence and country of origin, influences identity constructions […] Being one-and-a-half- or second-generation, they are well educated, multi-lingual and financially independent. In response to the societal and political discourses on Turkish (Muslim) women, they distanced themselves from the Turkish community in the Netherlands rejecting perceptions of being a 'typical' Turkish migrant with a different migration history or by not engaging in ethnic cultural practices [...] the processes of politicisation and class-consciousness, the women in this study utilise their skills, bicultural literacy and transnational network to expand their middle-class status" pp. 726
Generational Links between Entrepreneurship, Management and Puritanism (Grytten & Minde, 2019)	Cuantitativa: Descriptivos y aplicación del Método Solow	Fuentes históricas de información y datos compilados de Hodnes	Posicionar en el tiempo las tres generaciones de emprendedores que se fundamnentan en el estilo del clérigo Hauge, su creador	"[…] The paper seeks to map characteristics of puritan industrialism in terms of management and entrepreneurship […] The paper also sort Haugean entrepreneurship into three generations. In the first place, the Haugeans until the late 1800s. Secondly, Haugean descendants during the last decades of the 1800s until the last decades of the 1900s. Finally, Neo-Haugeans thereafter and until now [...] We conclude with ten different parameters, where puritan stewardship, Christian motivation, entrepreneurship and responsibility for the community seem to be among the most important features for their involvement. These attributes seem to have been fairly constant over time" pp. 254
Developing Next Generation of Innovators: Teaching Entrepreneurial Mindset Elements across Disciplines (Nadelson et al., 2018)	Cuantitativa: Estadística descriptiva	Tenacidad/motivación, conectar personas e ideas, ambigüedad, curiosidad, innovación/creatividad,	Explorar la implicación implícita y explícita de los académicos con el curriculum docente para educar en una mente emprendedora	"[…] Our research addressed a gap in the literature examining how university faculty members across the disciplines teach entrepreneurial thinking […] Having a developed entrepreneurial mindset has many potential benefits such as, increased propensity for positive relationships and personal interaction, being a creative problem solver, remaining motivated in the conditions of adversity, and embracing failure as an opportunity [...] faculty knowledge of entrepreneurship and limited focus on enhancing student development of facets of entrepreneurial thinking" pp. 124

Título	Tipo de investigación	Variables	Objetivos	Conclusiones
Transgenerational entrepreneurial family firms: An examination of the business model construct (Clinton, McAdam & Gamble, 2018)	Cualitativa e interpretativa y longitudinal: método del caso con entrevistas semiestructuradas	Motivacionales Elementos del modelo de negocio	Investigar el desarrollo intergeneracional del modelo de empresa en el seno de las familias empresariales transgeneracionales	"[…] The notable lack of theory development surrounding how and why entrepreneurial behaviours manifest and develop across generations […] we demonstrate how the combined approach of an informal management style and mutuallybeneficia l communications may be invalidated by external personnel involvement in subsequent generations, thus endangering the cohesion and unity of the TEF firm" pp. 281
Family entrepreneurship in the Czech Republic on the verge of first generation handover (Petrů & Havlíček, 2017)	Cuantitativa: Estadísticas descriptivas	1ª generación: padre o madre fundadora; 2ª generación: hijos/as y esposos/as; 3ª generación: nietos/as y/o miembros activos de la familia. Tipos de empresas: propiedad familiar, mayoría de la propiedad o más de un familiar involucrado en la empresa	Evaluar, en base al parámetro "experiencia", la representación generacional de los negocios familiares en relación al liderazgo y la propiedad del negocio	"[…] family businesses continue to be owned by the first generation, and the first generation retains their influence on business management also through their participation on the boards. Their problem is that in most cases, the founder is the only one to have the greatest knowledge, and therefore they are indispensable for the company. This provides them with control and power over processes, over employees, over the next generation, a respected position in the family and the entire company. Founders consider abandoning control and power a great sacrifice, they do not trust in successors that they are able to work at least as well as the founders. To ensure continuity and vitality of businesses, owners should respect succession planning as one of their main obligations, and they should do everything to make it smooth, efficient and, if possible, without conflict. Their control and power must be reoriented somewhere else […] [The basis of intergenerational communication is trust. The coming generation should not question the steps of the founders and they should respect that the founders made them at a specific time with specific resources" pp. 129
Perceptions of entrepreneurship across generations in family offices: A stewardship theory perspective (Welsh et al., 2013)	Cualitativa: Entrevistas en profundidad		Examinar la percepción de las distintas generaciones (fundadores y segundas generaciones) sobre el emprendimiento en los negocios familiares, las inversiones nuevas y cómo influyen en el crecimiento y la prosperidad de sus empresas	"[…] Our preliminary results suggest that subsequent leaders of the family office may become more conservative and not take entrepreneurial risk, especially in later generations. Our findings indicate that the first generation with stewardship tendencies perceives the family office as being more entrepreneurial than the later generations perceive. The later generations (successor level) perceive themselves to be less entrepreneurial in their approach to managing the family office investments and ventures due to the pressure not to lose family capital created by previous generations and diminishing family influence and stewardship" pp. 221

Algunos investigadores han observado, por ejemplo, cómo los jóvenes muestran altos niveles de comportamiento emprendedor fruto de la sensación de que aún les queda "una larga vida por vivir", frente a los adultos mayores que tienden a evitar riesgos, quizá por la misma razón, "el tiempo que les queda por vivir" (Gielnik et al., 2018). Para algunos autores se dan picos elevados de actividad emprendedora en torno a los 20 años, en comparación a los 30, disminuyendo en gran medida a partir de los 50 años (Minola et al., 2016; Reynolds, 1995). Sin embargo, el ciclo de vida de una persona va marcando su curva de aprendizaje, de forma tal que cuanto más avanza la edad más información se atesora (Karim, 2013) y más habilidades cognitivas se adquieren, retrasando la identificación de oportunidades (Camelo-Ordaz et al., 2016) e influyendo positivamente en la intención y el comportamiento emprendedor. Los resultados, por tanto, no parecen concluyentes.

Este hecho puede tener mucho que ver con que estos resultados se fundamentan especialmente en el concepto de edad biológica o cronológica, una visión que puede diferir del concepto de edad psicosocial (Tabla 4). Así, cuando los individuos se sienten "mayores" o "jóvenes" independientemente de su año de nacimiento, es la edad psicosocial la que lleva al individuo a identificarse con una forma de ver la vida y de actuar que puede no coincidir con la de sus coetáneos de nacimiento. Por su parte, y próximo a este concepto está el de edad vital, que impulsa a las personas a cambiar en cualquier momento de su vida, cuando los factores cognitivos, la motivación y el comportamiento de otras personas (Gielnik et al., 2018) les incentivan a modificar su comportamiento. Por tanto, la decisión de emprender no tiene "edad" sino que cuenta con mecanismos internos estrechamente relacionados con la edad cronológica y el autoconcepto del individuo, pero, y muy especialmente, con factores de contexto –*e.g.*, cultura, valores, acontecimientos…- y las percepciones que de dicho contexto tiene la persona (Minola et al., 2016).

Tabla 4. Dimensiones de la edad y su relación con la iniciativa emprendedora
Fuente: Elaboración propia a partir de Gielnik et al. (2018)

Edad cronológica	Se enmarca dentro de la fecha de nacimiento (salud, habilidades cognitivas, físicas, etc.) determinando la etapa de la vida en la que una persona se encuentra, por ejemplo, considerando un primer empleo o la jubilación
Edad funcional	Dos distinciones: edad biológica que se asocia negativamente con la intención (motivación) para actuar y edad psicológica que tiene una relación positiva con la motivación (autoeficacia)
Edad psicosocial	La edad subjetiva o la percepción que se tiene de cómo se siente, observa y actúa un individuo y con qué cohorte se identifica. La intención de actuar puede verse afectada, en consecuencia, por la pérdida de habilidades a medida que la persona envejece
Edad vital	La edad vital da la posibilidad de cambiar la intención de actuar en cualquier momento del ciclo de vida de una persona

Esto nos lleva a pensar que la edad, por cuanto presenta ese carácter multidimensional, puede afectar significativamente a las actitudes sociocognitivas del individuo. Pero el factor cultural también afecta a dichas actitudes, fruto de los valores compartidos por los individuos que coexisten en un entorno, una cuestión que tampoco ha pasado desapercibida a los investigadores del fenómeno emprendedor. Cada persona tiene su sistema de valores compartido con la comunidad (local, regional o nacional) que distingue a grupos de personas, regiones e incluso países. Sin duda, los valores culturales se aprenden durante la juventud, cuando los jóvenes son más adaptables a los cambios y realizan también sus aportaciones (Hofstede, 2015). Lo que parece claro es que existen más diferencias culturales entre países que dentro de un mismo país. Así, por ejemplo, los individuos que viven en zonas urbanas frente a los que viven en zonas rurales comparten los mismos valores que hacen que se construya una nación (Minkow & Hoftede, 2014).

Es de esta forma que la cultura de un país determina las percepciones compartidas, las creencias, los códigos de comunicación o los propios actos (Lim, 2016). Así, la cultura establece distinciones entre grupos humanos (Moriano et al., 2012). En este sentido, Minola et al. (2016) explican que los estudios precedentes han pasado por alto la relación edad-emprendimiento desde una perspectiva de heterogeneidad cultural. Esta reflexión deja algunas cuestiones abiertas y para la reflexión: ¿una generación puede ser homogénea en edad pero heterogénea en función del contexto y la cultura que domina el entorno en el que la persona se desarrolla?, ¿sería razonable pensar que una generación entiende y construye su entorno en función de una cultura dominante, afectando de manera diferente al proceso emprendedor según el país o región donde desarrolla su actividad?

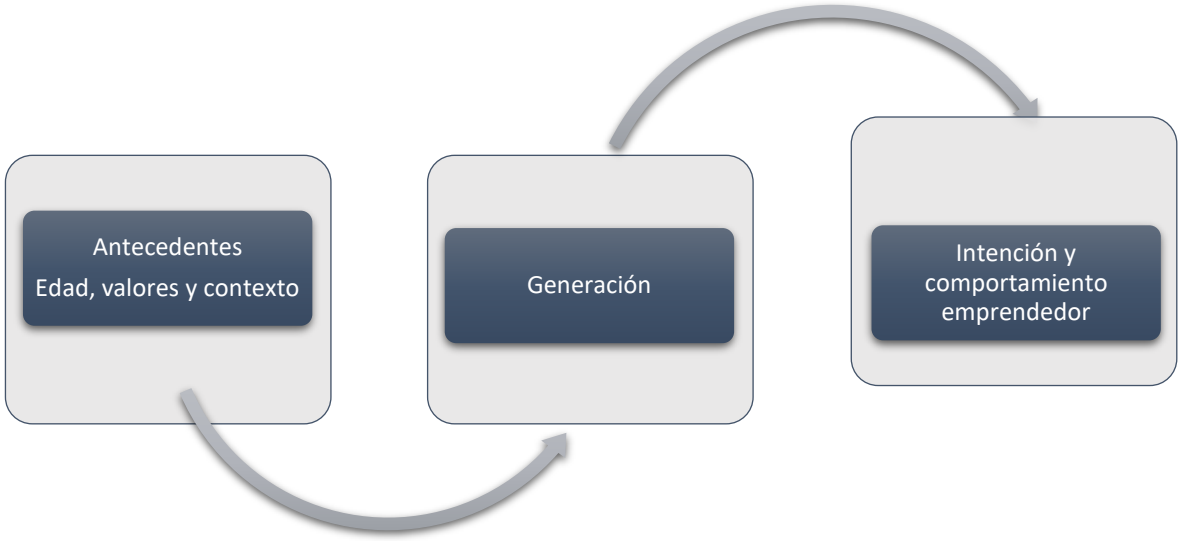
Lo que no cabe duda es que ante una sociedad global cada vez más interconectada, la homologación cultural empieza a asomar tímidamente, para impedir distinguir qué valores pertenecen a una cultura concreta. Por lo tanto, ¿estamos ante un proceso irreversible de homologación cultural que puede afectar a las generaciones venideras y a su ímpetu emprendedor?

Ahora bien, una región con sus particularidades históricas y culturales puede verse afectada por situaciones económicas, sociales y políticas que retrasan o promueven el emprendimiento durante toda una generación. Considerar todas estas cuestiones implica no perder de vista que el contexto también influye, y que los hechos históricos que se suceden dejan su muesca en las personas y su forma de ver la vida. No quedan lejos los estudios en el área que nos ocupa que han dado relevancia a eventos clave como la reciente crisis sanitaria

generada por la pandemia (Sharma et al. 2022; Zahra 2021) o su predecesora, de carácter socio-económica, que dio lugar a la Gran Recesión del 2008 (Devece et al., 2016).

Ahora bien, la consideración de la generación como variable explicativa en el estudio de la IE y el CE implica aunar bajo un mismo paraguas todos estos factores –*i.e.*, la edad, el contexto en que la generación se desarrolla y los valores compartidos por la misma (Figura 3).

Figura 3. La variable Generación como explicativa de la IE y el CE
Fuente: Elaboración propia



Ahora bien, la propia palabra generación abarca un espectro amplio y no exclusivo de situaciones que impiden una búsqueda eficiente de los trabajos de investigación sobre emprendimiento y generación. En este sentido, una búsqueda simple de los términos "*entrepreneur*$_*$*"* y "*generation"* en la base de datos *Scopus* reportó más de 2.500 artículos publicados que contenían ambos términos en el título, abstract o palabras clave. La inspección inicial nos permitió comprobar que muchos trabajos se referían a tópicos como generación de modelos, generación de empleo, generación de valor, entre otros, que nada tenían que ver con el tópico de nuestro interés. Una selección intencionada de una muestra pertinente para el concepto de generación que perseguimos, nos permitió obtener los artículos referidos en la Tabla 3 para comprobar las acepciones dominantes más arriba resumidas. De esta forma, las publicaciones se referían a generaciones de mujeres emprendedoras (Kovaleva et al., 2023; Ma et al., 2022; Kacar & Essers, 2019), generaciones de científicos, desempleados o jóvenes educados para el emprendimiento (Thompson, Misko & Chance, 2022; Nadelson et al., 2018), generaciones de potenciales emprendedores orientados hacia la sostenibilidad (Lediana et al., 2023), campañas de marketing dirigidas a una generación de niños sobre los que se actuaría

para animarlos a emprender en el futuro (Rajak & Dolan, 2022), generación de emprendedores *Haugianos* (Grytten & Minde, 2019) y generaciones de emprendedores en empresas familiares (Clinton, McAdam & Gamble, 2018; Petrů & Havlíček, 2017; Welsh et al., 2013). Estos trabajos se refieren fuertemente a los *contextos* a los que se vinculan las realidades investigadas, *e.g.* migrantes en China (Ma et al., 2022), empresas familiares con base en la República Checa (Petrů & Havlíček, 2017). Otros se refieren a *ámbitos* específicos de aplicación como la sostenibilidad (Lediana et al., 2023), la educación -estudiantes de doctorado en Thompson, Misko & Chance (2022)-, o la ciencia -científicos en Nadelson et al. (2018)-. Los *valores*, quedan reflejados en trabajos de identidad como el de Kacar & Essers (2019) o el de Grytten & Minde (2019) que analizan la historia de empresas *Hauganianas –i.e.*, sobre los preceptos fundacionales del clérigo Haugan-. Pero también asoma la *edad* como variable determinante de la generación en trabajos como el de Rajak & Dolan (2022) que analiza las campañas que fomentan el emprendimiento en edades tempranas.

Ahora bien, donde no parece existir un sesgo importante en la interpretación del concepto generación es cuando la búsqueda pretende encontrar a una generación concreta, como puede ser la *Z.* Solo sobre esta generación encontramos 149 artículos en *Scopus*, de los cuales tan solo 7 artículos trabajan específicamente investigación relacionada con el estudio de la IE con un enfoque de generación. En estos trabajos domina el uso de la Teoría del Comportamiento Planificado de Ajzen (1991) *–e.g.*, Mahmood et al. (2020), Nguyen et al. (2021)-, pero también encontramos otras teorías de interés como la Teoría Social Cognitiva que sustenta el trabajo de Hamdi et al. (2021), o con un enfoque pedagógico alternativo de la educación emprendedora en Irawanto & Novianti (2021) y, por último, la Teoría del Nivel de Conceptualización (*Construal Level Theory*) del trabajo de Santos et al. (2021). No sorprende ver que todos los trabajos sean empíricos aplicando métodos tradicionales de análisis como las ecuaciones estructurales como protagonistas (Hamdi et al., 2021; Irawanto & Novianti, 2021; Mahmood et al., 2020; Nguyen et al., 2021; Frunzaru & Cismaru, 2018) y un único trabajo que utiliza herramientas de IA, el análisis FsQCA (Santos et al., 2021). Por último, un único trabajo adopta una metodología cualitativa, trabajando con jóvenes que cursan asignaturas obligatorias de emprendimiento (Kristiawan & Syamsidar, 2019). En la mayoría de los estudios se utilizan muestras de estudiantes universitarios a excepción de este último trabajo que considera estudiantes de secundaria.

Tabla 6. Extracto de los trabajo en IE sobre Generación *Z*

Título	Tipo de investigación	Variables	Objectivos	Conclusiones
Monkey see, monkey do? Examining the effect of entrepreneurial orientation and knowledge sharing on new venture creation for Gen Y and Gen Z (Hamdi, Indarti, Manik & Lukito-Budi, 2021)	Cuantitativa: Enfoque hipotético-deductivo	Creación de empresas, orientación emprendedora y actitud hacia el conocimiento compartido, género, nivel educativo, estado civil, situación laboral y origen étnico	Las orientaciones emprendedoras de los individuos y sus actitudes hacia el conocimiento compartido afectan a la creación de empresas entre la generación Millennial (Y) y los nativos digitales (Z). Comprobar si este efecto encuentra diferencias entre generaciones	"[…] At present the border between the virtual and the real is blurred, therefore, the traditional sources of efficiency lose interest for the digital generation that lives in a virtual world with its role models (animes, games, etc.). The cognitive structure has completely changed which makes a revision of the theory of social cognition necessary. For Generation Y, the traditional method of efficiency is still effective" pp. 16
Factors Affecting Entrepreneurial Intention of Generation Z During COVID-19 Pandemic: An Empirical Study from Vietnam (Nguyen, Le, Huynh, Vo & Ha, 2021)	Cuantitativa: Ecuaciones estructurales	Intención emprendedora, asunción de riesgos, tendencias del mercado económico, personas influyentes y confianza, sexo, edad, nivel de estudios y situación laboral	Estudiar y analizar el impacto de los factores en la intención emprendedora de los Millennials (generación Y) y los nativos digitales (generación Z)	"[…] The factors that most influence the decision to undertake Generation Z are risk-taking and confidence. Whereas, influencers and market trends do not affect this generation" pp. 451
Are social and traditional entrepreneurial intentions that different? (Santos, Brännback & Liguori, 2021)	Cuantitativa: FsQCA	Intención emprendedora, emprendimiento social, altruismo, empatía, autoeficacia, emprendedor social, género.	Cómo las características personales predicen la IE desde dos enfoques diferentes: comercial y social	"[…] The student's cognitive representation of their EI is psychologically distanced from their daily lives and they are an abstract representation" pp. 1903
Entrepreneurship education in higher education: optimizing innovative behaviour of Z generation (Irawnanto & Novianti, 2021)	Cuantitativa: Regresión múltiple	Educación emprendedora pedagógica y alternativa, comportamiento innovador, género, Universidad, edad, estudios y calificaciones	Explorar cómo las percepciones hacia la educación emprendedora en la educación superior afectan a la innovación y al comportamiento de los estudiantes (generación Z)	"[…]Pedagogical entrepreneurial education significantly affects innovative behaviour. Likewise, an alternative approach to entrepreneurship education that emphasizes cognitive models does not prove that it increases innovative behaviour " pp. 5
Determining the Entrepreneurial Intentions of Youth/ Generation Z: A Study of Youth Intent towards Entrepreneurship (Mahmood, Lateef & Paracha, 2020)	Cuantitativa: PLS (Mínimos cuadrados)	Intención emprendedora, autoeficacia emprendedora, actitud hacia la iniciativa emprendedora, control del comportamiento percibido, normas sociales y oportunidades emprendedoras	Explorar y analizar las intenciones emprendedoras de la Generación Z. Determinar el efecto que determinadas características emprendedoras tienen en el comportamiento de esta generación hacia el emprendimiento	"[…] Attitude and control of perceived behaviour significantly impact young people's entrepreneurial intent in the future. There are no behavioural differences between generations (Millennial and digital natives). It is confirmed that Generation Z is entrepreneurial" pp. 148
The impact of individual entrepreneurial orientation and education on Generation Z's intention towards entrepreneurship (Frunzaru & Cismaru, 2018)	Cuantitativa: Correlación de Pearson, regresión lineal	Intención de emprender e intención orientada a emprender, necesidad de logro, comportamiento estructural, autoeficacia, flexibilidad laboral, padres emprendedores, nivel de estudio de los padres, edad, estudios de marketing o comunicación	Analizar qué características e intenciones emprendedoras tiene la Generación Z. Explorar el papel de la educación emprendedora en la orientación emprendedora y si tiene un efecto incremental en la IE de esta generación	"[…] Both generations (Millennial and digital natives) share similar characteristics around intention towards entrepreneurship and intention oriented towards entrepreneurship. Generation Z shows higher levels of achievement need, more work flexibility, and low self-efficacy. On

Título	Tipo de investigación	Variables	Objectivos	Conclusiones
				the other hand, entrepreneurship education significantly impacts both generations by increasing both the intention and orientation towards entrepreneurship" pp. 10-11
Role of School on Forming Character of Z-Generation Through Entrepreneurial Skills (Kristiawan & Syamsidar, 2019)	Cualitativa: Entrevistas en profundidad		El papel de la escuela en el fomento del carácter emprendedor de la generación *Z*	"[…] Z-Generation is a child who was born around 1995 to 2015. Z generation better understand the technology of the millennial generation. Z-generation has a different perspective on the job, such as wanting the flexibility, work on remote, and want a lot of traveling." "[…]Entrepreneurial activity in schools is expected to make Z-generation character who has a high work passion, productive and innovative." pp. 1944

De los trabajos analizados, especialmente relevante es el de Hamdi et al. (2021) en el que se comparan dos generaciones, los *Millennial* (Y) y la Generación *Z*, para examinar los efectos que la IE y la actitud hacia el conocimiento tienen en la creación de empresas. Su estudio se enmarca en un enfoque deductivo-hipotético donde se incluyen variables socio-demográficas como la edad y la educación, entre otras. Es importante destacar que los autores concluyen que la estructura cognitiva de la Generación *Z* difiere de la de su predecesora. Este hallazgo demuestra que los modelos de conducta que se han dado por válidos para otras generaciones, incluidos los *Millennials*, difieren significativamente en los jóvenes *nativos digitales*. En este sentido, sus conclusiones en muchos aspectos confluyen con las de Santos et al. (2021) para quienes además, las representaciones cognitivas de los estudiantes sobre su IE están psicológicamente distantes y representadas de forma abstracta al ser aún demasiado jóvenes. Pero también encontramos trabajos que se centran más en las características emprendedoras de la generación, como el de Nguyen et al. (2021), que concluyen que la confianza y la asunción de riesgos definen a los *nativos digitales*. Kristiawan & Syamsidar (2019), por su parte, resaltan su pasión por el trabajo, un trabajo que ha de ser flexible y en remoto, permitiéndoles disfrutar de su tiempo libre. Asimismo, añaden que la Generación *Z* presenta un perfil innovador y altamente productivo. La baja autoeficacia, la flexibilidad laboral o la necesidad de logros caracterizan a esta generación según Frunzaru & Cismaru (2018), coincidiendo con los hallazgos de Mahmood et al. (2020), para los que tanto *Millennials* como generación *Z* comparten características similares.

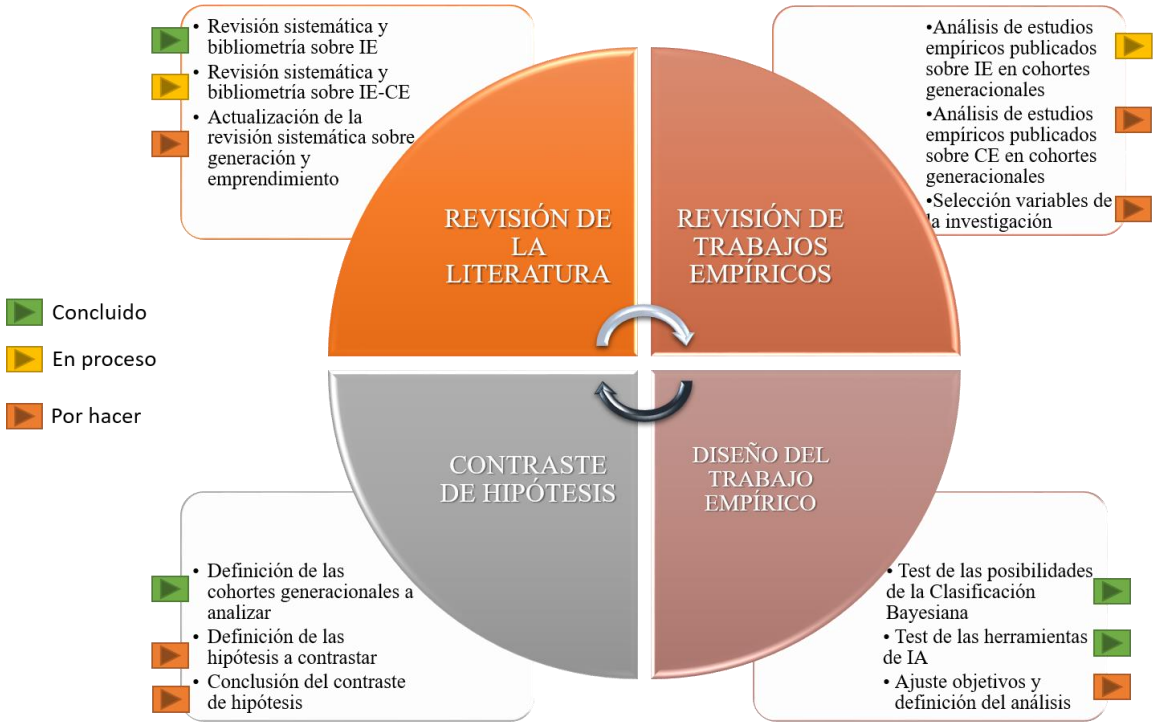
Lo que queda por hacer

Incorporar el concepto generación al estudio del emprendimiento implica dar por hecho que existen diferencias significativas entre unas cohortes generacionales y sus predecesoras en cuanto a su IE y a su CE. Subyace esta hipótesis en la línea de trabajo propuesta que es necesario despejar y que, por mor de los inconvenientes desvelados en la Introducción de esta tesis y evocados en este ensayo, require una preparación previa para su estudio.

Como indicábamos asimismo en la citada Introducción, el proyecto GEM nos ofrece datos de valor para este estudio, si bien requerimos algo de paciencia para extraer

resultados concluyentes con el fin de comparar dos o más generaciones con la que es objeto de nuestro interés, la generación *Z*. Sobre esta generación presumimos un cambio de tendencia tanto en su IE como en su CE respecto a las generaciones precedentes. A continuación reflejamos en un mapa resumen (Figura 4) los pasos ya culminados, los que están en proceso y aquellos que nos quedan por cubrir para concluir el estudio objetivo.

Figura 4. Resumen de las fases de estudio requeridas para distinguir la IE y el CE de la generación *Z* respecto a las precedentes
Fuente: Elaboración propia



Conclusiones

Aunque la noción de generación no es estática y sigue en revisión (Caballero & Baigorri, 2019), el marco que la define resulta útil para afrontar el estudio de la IE y del CE de las cohortes generacionales que conviven actualmente y de las que están por venir. Si bien, este enfoque se está integrando poco a poco en el estudio de la iniciativa emprendedora, y se encuentra aún en un estadio muy incipiente, creemos que tratar de encontrar resultados concluyentes sobre los aspectos que diferencian a las distintas generaciones en cuanto a su carácter emprendedor y su iniciativa es un tema que apenas ha comenzado a desarrollarse y que ofrece una fuente inagotable de investigación en esta área.

El marco teórico-empírico desarrollado a lo largo de esta tesis nos marca el camino a seguir para llevar a cabo nuevos experimentos que contribuyan a alcanzar el conocimiento pretendido. El proyecto GEM nos ofrece además un entorno de trabajo que de seguro dará mucho de sí tan pronto la muestra de la generación que codiciamos conocer gane fortaleza. Sin duda, los resultados obtenidos de esta línea de investigación permitirán establecer políticas más eficaces y eficientes para impulsar el espíritu emprendedor de la población, además de desarrollar una educación emprendedora adaptada a las nuevas generaciones, aspectos ambos cuyo efecto final debería permitir una efectiva transferencia intergeneracional.

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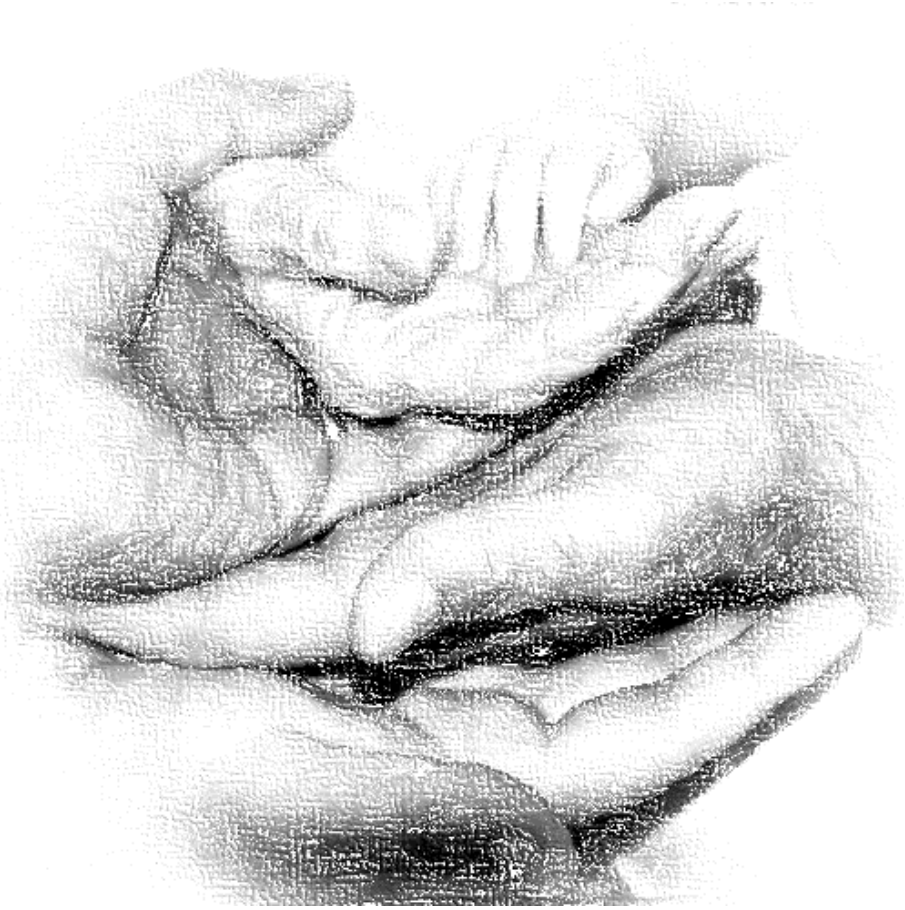

CAPÍTULO VI

Conclusiones
Conclusions

Conclusiones

En estos últimos compases de la tesis creemos importante sintetizar los hallazgos que se han encontrado en los diversos trabajos realizados y que abren camino hacia una línea de investigación específicamente centrada en el estudio de la intención y el comportamiento emprendedor de las diferentes generaciones. Así, podemos resumir las aportaciones de la presente tesis en un decálogo de conclusiones y reflexiones reseñables. A saber:

1. El estudio de la IE ha experimentado un crecimiento exponencial en los últimos años. Concretamente, el mayor volumen de publicaciones se refleja en la última etapa analizada en el segundo Capítulo de esta tesis, comprendida entre los años 2011 y 2021, y no parece que se hubiera alcanzado aún un punto de inflexión en las mismas. Este rápido crecimiento en la investigación no facilita la síntesis de los hallazgos, impidiendo obtener resultados concluyentes sobre las investigaciones en IE en sus diferentes vertientes de estudio. Será imprescindible que en los próximos años, además de actualizar los estudios de naturaleza cienciométrica, se lleven a cabo más meta-análisis sobre los diferentes temas de interés para el estudio de la IE a fin de sintetizar los hallazgos encontrados y observar cómo el conocimiento evoluciona.
2. El uso de dos indicadores diferenciados cuando se evoca la Cita Directa como medida del impacto de la investigación en un campo –*i.e.*, la Cita Global y la Cita Local- hace posible visibilizar información hasta ahora oculta para los especialistas de un área específica de investigación. Estas citaciones permiten ubicar a los científicos y su producción, tanto dentro como fuera del ámbito o tópico donde está desarrollando su labor. Si a ello añadimos las ventajas ofrecidas por los mapas estratégicos para visibilizar la evolución de un tópico o ámbito de estudio, tal y como se advierte en los capítulos 2 y 3 de la presente tesis, resulta que las técnicas bibliométricas disponen de herramientas de gran valor para la cienciometría. Estas ventajas aún no han sido suficientemente explotadas por los investigadores del área que nos ocupa.
3. Cuatro polos de atracción del interés científico en la IE se han detectado en las revisiones bibliométricas realizadas en los capítulos 2 y 3. El modelo TPB y su debate ejerce una fuerza motriz sobre el área de estudio, al que con mucha probabilidad se unirá en breves fechas el estudio de la autoeficacia en la

conformación de la IE. Por su parte, la educación emprendedora y el emprendimiento social crecen en el grado de atracción que ejercen como temas de investigación en IE. La primera lo hace por su importancia en la generación de una mentalidad emprendedora en la población, y la segunda, como una vía para mostrar la diversidad del fenómeno emprendedor. Sin embargo, con frecuencia se ha ignorado que la IE es un paso previo al CE. El abuso en el uso de las muestras de estudiantes universitarios para el estudio de la IE ha obviado el papel clave que juegan los propios emprendedores para explicar la transición desde la IE hacia el CE.

4. La sobreexplotación de la Teoría del Comportamiento Planificado de Azjen ha impedido el progreso de otros modelos que pueden ofrecer nuevos enfoques en el estudio sobre cómo la IE progresa hacia el CE. El propio Azjen (2011, 2020) observa las limitaciones del modelo en algunas de sus intervenciones más recientes. Su carácter altamente racional no llega a captar los procesos cognitivos y afectivos intrínsecamente ligados al individuo, lo que pone en duda hasta qué punto esta teoría ayuda a predecir el CE. Hemos entendido, además, que el uso de modelos y estrategias metodológicas basadas en enfoques psicosociales son una alternativa válida para comprender como la IE se transforma en CE.
5. Hasta ahora, además, los modelos de intención han considerado las actitudes como una pieza clave para entender cómo se forma la intención y cómo esta se transforma en comportamiento, pero no han tomado en consideración su verdadero carácter y la forma en que participan de estos eventos. En el Capítulo 4 de esta tesis logramos demostrar que tanto la IE como el CE no responden a un patrón único de actitudes sociocognitivas y que estas, además, no son resilientes a los sucesos del entorno. Estos hallazgos añaden valor a los modelos y teorías que tratan de explicar ambos eventos.
6. Por tanto, para evitar la esterilización de la investigación en IE, es prioritario testar nuevas teorías y enfoques que permitan captar el carácter dinámico de la conformación de esta y de la forma en que se materializa en comportamiento. En el Capítulo 4 se lleva a cabo una tentativa en esta línea, apostando por el planteamiento teórico de Bandura en relación a la importancia de los factores socio-cognitivos en la conformación del comportamiento. La tesis propone una adaptación de esta teoría planteando una incipiente *Teoría Sociocognitiva del*

Emprendimiento que entendemos útil para nuestros propósitos dado el carácter eminentemente social del concepto "generación".

7. Por su parte, en la era del *big data* y la Inteligencia Artificial (IA), la explotación de una ingente cantidad de datos derivados de proyectos como el PSED, GEM o GUESSS brinda la oportunidad de llevar a cabo trabajos de interés para el campo. Las técnicas disponibles en IA poco exploradas hasta el momento, permiten modelizar la relación IE-CE pero requieren de un uso inteligente de las variables contenidas en dichas bases de datos. Se abre así la puerta a una nueva generación de estudios que extraigan todo el conocimiento que estas bases de datos atesoran en su interior. En esta tesis, hemos puesto en valor cómo la combinación de técnicas de IA y la estadística Bayesiana, aplicadas sobre datos GEM, ofrecen resultados científicos de interés hasta ahora pasados por alto en la investigación en emprendimiento.
8. Sociólogos, antropólogos y humanistas encuentran tres elementos coincidentes en la conformación de una generación: mismo año de nacimiento, eventos históricos comunes y una estructura de valores compartida. Tres elementos que, de alguna forma, han sido ya considerados de manera aislada por las investigaciones en emprendimiento. El reto desde el cual esta tesis inicia su andadura, es precisamente establecer el estudio simultáneo de estos elementos bajo el paraguas del concepto de "generación", un abordaje hasta ahora poco explorado por investigadores coetáneos.
9. A nivel global, se ha popularizado la clasificación de las generaciones a imagen y semejanza de las dominantes en Estados Unidos y otros países occidentales, quienes no sufrieron las inclemencias de las contiendas bélicas del siglo XX con tanta virulencia como España, Rusia, Alemania o Italia. Aun cuando el concepto es universal, un contexto en particular puede verse afectado por eventos históricos específicos haciendo emerger generaciones singulares surgidas al albur de sus propias circunstancias. Esto dificulta el estudio a escala global del fenómeno emprendedor desde un enfoque de generaciones. Sin embargo, la globalización que ha tenido lugar entre el siglo XX y los primeros años del XXI, combinadamente con la digitalización creciente de la economía y la sociedad, han impulsado una cierta homologación global de las generaciones, fenómeno del que aún no conocemos todo su alcance. Lo que no cabe duda es que la denominada generación *Z* o de los *nativos digitales*, está haciendo ya su entrada en el mercado

laboral y parece razonable preguntarse por su capacidad para mantener la cohesión intergeneracional necesaria para preservar el bienestar de las longevas generaciones que la preceden. Unos jóvenes que han estado expuestos a la tecnología desde su nacimiento, y para los que algunos observan un carácter netamente emprendedor que les carga de muchas responsabilidades para el final de este milenio. Es por tanto un interesante objeto de estudio conocer los patrones sociocognitivos que dominan a las diferentes generaciones, patrones que moldean sus comportamientos. Predecirlos no es tarea sencilla, pero sin duda poseemos importantes medios para poder hacerlo. Con todo, se podrá, sin duda, dar un salto cualitativo no solo en disponer de un mejor conocimiento de la IE y del CE, sino también en procurar una mejor educación para el emprendimiento y acertadas políticas de promoción del espíritu emprendedor que ayudarán a reforzar estos comportamientos en la población general y en la empresarial en particular.

10. A la luz de los estudios a los que hemos podido tener acceso, el enfoque generacional en el estudio del emprendimiento parece que aún no ha tomado conciencia. Los próximos años, sin duda, serán decisivos para una apuesta arriesgada pero que, de seguro, nos ofrecerá un conocimiento más profundo de la iniciativa emprendedora y de sus efectos socio-económicos.

Estas conclusiones muestran los pasos que hemos realizado en el progreso hacia el estudio de la IE y CE de las diferentes generaciones y especialmente de la generación *Z*, con el fin de que este produzca no solo resultados interesantes, sino también importantes (Newbert et al., 2022). No obstante, aún queda mucho por hacer para obtener resultados concluyentes en un reto, sin duda, apasionante.

Conclusions

In these last steps of the thesis, we believe it is important to synthesize the findings that have been found in the various works carried out and that opens the way to a line of research specifically focused on the study of the intention and entrepreneurial behaviour of different generations. Thus, we can summarize the contributions of this thesis in a decalogue of conclusions and reflections noteworthy. Namely:

1. The EI study has experienced exponential growth in recent years. Specifically, the greater volume of publications is reflected in the last stage analyzed in the second Chapter of this thesis, between 2011 and 2021, and it does not seem that a turning point had yet been reached in them. This rapid growth in research does not facilitate the synthesis of findings, preventing conclusive results on IE research in its different aspects of the study. It will be essential that in the coming years, in addition to updating studies of a scientometric nature, more meta-analyses are carried out on the different topics of interest for the study of EI to synthesize the findings found and observe how knowledge evolves.
2. The use of two different indicators when evoking the Direct Citation as a measure of the impact of research in a field – *i.e.*, the Global Citation and the Local Citation – makes it possible to make visible information hitherto hidden for specialists in a specific area of research. These citations allow scientists and their production to be located both inside and outside the field or topic where they are developing their work. If we add to this the advantages offered by the strategic maps to make visible the evolution of a topic or field of study, as noted in chapters 2 and 3 of this thesis, it turns out that bibliometric techniques have tools of great value for scientometrics, wealth not yet sufficiently exploited by researchers in the area that concerns us.
3. Four poles of attraction of scientific interest in EI have been detected in the bibliometric reviews carried out in Chapters 2 and 3. The TPB model and its debate exert a driving force on the area of study, which will most likely be joined shortly by the study of self-efficacy in the formation of EI. On the other hand, entrepreneurial education and social entrepreneurship grow in the degree of attraction they exert as research topics at EI. The first does so because of its importance in the generation of an entrepreneurial mentality in the population,

and the second, as a way to show the diversity of the entrepreneurial phenomenon. However, it has often been ignored that EI is a pre-EB step. The abuse in the use of university student samples for the study of EI has ignored the key role played by entrepreneurs themselves in explaining the transition from EI to EB.

4. The overexploitation of Azjen's Theory of Planned Behavior has impeded the progress of other models that may offer new approaches in the study of how EI progresses towards EB. Azjen himself (2011, 2020) notes the limitations of the model in some of his most recent interventions. Its highly rational nature fails to capture the cognitive and affective processes intrinsically linked to the individual, which calls into question to what extent this theory helps to predict EB. We have also understood that the use of methodological models and strategies based on psychosocial approaches is a valid alternative to understanding how EI is transformed into EB.
5. Until now, in addition, intention models have considered attitudes as a key piece to understanding how intention is formed and how it is transformed into behaviour, but they have not taken into consideration their true character and the way they participate in these events. In Chapter 4 of this thesis, we managed to demonstrate that both EI and EB do not respond to a single pattern of socio-cognitive attitudes and that these, in addition, are not resilient to environmental events. These findings add value to the models and theories that attempt to explain both events.
6. Therefore, to avoid sterilization of research in EI, it is a priority to test new theories and approaches that allow us to capture the dynamic nature of the conformation of this and how it materializes in behaviour. Chapter 4 is carried out an attempt in this line, betting on the theoretical approach of Bandura concerning the importance of socio-cognitive factors in shaping behaviour. The thesis proposes an adaptation of this theory by proposing an incipient *Sociocognitive Theory of Entrepreneurship* that we understand useful for our purposes given the eminently social character of the concept of "generation".
7. On the other hand, in the era *of big data* and Artificial Intelligence (AI), the exploitation of a huge amount of data derived from projects such as PSED, GEM or GUESSS provides the opportunity to carry out work of interest to the field. The techniques available in AI, little explored so far, allow modelling the EI-EB relationship but require intelligent use of the variables contained in these

databases. This opens the door to a new generation of studies that extract all the knowledge that these databases treasure inside. In this thesis, we have highlighted how the combination of AI techniques and Bayesian statistics, applied to GEM data, offer scientific results of interest hitherto overlooked in entrepreneurship research.

8. Sociologists, anthropologists and humanists find three elements that coincide in the formation of a generation: the same year of birth, common historical events and a shared value structure. Three elements that, in some way, have already been considered in isolation by research in entrepreneurship. The challenge from which this thesis begins its journey is precisely to establish the simultaneous study of these elements under the umbrella of the concept of "generation", an approach so far little explored by contemporary researchers.
9. At a global level, the classification of generations in the image and likeness of the dominant ones in the United States and other Western countries has become popular, who did not suffer the inclemency of the war of the twentieth century with as much virulence as Spain, Russia, Germany or Italy. Although the concept is universal, a particular context can be affected by specific historical events, causing singular generations to emerge at the mercy of their circumstances, which makes it difficult to study the entrepreneurial phenomenon on a global scale from a generational approach. However, the globalization that has taken place between the twentieth century and the first years of the twenty-first, combined with the growing digitalization of the economy and society, has driven a certain global homologation of generations, a phenomenon of which we still do not know its full scope. What is certain is that the so-called Generation *Z* or *digital natives*, is already making its entry into the labour market and it seems reasonable to wonder about its ability to maintain the intergenerational cohesion necessary to preserve the well-being of the long generations that precede it. Young people who have been exposed to technology since birth, and for whom some observe a purely entrepreneurial character that burdens them with many responsibilities for the end of this millennium. It is, therefore, an interesting object of study to know the sociocognitive patterns that dominate the different generations, patterns that shape their behaviours. Predicting these is not an easy task, but we certainly have important means to do so. However, it will undoubtedly be possible to make a qualitative leap not only in having a better knowledge of EI and the EB but also

in seeking a better education for entrepreneurship and successful policies to promote entrepreneurship that will help reinforce these behaviours in the general population and the business population in particular.

10. In light of the studies to which we have been able to have access, the generational approach in the study of entrepreneurship seems to have not yet become aware. The coming years, without a doubt, will be decisive for a risky bet but that, for sure, will offer us a deeper knowledge of entrepreneurship and its socio-economic effects.

These conclusions show only the steps we have taken in the progress towards the study of EI and CE of different generations and especially of generation *Z* so that it produces not only interesting but also important results (Newbert et al., 2022). However, much remains to be done to obtain conclusive results in a challenge that is undoubtedly exciting.

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