VNIVERSITAT DE VALÈNCIA

Facultat d' Economia

TESIS DOCTORAL

Factores determinantes de actitudes e intenciones conductuales de la comunidad universitaria sobre el cambio climático

Presentada por: Israel Javier Juma Michilena

Dirigida por: Dra. María Eugenia Ruíz Molina

Dra. Irene Gil Saura

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Nota de proyectos

Esta Tesis Doctoral[1] se enmarca en el proyecto de investigación financiado por la Comisión Europea –acuerdo de subvención Erasmus+ nº 610032-EPP-1-2019-1-CO-EPPKA2-CBHE-JP (2019–2006/001–001)-, y es parte del proyecto de I+D+i Ayuda PID2020-112660RB-I00 financiado por MCIN/AEI/10.13039/501100011033 desarrollado por el grupo de investigación consolidado AICO/2021/144 financiado por la Conselleria d' Innovació, Universitats, Ciència i Societat Digital de la Generalitat Valenciana; además, este trabajo recibió la financiación de la Universitat de València y del Ayuntamiento de Valencia con la Beca de doctorado Juan Castelló.

[1] Según el Reglamento de Doctorado de la Universitat de València, esta Tesis Doctoral se presenta como un compendio de publicaciones en revistas indexadas en algún índice internacional como por ejemplo JCR (WoS) y/o SJR (Scopus) que contengan los resultados del trabajo realizado (véase Reglamento sobre depósito, evaluación y defensa de la Tesis Doctoral aprobado por el Consell de Govern de 28 de junio de 2016. ACGUV 172/2016, modificado CG 31-X-2017, Artículo 8. Tesis doctoral presentada como compendio de publicaciones). De acuerdo con la citada normativa y al objeto de cumplir con los requisitos establecidos, esta Tesis se desarrolla en dos partes. En la Parte 1, se propone un resumen extendido de la Tesis Doctoral que incluye la lista completa de las referencias bibliográficas que lo sustentan. En la Parte 2, se incluyen en forma de Anexos la copia completa de los cuatro trabajos publicados que son la base de esta Tesis Doctoral por compendio. En todos ellos figura, el nombre y filiación de todos los coautores de los trabajos y la referencia completa de la revista en que los trabajos han sido publicados, incluyendo el DOI que posibilita el enlace a la publicación.

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PARTE 1. RESUMEN EXTENSO

1. INTRODUCCIÓN

1.1. Antecedentes

La crisis ambiental y el desafío de la sostenibilidad son problemas transversales y apremiantes en la actualidad. Responder a estos desafíos se ha vuelto una necesidad y las soluciones tradicionales han resultado insuficientes (Mohammadi *et al.,* 2023). Es cada vez más necesario desarrollar acciones que contribuyan efectivamente a una transición sostenible. Los problemas son complejos y preocupantes. Reclaman respuestas multidisciplinarias, la participación de la sociedad y la articulación de múltiples niveles de acción (Nogueira *et al.*, 2024).

A medida que el alcance del daño al medio ambiente se vuelve cada vez más alarmante, las universidades, como instituciones centrales, están bajo presión para ayudar a la sociedad a liderar la transición hacia un futuro sostenible (Hurth y Stewart, 2022). Las universidades son lugares donde se produce, preserva, difunde, integra y aplica el conocimiento; todo lo cual es esencial para apoyar y liderar las transformaciones hacia individuos más conscientes con el medio ambiente (Stephens *et al.,* 2008). Estos centros de educación superior tienen la responsabilidad de contribuir a un futuro sostenible no únicamente por el rol que ejercen en la sociedad, sino también, porque han sido cómplices de permitir que muchos de sus miembros adopten comportamientos inconscientes con la naturaleza (Cuesta-Claros *et al.,* 2022). La implementación efectiva de prácticas de sostenibilidad en las universidades depende exclusivamente de la voluntad y el compromiso de los empleados y estudiantes, y, en vista de que la crisis ambiental sigue aumentando, está claro que aún falta un esfuerzo sistemático para incentivar el comportamiento proambiental de la comunidad universitaria (Mohammadi *et al.,* 2023).

En este contexto, numerosos estudios han intentado indagar en las iniciativas proambientales propuestas por las universidades para abordar el desarrollo sostenible (Stephens *et al*., 2008). No obstante, las medidas alcanzadas hasta el momento no tienen la efectividad deseada y cada vez se observan consecuencias ambientales que requieren acciones urgentes, como es el cambio climático. Mebane *et al.* (2023) afirman que la enseñanza en las universidades se ha decantado ampliamente por mejorar el conocimiento sobre las causas que originan el cambio climático, pero se han descuidado las acciones que promueven cambios de actitudes y comportamientos (Tolppanen *et al.,* 2022). En este sentido, para intentar cambiar esta tónica, en los últimos años, varias investigaciones han puesto como foco vital el análisis de asuntos explícitamente comportamentales (Glavovic *et al*., 2022). Aquí, los resultados y las implicaciones teórico-prácticas

planteadas resultan insuficientes y las conductas de los individuos siguen siendo inconscientes y perjudiciales para la sociedad (Farrukh *et al.*, 2023).

1.2. Motivación

La principal motivación de llevar a cabo esta Tesis Doctoral es contribuir a llenar el vacío existente en la literatura del comportamiento humano y establecer bases y directrices de gestión para futuras acciones a desarrollar sobre la adaptación y mitigación del cambio climático en un entorno educativo y social. En la actualidad, no hay un consenso generalizado sobre las acciones más efectivas para que la comunidad universitaria se involucre en el desarrollo sostenible (Mohammadi *et al.*, 2023). Este escenario ofrece oportunidades para articular investigaciones en el área de marketing alineadas con la urgencia de dar respuesta a esta problemática global y explorar en profundidad las razones que frenan, motivan o incentivan los comportamientos proambientales de los distintos miembros de la comunidad universitaria.

A este respecto, la presente Tesis Doctoral, después de un exhaustivo análisis de la literatura bajo un enfoque teórico y práctico, presenta algunos de los factores que anteceden e influyen en el comportamiento proambiental individual desde diferentes enfoques: el primero, desde el punto de vista de la comunidad universitaria; el segundo, desde el punto de vista de la Generación Z, considerando perfiles de distintas nacionalidades; el tercero, desde el punto de vista de los estudiantes; y, el cuarto y último, desde el punto de vista del empleado. Esta Tesis se ha basado en teorías previamente validadas en la literatura, como es el caso de la "Teoría del Comportamiento Planificado" (TPB) propuesta por Ajzen (1991) que sostiene la secuencia creencias-actitudes-comportamientos para explicar la conducta humana. Mediante estos fundamentos, se presentan aportes novedosos que respaldan y contribuyen a esta teoría, la cual ha sido ampliamente cuestionada cuando se trata de asuntos de sostenibilidad, ya que varios planteamientos afirman que las actitudes no son indicadores adecuados para describir comportamientos favorables con el medio ambiente (Savari y Khaleghi, 2023). Esta discrepancia constituye un desafío desde la perspectiva de marketing, por lo que se ha diseñado un modelo que expone el comportamiento proambiental individual con un complemento adicional a la TPB: las motivaciones del individuo. En este sentido, también se presentan hallazgos sobre el papel moderador que tiene el tipo de afiliación de la comunidad universitaria en el comportamiento, es decir, se contrastan datos de empleados (docentes y personal de administración y servicios) frente a estudiantes para evaluar si se encuentran diferencias de conducta. Estudios previos afirman que los empleados, al estar vinculados por un mayor periodo de tiempo a la universidad, pueden tener más comportamientos proambientales en el campus en comparación con los estudiantes (Tu *et al.*, 2023). Por este motivo, esta Tesis expone resultados que pueden ayudar a entender el comportamiento de los estudiantes y empleados, y se enmarcan pautas con las acciones que deberían tomar los gestores de universidades para conseguir una mayor implicación de la comunidad universitaria.

Además, otro asunto controvertido en la investigación del cambio climático es la relevancia que tienen las cohortes generacionales y los aspectos transculturales en la asunción de comportamientos proambientales. Por ello, también basados en la Teoría del Comportamiento Planificado (TPB) propuesta por Ajzen (1991), se ha diseñado un nuevo modelo que intenta explicar los factores que influyen en el comportamiento proambiental de la Generación Z a través de factores como las creencias, motivación intrínseca, desafección medioambiental, actitudes, participación medioambiental y comportamiento proambiental individual. Son varias las razones que justifican la selección de esta cohorte generacional como objetivo de investigación; entre otros motivos, es la generación que representa la mayor fuerza laboral del planeta (Sakdiyakorn *et al*., 2021); hay pocos estudios que consideran esta parte de la población; y, varios de sus miembros están a punto de graduarse de la universidad, lo que les convierte en el foco vital para cualquier iniciativa. Estudios anteriores sugieren que, con respecto a la valoración de la sostenibilidad, el comportamiento de la Generación Z difiere con respecto al de otras generaciones (Prayag *et al.,* 2022; Seyfi *et al.,*2023; Sharma *et al.,* 2023), lo cual abre un interesante debate de investigación.

Así también, este estudio aporta un análisis transcultural que permite detectar si existen o no diferencias en el comportamiento de los individuos de la Generación Z en función de su nacionalidad. Paradójicamente, los países en desarrollo, donde la mayoría de los desafíos ambientales ocurren, han recibido poca atención en la investigación (Amoah y Addoah, 2021). Esto es particularmente cierto para América Latina (Karki *et al.,* 2020), una región altamente vulnerable a las consecuencias derivadas del cambio climático. Ante este escenario, resulta preocupante el escaso número de investigaciones sobre el comportamiento y el cambio climático en estos territorios (Fierros-González y López-Feldman, 2021). La presente Tesis Doctoral, mediante este estudio, ofrece una visión general de individuos de la Generación Z provenientes de países en vías de desarrollo, como son: Colombia, México y Brasil. Se han seleccionado estos países debido a que estudios transculturales muestran que existen diferencias significativas en el comportamiento proambiental con diferentes orígenes culturales (Mi *et al.,* 2020), y, basados en la ubicación geográfica, la economía, el lenguaje, entre otras características palpables, son países que pueden tener ciertas diferencias. Con los datos recabados, se ha contrastado información, se ha abordado la brecha existente en la literatura y se han presentado nuevas implicaciones tanto para la gestión como para la práctica.

Por otro lado, a lo largo de los años se han cuestionado los hallazgos sobre las acciones que deberían implementar las universidades para motivar a los estudiantes a involucrarse en la lucha contra el cambio climático (Leal-Filho *et al.,* 2021). Esto se puede deber a que, si bien, existen diversas investigaciones que profundizan en las motivaciones, hasta donde tenemos constancia, únicamente consideran la motivación como un factor individual, lo que genera que se pase por alto la distinción entre las motivaciones intrínsecas (propias del individuo) y extrínsecas (incentivos o recompensas externas) (Deci y Ryan, 2000), lo cual es

vital cuando se trata de la sostenibilidad (Leitão *et al*., 2022). Esto abre una brecha de investigación para explorar meticulosamente las distintas motivaciones de los estudiantes para participar activamente en la lucha contra el cambio climático. Aquí, no se trata únicamente de proponer un listado de acciones que podrían atraer la atención, como se ha venido haciendo hasta la fecha, sino de encontrar y exponer las acciones que más motivación generan dentro de este colectivo. Este estudio se centró en los estudiantes de universidades porque representan una parte de la población que abarca a futuros líderes empresariales, científicos, investigadores, emprendedores, formuladores de políticas, etc. Los estudiantes tienen roles sociales clave, por lo que desempeñan un papel crucial en la promoción de comportamientos y soluciones proambientales (Zeng *et al.*, 2023).

Por último, hasta donde sabemos, no hay estudios que analicen los obstáculos que frenan la motivación cuando se trata de iniciativas proambientales, si bien, en la presente Tesis se abordan las principales motivaciones de los estudiantes, y, otros estudios han analizado las barreras a los comportamientos proambientales de los empleados (Desrochers y Zelenski, 2023), también es trascendental conocer los factores que obstruyen la motivación de los empleados de universidades. Estos hallazgos son una contribución relevante para guiar a los gerentes de organizaciones a desarrollar acciones que eliminen o al menos, disminuyan los obstáculos percibidos por los empleados para participar activamente en comportamientos proambientales (Barszcz *et al*., 2023). En este sentido, la motivación no únicamente se analizó como un factor individual, sino que se realizó una distinción entre motivación intrínseca y extrínseca para ofrecer resultados mejor sintetizados.

Con todo lo anteriormente expuesto, a fin de responder a los gaps observados en la literatura y perseguir los objetivos de esta Tesis, en los términos en que se concentrarán en el siguiente epígrafe, se llevó a cabo un trabajo de investigación bajo un doble enfoque teórico-práctico y desde múltiples perspectivas; a partir de sus resultados, se han publicado cuatro trabajos en revistas internacionales indexadas, que son los que dan contenido a esta Tesis Doctoral por compendio. A continuación, se marcarán los objetivos principales y específicos, y se describirá la estructura que siguen las siguientes páginas de la presente Tesis Doctoral.

1.3. Objetivos

A partir de los planteamientos realizados en el apartado anterior, y en la dirección de investigación que aborda los gaps señalados en el epígrafe de justificación, se establece el **objetivo principal** de esta Tesis Doctoral como sigue:

"Examinar los factores que influyen e impulsan el comportamiento proambiental de los miembros de la comunidad universitaria en un contexto de sostenibilidad, y determinar cómo contribuyen variables como creencias, actitudes, motivaciones intrínsecas y extrínsecas, desafección medioambiental y/o participación

medioambiental en el comportamiento proambiental individual de la comunidad universitaria; y, además, analizar cuáles son las principales motivaciones y las barreras que frenan la motivación a participar activamente en la lucha contra el cambio climático".

Este objetivo principal se concreta en distintos objetivos específicos (véase Tabla 1) que fueron orientados y alcanzados mediante una investigación llevada a cabo en 9 universidades latinoamericanas, cuyos resultados fueron difundidos y publicados como 4 trabajos científicos en forma de artículos que sustentan esta Tesis Doctoral. Estos son:

- **A1. Artículo 1:** "An analysis of the factors influencing pro-environmental behavioural intentions on climate change in the university community", publicado en la revista *Economic Research-Ekonomska Istraživanja*, en 2023.
- **A2. Artículo 2:** "Pro-environmental behaviours of Generation Z: A cross-cultural approach", publicado en la revista *International Review on Public and Nonprofit Marketing*, en 2024.
- **A3. Artículo 3:** "How to increase students' motivation to engage in university initiatives towards environmental sustainability", publicado en la revista *Journal of Consumer Affairs*, en 2023.
- **A4. Artículo 4:** "Main motivations and barriers to pro-environmental behaviour: A study from the employee's perspective", publicado en la revista *Sustainability Accounting, Management and Policy Journal*, en 2024.

Tabla 1. Objetivos específicos de la Tesis Doctoral y trabajos publicados en donde se investigaron.

Nº	OBJETIVOS ESPECÍFICOS	ARTÍCULO
1	Conocer la influencia de las creencias sobre el cambio climático en las actitudes hacia el mismo, tanto para miembros de la comunidad universitaria como para la Generación Z.	1 y 2
2	Examinar la influencia de las creencias sobre el cambio climático en las motivaciones intrínsecas de los miembros de la comunidad universitaria hacia las acciones propuestas por la universidad para abordar este problema.	1
3	Evaluar la influencia de las creencias sobre el cambio climático en las motivaciones extrínsecas de los miembros de la comunidad universitaria hacia las acciones propuestas por la universidad para abordar este problema.	1
4	Explorar si las actitudes hacia el cambio climático influyen en las motivaciones intrínsecas de los miembros de la comunidad universitaria hacia las acciones propuestas por la universidad para abordar este problema.	1
5	Evaluar la influencia de las actitudes hacia el cambio climático en las motivaciones extrínsecas de los miembros de la comunidad universitaria hacia las acciones propuestas por la universidad para abordar este problema.	1
6	Examinar la influencia de las actitudes hacia el cambio climático sobre el comportamiento proambiental individual de miembros de la comunidad universitaria y de la Generación Z.	1 y 2
7	Analizar la influencia de las actitudes hacia el cambio climático de miembros de la comunidad universitaria sobre la respuesta proambiental de la comunidad universitaria.	1
8	Conocer la influencia de las motivaciones intrínsecas de miembros de la comunidad universitaria en la respuesta proambiental de la comunidad universitaria.	1
9	Conocer la influencia de las motivaciones extrínsecas de miembros de la comunidad universitaria en la respuesta proambiental de la comunidad universitaria.	1

10	Explorar si el comportamiento proambiental individual de miembros de la comunidad universitaria influye en la respuesta proambiental de la comunidad universitaria.	1
11	Conocer si la vinculación con la universidad juega un papel moderador en las relaciones entre los diferentes constructos, siendo más fuerte para los empleados de la institución educativa que para los estudiantes universitarios.	1
12	Examinar si la desafección ambiental de individuos de la Generación Z tiene una influencia negativa en las actitudes hacia el cambio climático.	2
13	Evaluar si las motivaciones intrínsecas de individuos de la Generación Z influyen positivamente en las actitudes hacia el cambio climático.	2
14	Evaluar si las motivaciones intrínsecas de individuos de la Generación Z influyen en el comportamiento proambiental individual.	2
15	Conocer si la participación previa de una persona de la Generación Z en iniciativas ambientales influye en el comportamiento proambiental individual.	2
16	Examinar si la nacionalidad juega un papel moderador en las relaciones entre los diferentes constructos que influyen en el comportamiento proambiental de la Generación Z.	2
17	Conocer cuáles son las principales motivaciones (intrínsecas y extrínsecas) de los estudiantes universitarios para participar activamente en la lucha contra el cambio climático.	3
18	Conocer cuáles son las principales barreras que frenan la motivación (intrínseca y extrínseca) de los empleados de universidades para participar activamente en la lucha contra el cambio climático.	4

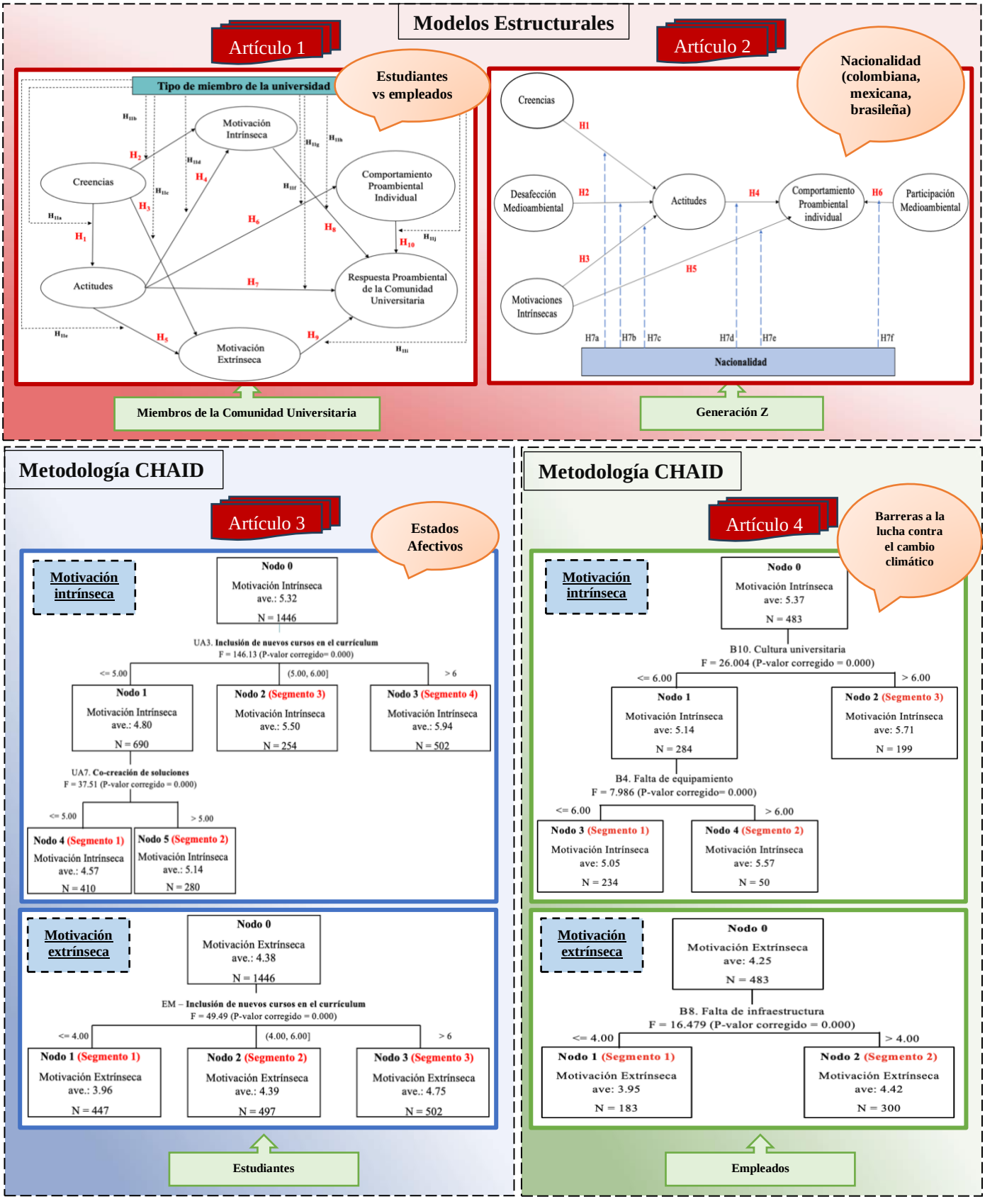
Fuente: Elaboración propia

1.4. Estructura

La presente Tesis Doctoral está compuesta por dos partes. La **Parte 1** comienza con la presentación de un resumen extenso que se estructura en cuatro epígrafes. Así, el epígrafe 1, incluye la introducción, en la que se justifica la investigación abordando sus antecedentes y su motivación; después, se enuncian los objetivos; y finalmente, se describe la estructura de la Tesis. A continuación, en el epígrafe 2 se propone, de un lado, la revisión minuciosa de la literatura sobre los tópicos relevantes de esta Tesis Doctoral y la fundamentación y enunciado de las hipótesis de trabajo que la guían, así como las principales cuestiones de investigación que se abordan; y de otro, la descripción de la metodología de investigación utilizada en cada uno de los estudios que apoyan las publicaciones que sustentan la Tesis. En el epígrafe 3 se lleva a cabo la discusión de resultados y se delimita la contribución teórica de la Tesis al avance del conocimiento. Finalmente, la **Parte 1** se cierra con la narración de las conclusiones alcanzadas, los hallazgos y directrices para la gestión en las universidades, el reconocimiento de las limitaciones que contienen los estudios, y, derivadas de ellas, las oportunidades de investigación futuras. Esta **Parte 1** incluye un listado final de las referencias. En lo que respecta a la **Parte 2**, se atiende a la normativa que regula los estudios de doctorado en la Universitat de València y se muestra como anexos los cuatro artículos publicados que sustentan esta Tesis Doctoral por compendio.

A modo resumen, la **Figura 1** presenta una descripción gráfica de los artículos que componen la presente Tesis, las relaciones entre las variables escogidas para lograr los objetivos de investigación propuestos, y una breve introducción de las técnicas utilizadas, las cuales, se explicarán posteriormente de forma detallada.

Figura 1. Estructura de la Tesis Doctoral: modelo, relaciones y estudios realizados.



Fuente: Elaboración propia

2. ESTADO DEL ARTE, HIPÓTESIS Y METODOLOGÍA DE INVESTIGACIÓN

2.1. Marco conceptual, hipótesis y cuestiones de investigación

2.1.1. Sostenibilidad y cambio climático en universidades

Debido a la creciente preocupación por la degradación del medio ambiente, el mundo intenta avanzar hacia el desarrollo sostenible (DS) en casi todas las esferas de la actividad humana (Popowska y Sady, 2023). El Informe Brundtland de las Naciones Unidas definió el desarrollo sostenible como "*el desarrollo que satisface las necesidades del presente sin comprometer la capacidad de las generaciones futuras para satisfacer sus necesidades*" (Brundtland *et al.*, 1987, pág. 41). El desarrollo sostenible es un tema en constante evolución, capaz de provocar cambios en el comportamiento de la sociedad y en las organizaciones interesadas en equilibrar la dimensión económica, social y ambiental del desarrollo (Serafini *et al.*, 2022). El objetivo es buscar el progreso de la población con el requisito de conservar el medio ambiente y los recursos naturales, sin afectar o condicionar las capacidades del futuro (Saleem *et al.*, 2023).

La sostenibilidad requiere la colaboración entre países y la inclusión tanto de jóvenes como de profesionales para impulsar un proceso hacia una transición sostenible (D'Adamo y Gastaldi, 2023). Las instituciones de educación superior tienen el potencial de contribuir significativamente a los Objetivos de Desarrollo Sostenible (ODS), los cuales, se formularon en 2015 como parte de la Agenda 2030 de la Asamblea General de las Naciones Unidas (UN, 2015). Esta agenda establece un marco global para redirigir a la sociedad hacia la sostenibilidad contemplando 17 objetivos (Serafini *et al.*, 2022); estos objetivos se han establecido para garantizar la justicia, la paz, la estabilidad y la realización de vida para todos sin temor de amenazas que afecten la integridad de los habitantes del planeta (Singh y Blessinger, 2023). Aquí, el ODS 4 enfatiza la necesidad de hacer partícipes a las universidades en busca de asegurar que todos los miembros de la comunidad universitaria adquieran los conocimientos y habilidades para actuar conscientemente con la naturaleza y promover el desarrollo sostenible entre otros miembros de la sociedad (Abd-Mutalib *et al.*, 2023).

Es necesario que, cada vez más, las universidades reafirmen su papel como agentes de cambio e incorporen los tres pilares de la sostenibilidad para contribuir a mitigar los impactos ambientales, sociales y económicos, al mismo tiempo que promuevan la salud y el bienestar de la población mundial (Moura-Leite *et al.*, 2023). Es fundamental empoderar a los miembros de la comunidad universitaria para que aborden el desarrollo sostenible fomentando conocimientos, actitudes y comportamientos positivos vinculados con el cuidado y protección del medio ambiente (Saleem *et al.*, 2023). Podría decirse que, a pesar de los esfuerzos por generar una mayor conciencia sobre los ODS, la mayoría de las instituciones de educación superior aún no han adoptado plenamente la sostenibilidad en su plan de estudios; ni han creado ambientes de aprendizaje

apropiados para generar concienciación ambiental (D'Adamo y Gastaldi, 2023). Sostenemos que es hora de repensar la estrategia educativa, dada la importancia de la aplicación de acciones sostenibles en las agendas empresariales y gubernamentales a nivel mundial (France *et al.,* 2022).

Las universidades, como organizaciones dedicadas a la educación, los servicios comunitarios y la investigación, desempeñan un papel de liderazgo en el cálculo, seguimiento, reducción o incluso compensación de su huella de carbono como ejemplo de organizaciones sostenibles que promueven la transformación hacia una sociedad neutra de carbono (Valls-Val y Bovea, 2022). La no realización de prácticas sostenibles conlleva consecuencias graves para el planeta, entre ellas, el cambio climático, que es una de las amenazas más apremiantes a las que se enfrenta la humanidad. El principal factor que contribuye al cambio climático es el calentamiento global, causado principalmente por acciones humanas que producen emisiones de gases de efecto invernadero (Ssekamatte, 2023).

El cambio climático es uno de los desafíos mundiales que más preocupan a la población (Li y Liu, 2022). Los eventos climáticos más extremos están impactando negativamente la producción de alimentos, el acceso al agua, la salud física y mental y la infraestructura física y económica, particularmente de las poblaciones vulnerables de todo el mundo (Kinol *et al.*, 2023). Esto incluye también efectos meteorológicos agudos y urgentes, como olas de calor, tormentas de polvo e incendios, inundaciones, así como cambios ambientales lentos y menos visibles, como la degradación de la tierra, el agua y la calidad del aire (Lal *et al.,* 2022). Las emisiones globales están vinculadas a formas directas e indirectas de comportamiento humano y, si bien, el enfoque de sostenibilidad a menudo descansa en el sector empresarial y los gobiernos, los cambios a nivel individual son de mayor importancia de lo que comúnmente la gente aprecia (Farrukh *et al.,* 2023).

2.1.2. Teoría del comportamiento planificado (TPB)

Para entender el comportamiento humano, la teoría del comportamiento planificado (*Theory of Planned Behavior* o TPB) desarrollada por Ajzen (1991) es la propuesta conductual más comúnmente adoptada y el modelo más adecuado para explicar el comportamiento individual (Armitage y Conner, 2001). Esta teoría estudia el comportamiento desde la perspectiva de la psicología, y se basa en la creencia de que el comportamiento humano es intencional y planificado (Ma *et al.*, 2022). En este contexto, la TPB sitúa el origen del comportamiento en las creencias de un individuo, las cuales, generan una actitud y una intención que posteriormente provoca un comportamiento (Ajzen, 1991), siendo la base de la teoría la secuencia entre creencias-actitudes-intenciones-comportamientos. El objetivo de esta teoría es plasmar los principales predictores del comportamiento individual a través de un modelo de procesos cognitivos que conducen a decisiones comportamentales (Correia *et al.,* 2022).

Desde su desarrollo, hace más de treinta años, la TPB se ha utilizado con frecuencia como marco central para comprender los factores que conducen al comportamiento (Wallace y Buil, 2023), y ha sido probada y validada en diferentes áreas de investigación (Wang *et al*., 2020; Tunji-Olayeni *et al.,* 2023; Savari *et al.,* 2023), entre ellas, disciplinas que incluyen el comportamiento individual, la psicología social, el comportamiento del consumidor, el turismo y el marketing (Fenitra *et al*., 2023).

En relación con el estudio de tópicos ligados al medio ambiente, la TPB se ha utilizado por los investigadores para examinar el transporte alternativo, la conservación del agua, la conservación de energía, el reciclaje de residuos, el bajo consumo de carbono y otros comportamientos proambientales (Zeng *et al*. 2023). En esta línea, cuando esta teoría se amplía de forma orientada a comportamientos específicos, como es el caso de los comportamientos favorables con el medio ambiente, ha sido blanco de duras críticas (Gansser y Reich, 2023), sobre todo por su limitada eficacia predictiva al utilizar un número muy reducido de variables explicativas del comportamiento (Correia *et al*., 2022). Varios hallazgos han defendido que el poder explicativo de la TPB aumentaría para los comportamientos asociados con un "comportamiento verde" si se introducen nuevas variables a esta teoría (Wallace y Buil, 2023; Huang *et al*., 2023). Por ello, se estima necesario el desarrollo de un modelo integral que permita extender esta teoría y ayude a mejorar el entendimiento del comportamiento del ser humano en asuntos de sostenibilidad (Lee *et al.,* 2023).

A pesar de sus limitaciones, la TPB ha atraído un considerable interés de investigación, lo que ha resultado en una producción científica desde 1995 hasta el 2019 de 531 artículos relevantes, de 69 países y regiones diferentes (Correia *et al.,* 2022); con 169 artículos que exploran específicamente el comportamiento proambiental (Yuriev *et al.,* 2020), y con un aumento considerable en el número de artículos de investigación científica que aplican la TPB en comportamientos proambientales en los últimos años (Correia *et al.,* 2022).

Una selección de 10 trabajos en los que apoyar la investigación del comportamiento proambiental basados en la TPB se presenta en la Tabla 2.

Tabla 2. Una selección de 10 trabajos en los que apoyar la investigación del comportamiento proambiental basados en la TPB.

AUTOR	OBJETIVO DEL ESTUDIO	METODOLOGÍA	ESCALA (Número de ítems)	PRINCIPALES RESULTADOS
Ateş (2020)	Comprender los factores que influyen en los comportamientos proambientales fusionando la teoría del comportamiento planificado y el modelo de norma personal de identidad de valor.	Encuesta a profesores de Ciencias de la región central de Anatolia en Turquía (340).	Valor biosférico (4) Autoidentidad ambiental (3) Norma personal (3) Actitud (3) Norma subjetiva (3) Control conductual percibido (2) Intención (2) Comportamiento (13)	Los resultados muestran que 14 de las 16 hipótesis dentro del modelo que fusionó la TPB y el modelo de norma personal de identidad de valor fueron sustentadas estadísticamente en la determinación de antecedentes de conductas proambientales.
Yuriev *et al.* (2020)	Identificar y evaluar la importancia de los factores psicosociales y organizacionales que influyen en las intenciones de los empleados para adoptar conductas proambientales en el lugar de trabajo.	Encuesta a empleados de una universidad canadiense (318).	Creencias conductuales (4) Creencias normativas (3) Creencias de control (7)	Los resultados muestran que la TPB explica correctamente las intenciones de los empleados de viajar al trabajo utilizando transporte alternativo y de hacer eco-sugerencias dirigidas al lugar de trabajo. Las barreras organizacionales no jugaron un papel importante en la predicción de las intenciones de utilizar transporte alternativo; algunos obstáculos organizacionales (opinión de colegas, papeleo requerido) influyeron en la intención de los trabajadores de hacer eco-sugerencias.
Wang *et al.* (2020)	Examinar las dimensiones del comportamiento ambiental de los turistas considerando la TPB.	Encuesta a turistas de Zhongshan, ubicado en la provincia de Jiangsu, China (538).	Actitudes (4) Normas subjetivas (3) Control conductual percibido (3) Intención de comportamiento ambientalmente radical (3) Comportamiento ambientalmente radical (3) Intención de comportamiento ambientalmente conservador (3) Comportamiento ambientalmente conservador (3) Intención de comportamiento ambientalmente perturbador (3) Comportamiento ambientalmente perturbador (3).	Los resultados muestran que las relaciones hipotéticas entre actitud, normas subjetivas, control conductual percibido, intención de comportamiento ambiental y comportamiento ambiental conservador y perturbador de los turistas han sido respaldadas.
Wallace y Buil (2023).	Integrar el concepto de comportamiento ecológico conspicuo para explicar las publicaciones en redes sociales sobre el cambio climático que transmiten una identidad virtual proambiental basados en la teoría del comportamiento planificado.	Encuesta en línea a usuarios de Instagram de los Estados Unidos (436).	Control conductual percibido (4) Actitud (6) Normas subjetivas (4) Intención (3) Narcisismo (10) Comportamiento ecológico llamativo (4).	Los resultados muestran que el concepto de comportamiento ecológico conspicuo se relaciona positivamente con las intenciones y comportamientos proambientales de los individuos.
Shanmugavel y	Adaptar el marco teórico extendido de la teoría del comportamiento	Encuesta a prospectos de	Norma personal (3) Norma descriptiva (3)	Los resultados muestran que las normas personales desempeñan un papel importante en el desarrollo de una

Balakrishnan (2023).	planificado e integrar variables proambientales para comprender la relación directa e indirecta con la intención conductual dirigida hacia los vehículos eléctricos.	compras de vehículos eléctricos de la India (400).	Norma subjetiva (4) Conocimiento ambiental (5) Responsabilidad ambiental (4) Preocupación ambiental (4) Intención de comportamiento hacia los vehículos eléctricos (3)	intención de comportamiento positiva hacia los vehículos eléctricos. Además, se encuentra que el conocimiento ambiental tiene un efecto indirecto significativo en el modelo.
Al-Zaidi *et al.* (2023)	Investigar el impacto de los factores situacionales y los estados psicológicos internos en las decisiones de los empleados de realizar un comportamiento proambiental voluntario utilizando un modelo que combina la teoría del comportamiento planificado, el modelo de activación de normas y el modelo de determinación de acción integral.	Encuesta en línea a empleados de organizaciones públicas en Abu Dhabi, Emiratos Árabes Unidos (310).	Actitud (5) Control conductual percibido (2) Norma moral personal (4) Responsabilidad social corporativa percibida (5) Comportamiento de la ciudadanía hacia el medio ambiente (7) Hábito (10) Comportamiento voluntario proambiental (7)	Los resultados reflejan que las percepciones de los empleados sobre la responsabilidad social corporativa tienen un impacto significativo en la intención de adoptar un comportamiento proambiental voluntario, al igual que todas las demás variables excepto el control conductual percibido. Los hábitos relacionados con el comportamiento proambiental mejoraron la relación entre la intención y el comportamiento real.
Zeng *et al.* (2023)	Descubrir cómo se puede fomentar un comportamiento de consumo sostenible a través de conocimientos, comportamientos y actitudes ambientales.	Encuesta a estudiantes matriculados en programas de pregrado, maestría y doctorado en universidades públicas y privadas de China (298).	Conocimiento ambiental (3) Percepción de riesgo ambiental (3) Preocupación ambiental (4) Actitud ambiental (6) Comportamiento proambiental (6) Consumo sostenible (4)	Los resultados mostraron que el conocimiento ambiental y las percepciones de riesgo ambiental están relacionados positivamente con las preocupaciones ambientales. De igual forma, las preocupaciones ambientales y el comportamiento proambiental están relacionados positivamente con el comportamiento de consumo sostenible. La actitud ambiental apareció como moderadora en la relación entre las preocupaciones ambientales y el comportamiento proambiental.
Correia *et al.* (2022)	Explorar los principales determinantes del comportamiento proambiental de los estudiantes de educación superior a través de la aplicación de la teoría del comportamiento planificado.	Encuesta en línea a estudiantes de una institución pública de educación superior en Portugal (371).	Actitud ambiental (4) Norma subjetiva (4) Control conductual percibido (3) Conocimiento ambiental (4) Intención proambiental (3) Comportamiento proambiental (3)	Los resultados muestran que la actitud y el conocimiento ambiental de los estudiantes no tienen un impacto significativo en su intención proambiental, mientras que el control conductual percibido y la norma subjetiva tienen un impacto positivo en su intención proambiental. Además, se ha constatado que el control conductual percibido por los estudiantes y la intención proambiental tienen un impacto positivo en su comportamiento proambiental.
Wu *et al.* (2022)	Analizar la incorporación de la preocupación ambiental y el conocimiento ambiental en la teoría del comportamiento planificado y examinar las rutas psicológicas que vinculan estas variables con el comportamiento de gestión de residuos.	Encuesta a estudiantes universitarios en China (434).	Comportamiento de reciclaje (3) Normas subjetivas (4) Actitudes (4) Control conductual percibido (1) Cosmovisión ecológica (5) Normas personales (2) Conocimiento ambiental (5)	Los resultados mostraron que las normas subjetivas, el control conductual percibido, las normas personales y el conocimiento ambiental son predictores esenciales del comportamiento de gestión de residuos. Por su parte, la preocupación ambiental y las normas subjetivas podrían influir en el comportamiento de gestión de residuos a través de normas personales. El conocimiento ambiental podría influir indirectamente en el comportamiento de gestión de residuos.

Huang *et al.* (2023)	Investigar la intención de los consumidores de participar en los retiros de automóviles por defectos ambientales sobre la base de la teoría del comportamiento planificado (TPB) y ampliar esta teoría agregando los constructos de beneficios ambientales percibidos, beneficios personales y costos personales.	Encuesta en línea a compradores de automóviles en China (628).	Beneficios ambientales percibidos (3) Beneficios personales percibidos (3) Costos personales percibidos (3) Actitud (3) Norma subjetiva (4) Control conductual percibido (4) Intención conductual (4)	Los resultados muestran que el control conductual percibido y la actitud positiva hacia la participación en los retiros de automóviles por defectos ambientales influyen positivamente en la intención de participación de los consumidores. La actitud se explica principalmente por los beneficios ambientales percibidos, mientras que la norma subjetiva se explica por los beneficios ambientales y personales percibidos.
Fenitra *et al.* (2023)	Examinar los factores que determinan y dan forma al comportamiento ambientalmente responsable, específicamente evitando que los visitantes de un parque natural tiren basura, basados en la teoría del comportamiento planificado.	Encuesta a personas que visitaron el Parque Nacional Monte Merapi en Indonesia (328).	Actitud (3) Comportamiento responsable previsto (3) Norma personal (5) Norma subjetiva (2) Atribución de responsabilidad (3) Conciencia de las consecuencias (3) Control de conducta percibida (4)	Los resultados muestran el poder de las normas personales sobre los constructos de la teoría del comportamiento planificado (control conductual percibido, actitud y norma subjetiva).
Ng y Cheung 2022)	Desarrollar un modelo integrador que explore de manera integral los antecedentes de las intenciones proambientales en los jóvenes, con base en la teoría del valor del cliente y el marco teórico de la teoría del comportamiento planificado.	Encuesta a jóvenes de dos centros de educación secundaria de Hong Kong (279)	Valor emocional (3) Valor funcional (3) Valor relacional (3) Actitud proambiental (7) Reciclaje (3) Conservación (3)	Los resultados muestran que los valores percibidos por los jóvenes con respecto al ambientalismo juegan un papel esencial en el desarrollo de actitudes e intenciones de comportamiento proambientales, como la intención de reciclaje y la intención de conservación. Los resultados respaldan la utilidad de la teoría del comportamiento planificado para la adopción de la actitud y la intención conductual como componentes clave del modelo.

Fuente: Elaboración propia

2.1.3. Cohortes generacionales

A continuación, al igual que en varias hipótesis que componen la presente Tesis Doctoral, se hace énfasis no solo al estudio de la comunidad universitaria, sino también al análisis de la Generación Z. Esto se debe a la importancia que ha adquirido el estudio de las cohortes generacionales en el comportamiento proambiental (Prayag *et al.,* 2022). Las cohortes generacionales representan un conjunto de individuos nacidos en un periodo de tiempo similar, siendo su principal indicador no tanto la edad, como las experiencias compartidas dentro de intervalos de tiempo específicos (Lin y Chen, 2022). Varias investigaciones han mostrado discrepancias en los periodos contemplados para cada generación y se ha observado cierta controversia; no obstante, dentro del marco de la presente Tesis, se ha considerado la categorización más aceptada: Baby Boomers (1946–1964), Generación X (1965–1979), Generación Y o Millennials (1980–1995) y Generación Z o Centennials (1996-2003) (Ribeiro *et al.,* 2023).

Los Millennials han sido catalogados como la "*generación más verde*" con grandes preocupaciones ambientales, y representan la cohorte generacional que ha atraído más atención de los investigadores en análisis comportamentales (Van Breda *et al.,* 2023), mientras la literatura sobre los Centennials todavía es escasa y limitada en lo que refiere a la sostenibilidad y cambio climático. Estudios como el de Prayag *et al.* (2022) argumentan que la Generación Z está menos involucrada en prácticas ambientales que las cohortes con mayor edad. De manera similar, Sharma *et al.* (2023) revelan que la Generación Z exhibe niveles más altos de concienciación ambiental, actitudes prosociales, y participación en comportamientos de reducción de desperdicio de alimentos en comparación con individuos de mayor edad. Por su parte, Ribeiro *et al.* (2023) sugieren que, con respecto a la valoración de la sostenibilidad, el comportamiento y estilo de vida de la Generación Z difiere con respecto al de otras generaciones. Por tales motivos, es importante realizar un análisis generacional que enriquezca la comprensión teórica del comportamiento proambiental y destaque los factores que promueven conductas sostenibles entre los miembros de la comunidad universitaria. Son varias las razones que explican el interés por dirigir nuestra atención a la Generación Z. En primer lugar, hasta donde tenemos constancia, ningún estudio ha investigado el efecto de la TPB y otros factores conductuales en los comportamientos proambientales de esta generación, por lo que no sabemos cómo esta teoría (TPB) puede predecir las conductas dirigidas hacia la adaptación y mitigación del cambio climático de la Generación Z. En segundo lugar, el análisis generacional es de suma importancia para reconocer las tendencias futuras y los factores sociocognitivos que influyen en las cohortes más jóvenes en la actualidad (D' Arco *et al.,* 2023). Y, en tercer lugar, nuestro interés por la Generación Z podría explicarse por el hecho de que esta cohorte generacional representa la principal fuerza laboral del planeta y se piensa que sus miembros son los que más influencia ejercen en otros miembros de la sociedad, por lo que se pueden considerar como principales impulsores de comportamientos proambientales (Lin y Chen, 2022).

2.1.4. Creencias y actitudes hacia el cambio climático

Siguiendo la Teoría del Comportamiento Planificado (TPB), la conducta se origina con las creencias del individuo. Las creencias son la base de un comportamiento, representan la idea o conocimiento que ha adquirido una persona por experiencias previas, lo que conduce a cualquier tipo de acción (Lee *et al.,* 2023). Es decir, si un individuo tiene conocimiento y es consciente de los problemas producidos por ciertos comportamientos, es probable que adopte una actitud en función de su contribución a esos problemas y a si puede o no resolverlos (Esfandiar *et al.,* 2023). Así pues, cuando se trata de comportamientos proambientales, las personas pueden intentar implicarse en prevenir o mejorar las consecuencias adversas derivadas del cambio climático cuando creen que su acción tiene repercusión, ya sea de forma individual o colectiva (Lee *et al.,* 2023).

Las creencias son pensamientos o conocimientos previos de un individuo sobre la realización de una conducta; implican una valoración parcial de un objeto o situación y gestionan las expectativas que el individuo tiene sobre ello, por lo que se describen como juicios de valor (Barszcz *et al.*, 2023). En términos de sostenibilidad, a las creencias les puede seguir un sentido de responsabilidad con respecto a los efectos adversos de realizar una conducta perjudicial hacia la naturaleza (Savari *et al.,* 2023). Varios investigadores han demostrado que los individuos con amplios conocimientos ambientales o con cierta preocupación ambiental tienen inclinación por adoptar actitudes proambientales con el fin de dañar lo menos posible al ecosistema (Shanmugavel y Balakrishnan, 2023).

Las actitudes representan las creencias de una persona con respecto a las repercusiones de participar en un comportamiento, originadas por la evaluación que esa persona realiza de las consecuencias (Cordano *et al*., 2010). La actitud es una disposición (des)favorable hacia un comportamiento (Ajzen,1991). En términos de sostenibilidad, la actitud se refiere a la evaluación que hace un individuo antes de realizar un comportamiento específico (Tunji-Olayeni *et al.,* 2023); por tanto, una persona con una actitud ambiental positiva probablemente mostrará un comportamiento ambiental positivo (Abd-Mutalib *et al.*, 2023). Por su parte, los individuos con actitudes ambientales débiles tienen menos probabilidades de expresar su voluntad de cambiar su comportamiento que aquellos con actitudes más fuertes (McKercher *et al.*, 2011).

Varios estudios han probado en distintos campos de investigación que las creencias influyen en las actitudes. Así, por ejemplo, Yuriev *et al.* (2020) comprueban esta relación en un contexto de medición del comportamiento proambiental de empleados en el lugar de trabajo; Shanmugavel y Balakrishnan (2023), aprueban esta relación en las conductas dirigidas a la compra de vehículos eléctricos; Dąbrowski *et al.* (2022) corroboran esta relación en la medición del comportamiento proambiental de la Generación Z; Zeng *et al*. (2023) aseguran que las actitudes y comportamientos de estudiantes universitarios están relacionados con sus creencias del sistema ambiental y con su grado de concienciación sobre los problemas ambientales

globales. Por ende, a mayor conocimiento, las personas se preocupan más por el medio ambiente y adoptan prácticas más sostenibles dirigidas a mitigar los problemas derivados por el cambio climático (Miller *et al.,* 2022). Se considera que cada acción que realiza un individuo tiene una consecuencia potencial que puede ser positiva o negativa desde un contexto individual o grupal; por ello, antes de actuar, los individuos evalúan los posibles efectos de sus acciones en función de sus creencias (Huang *et al*., 2023). En esta dirección, y para lograr el objetivo específico 1 de la presente Tesis Doctoral - "*Conocer la influencia de las creencias sobre el cambio climático en las actitudes hacia el mismo, tanto para miembros de la comunidad universitaria como para la Generación Z*"-, en los Artículos 1 y 2 se propuso la siguiente hipótesis:

HI: Las creencias sobre el cambio climático influyen en las actitudes hacia el mismo.

2.1.5. Motivaciones intrínsecas y extrínsecas

En la literatura previa se han desarrollado varias teorías sobre la motivación, que se pueden clasificar en dos categorías: la primera, tiene sus raíces en aspectos biológicos; y la segunda, se basa en teorías psicológicas que perciben la motivación como un ciclo interno del individuo (Zhou y Zhang, 2023). Con el fin de cumplir los objetivos de la presente Tesis, nos centramos específicamente en las motivaciones psicológicas porque permiten establecer mecanismos de predicción del comportamiento individual. La teoría de la autodeterminación planteada por Ryan y Deci (2000) es, dentro de la Psicología, la más utilizada para el análisis de las motivaciones humanas. Esta teoría sostiene que las motivaciones se componen de aspectos intrínsecos y extrínsecos (Chao *et al*., 2023) y ha servido como sustento de varias investigaciones que analizan los comportamientos proambientales (Dodds *et al.,* 2022).

La motivación es un proceso psicológico que dirige o activa, conductas (Ryan y Deci, 2000) y se expresa a través de intenciones, metas, e impulsos (Ojo, 2022). Muchos académicos sostienen que las motivaciones pueden explicar una variedad de resultados conductuales, incluido un mayor compromiso con la actividad, así como un esfuerzo concentrado hacia su implementación (Tandon *et al.,* 2020). La motivación dirige, inicia, dinamiza y permite que el individuo realice determinadas acciones (Pham *et al.,* 2022). La motivación intrínseca es la tendencia a participar en una actividad por el disfrute y el placer derivados de la actividad misma (Pham *et al*., 2022); permite al individuo tomar decisiones basadas en la propia voluntad y no influenciadas por factores externos (Kim y Lee, 2022). La motivación extrínseca se refiere a la realización de una actividad para alcanzar algún resultado separable (Ryan y Deci, 2000), es decir, influye en la obtención de resultados para una acción particular (Kim y Lee, 2022) y se debe a recompensas o presiones ajenas al individuo, como regulaciones políticas, presión social e incentivos financieros (Dodds *et al*., 2022). Una selección de 10 trabajos en los que apoyar la investigación de las motivaciones intrínsecas y extrínsecas se presenta en la Tabla 3.

Tabla 3. Una selección de 10 trabajos en los que apoyar la investigación de las motivaciones intrínsecas y extrínsecas en asuntos ambientales.

AUTOR	OBJETIVO DEL ESTUDIO	METODOLOGÍA	ESCALA (Número de ítems)	PRINCIPALES RESULTADOS
Budzanowska-Drzewiecka y Tutko (2021)	Examinar el alcance de los comportamientos ecológicos de los empleados en la esfera pública y privada; y explorar la relación entre la motivación individual y los comportamientos proambientales.	Encuesta en línea a empleados polacos (325).	Motivación intrínseca (4) Regulación integrada (4) Regulación identificada (4) Regulación introyectada (4) Regulación externa (4) Desmotivación (4)	Los resultados muestran que los empleados polacos adoptan principalmente comportamientos proambientales en el ámbito privado. El compromiso de los empleados con comportamientos ecológicos está impulsado por una motivación autónoma. La motivación intrínseca es un factor más importante en el caso de comportamientos proambientales en la esfera privada que la regulación integrada en el ámbito público.
Ojo (2022)	Explorar los factores motivacionales que influyen en los comportamientos proambientales de los profesionales de la tecnología de la información.	Encuesta a profesionales de la tecnología de la información en Malasia (333).	Motivación autónoma (12) Motivación controlada (6) Prácticas de gestión verde de recursos humanos (5) Comportamientos proambientales (7)	Los resultados muestran que la motivación autónoma y las prácticas de gestión verde de recursos humanos tienen efectos significativos en los comportamientos proambientales. Además, la gestión verde de recursos humanos fue un moderador significativo del efecto de la motivación autónoma en los comportamientos proambientales.
Pham *et al.* (2022)	Examinar los impactos sinérgicos de las motivaciones intrínsecas, extrínsecas y prosociales en la promoción de conductas de consumo proambientales sostenidas.	Encuesta a consumidores de plásticos de un solo uso en centros comerciales de ciudades de Vietnam (468).	Motivación intrínseca (5) Motivación prosocial (4) Motivación extrínseca (7) Comportamiento sostenido del consumidor proambiental (7)	Los resultados muestran que las motivaciones intrínsecas y prosociales son predictores importantes del comportamiento sostenido del consumidor proambiental. Además, se encontraron efectos de interacción positivos entre la motivación intrínseca y extrínseca, y entre la motivación intrínseca y prosocial al fomentar el comportamiento sostenido de consumidor proambiental
Kim y Lee (2022)	Examinar las interrelaciones entre la motivación verde autónoma, la motivación verde externa, la preocupación ambiental, la autoeficacia y tres tipos de motivación ambiental verde de los empleados.	Encuesta a empleados de restaurantes, hoteles, agencias de viajes y aerolíneas en Corea del Sur (410).	Motivación autónoma verde (6) Motivación externa verde (3) Preocupación medioambiental (4) Autoeficacia (6) Comportamiento de gestión de ideas verdes (3) Comportamiento activista de la idea verde (3)	Los resultados muestran que la motivación autónoma influyó significativamente en la preocupación ambiental, la autoeficacia, el comportamiento de generación de ideas verdes y el comportamiento de promoción de ideas verdes. Además, la motivación externa afectó significativamente la autoeficacia, la preocupación ambiental y el comportamiento de promoción de ideas ecológicas.
Dang *et al.* (2022)	Conocer los efectos de la percepción de salubridad de alimentos y la conciencia ambiental sobre la intención de compra de productos orgánicos para beber, basándose en teorías cognitivas sociales y motivaciones.	Encuesta a consumidores de diferentes tiendas de alimentos minoristas en Vietnam (606).	Salud alimentaria percibida (4) Conciencia ambiental (3) Motivación extrínseca del consumidor (3) Creencias de responsabilidad social corporativa (3) Intención de compra (3)	Los resultados respaldan la capacidad predictiva de la percepción y las teorías cognitivas sociales para explicar las percepciones, la motivación y la intención de comportamiento de los consumidores hacia los productos para beber orgánicos. De forma complementaria, los resultados proporcionan evidencia del efecto moderador de las creencias en responsabilidad social corporativa sobre la relación entre la motivación extrínseca del consumidor y la intención de compra.

Ali *et al.* (2020)	Evaluar cómo el pensamiento "verde" y el altruismo se traducen en intenciones de compra de productos electrónicos, y examinar cómo las motivaciones ecológicas intrínsecas y extrínsecas pueden explicar estas relaciones.	Encuesta a compradores de la industria electrónica en China (2021).	Pensamiento verde (3) Altruismo (4) Motivación intrínseca verde (5) Motivación extrínseca verde (4) Intención de compra verde (5)	Los resultados muestran que tanto el pensamiento ecológico como el altruismo tienen un impacto sustancial en la intención de compra ecológica. Además, la motivación verde media estas relaciones, mientras que la motivación extrínseca verde modera el efecto del pensamiento verde y la motivación intrínseca verde sobre la intención de compra verde.
Ahmed *et al.* (2021)	Explorar los factores que influyen en el desempeño ambiental de los empleados incorporando la motivación verde y la madurez de la gestión ambiental proactiva como mediadores.	Encuesta en línea a empleados de hoteles de servicio al huésped en Pakistán (442).	Desempeño ambiental de los empleados (5) Motivación extrínseca verde (3) Prácticas verdes de recursos humanos (5) Motivación intrínseca verde (3) Madurez de la gestión ambiental proactiva (5)	Los resultados muestran que las prácticas verdes de recursos humanos se relacionan positiva y significativamente con la motivación verde intrínseca y extrínseca y la madurez de la gestión ambiental proactiva. Por otro lado, el análisis de mediación revela que la motivación intrínseca y extrínseca, media parcialmente la asociación entre las prácticas verdes de recursos humanos y el desempeño ambiental de los empleados.
Li *et al.* (2020)	Investigar la influencia de la motivación verde intrínseca y extrínseca en la creatividad verde con la incorporación de otros constructos.	Encuesta a jefes de departamentos, líderes y empleados de I+D en China (298).	Creatividad verde (6) Liderazgo transformacional verde (6) Motivación intrínseca verde (6) Motivación extrínseca verde (5)	Los resultados muestran que el liderazgo transformacional verde tiene una influencia significativa en la motivación intrínseca y la creatividad verde, que son necesarias para que los empleados produzcan productos y servicios verdes. Además, se encuentra que la motivación intrínseca verde media parcialmente la relación entre el liderazgo transformacional verde y la creatividad verde. Por otra parte, la motivación verde extrínseca como moderadora influye ligeramente la motivación verde intrínseca para el comportamiento creativo verde.
Tandon *et al.* (2020)	Comprender las posibles asociaciones entre las motivaciones (intrínsecas y extrínsecas), la actitud y el comportamiento de compra de alimentos orgánicos	Encuesta a consumidores de centros comerciales en la India (378).	Motivación intrínseca (2) Regulación integrada (2) Regulación introyectada (2) Regulación externa (4) Actitud (2) Comportamiento de compra (2)	Los resultados muestran la influencia significativa de la motivación intrínseca, la regulación integrada, y externa en la actitud del consumidor y el comportamiento de compra.
Chedid *et al.* (2022)	Examinar la relación entre los factores individuales y la actitud hacia el intercambio de conocimientos entre profesores e investigadores, considerando que la actitud de compartir conocimiento es motivada y ejecutada principalmente a nivel individual.	Encuesta a profesores e investigadores de una universidad de Portugal (176).	Motivación intrínseca (4) Motivación extrínseca (5) Redes sociales (3) Actitud hacia el intercambio de conocimientos (4)	Los resultados muestran que la motivación intrínseca es el factor que más incide en la actitud de compartir conocimientos. Dado que la motivación intrínseca es una actividad movida por la autodeterminación y libre de presiones, el hallazgo se relaciona con los valores como la libertad y autonomía existentes en este contexto.

Fuente: Elaboración propia

Según Zeng *et al*. (2023), las personas con mayor educación parecen tener una comprensión más profunda del medio ambiente y estar más motivadas hacia prácticas de sostenibilidad. Las creencias resumen los factores motivadores que influyen en el comportamiento, los cuales, indican cuán grande es la disposición de una persona a esforzarse por lograr una determinada conducta (Gansser y Reich, 2023). Cuando los individuos desarrollan preocupaciones ambientales a través de las creencias, utilizan esta comprensión para guiar eficazmente su propio comportamiento, así como el de los demás (Chao *et al*., 2023).

Varios estudios argumentaron que las creencias que generan una preocupación ambiental están vinculadas a motivaciones que impactan en el comportamiento proambiental (Lange y Dewitte, 2019). La preocupación ambiental se refiere a la creencia de un individuo de que los seres humanos ponen en peligro el medio ambiente, junto con la voluntad de proteger la naturaleza (Chao *et al*., 2023). Ali *et al.* (2020) mencionan que las creencias probablemente aumenten la motivación intrínseca de los individuos para adoptar comportamientos amigables con el medio ambiente. En un entorno educativo, donde los miembros de la comunidad universitaria son conscientes del cambio climático y los riesgos asociados, indisolublemente están predispuestos a desarrollar motivaciones que impulsen comportamientos (Filho *et al.*, 2023), por lo que es probable que se esfuercen en la mitigación y adaptación del clima por sentirse mejor y por el disfrute de la actividad en sí (Ferreira *et al.*, 2022). Por lo tanto, para lograr el objetivo específico 2 de la Tesis -"*Examinar la influencia de las creencias sobre el cambio climático en las motivaciones intrínsecas de los miembros de la comunidad universitaria hacia las acciones propuestas por la universidad para abordar este problema"*-, en el Artículo 1 se propuso la siguiente hipótesis:

> *HII: Las creencias sobre el cambio climático influyen en las motivaciones intrínsecas de los miembros de la comunidad universitaria hacia las acciones propuestas por la universidad para abordar este problema.*

La adaptación al cambio climático se define como un proceso, resultado o acción de un individuo o grupo para afrontar y gestionar alguna condición, estrés, peligro, riesgo u oportunidad cambiante (Villamor *et al.,* 2023). Para que la adaptación y mitigación del cambio climático se pueda gestionar, es necesaria la implicación de los miembros de la comunidad universitaria en el cuidado de la naturaleza, y como consecuencia de ello, la influencia de esa conducta en otros miembros de la sociedad (D'Adamo y Gastaldi, 2023). Para lograr este objetivo, las creencias de los individuos juegan un rol trascendental, ya que estas creencias afectan el proceso de pensamiento, incluida la motivación, las emociones, las actitudes y las acciones (Dang *et al.*, 2022).

Si los individuos son conscientes de las consecuencias del cambio climático y de la importancia de su contribución para mitigar este problema, se producirá una evaluación adaptativa o de afrontamiento que se refiere a un proceso cognitivo donde el individuo evalúa su capacidad para evitar un riesgo particular

(Villamor *et al.*, 2023). Posteriormente, aparece el proceso de toma de decisiones, en el cual, anteceden las percepciones, pensamientos o creencias sobre ciertos objetos o temas (Ali *et al.*, 2020). Las creencias pueden guiar la actividad de una persona en una determinada dirección (Barszcz *et al.*, 2023), ya sea por propio placer o por incentivos externos como recompensas o premios por desarrollar una determinada actividad. Aquí, puede ser que el individuo sea consciente de las repercusiones del daño al medio ambiente, pero no sentir la necesidad de involucrarse (D'Adamo y Gastaldi, 2023) o, por el contrario, por ejemplo, la creencia de que el reciclaje conducirá a océanos más limpios y a la muerte de menos animales marinos podría ser una de las creencias que anteceden a una actitud positiva al reciclaje (Van Breda *et al.*, 2023).

Las universidades son las llamadas a abordar el desarrollo sostenible y a fomentar la participación de los miembros de la comunidad universitaria a través de incentivos o acciones, que si bien, pueden generar comportamientos individuales momentáneos y no tan prolongados, como en el caso de los individuos que realizan este tipo de actividades por placer, este puede ser un punto de partida para involucrar a otros miembros de la sociedad (Dang *et al.*, 2022) y crear un patrón de comportamiento que conduzca a una actitud ambientalmente responsable en el tiempo (Villamor *et al.*, 2023). Sobre este supuesto, para lograr el objetivo específico 3 de la Tesis -"*Evaluar la influencia de las creencias sobre el cambio climático en las motivaciones extrínsecas de los miembros de la comunidad universitaria hacia las acciones propuestas por la universidad para abordar este problema*"-, en el Artículo 1 se propuso la siguiente hipótesis:

> *HIII: Las creencias sobre el cambio climático influyen en las motivaciones extrínsecas de los miembros de la comunidad universitaria hacia las acciones propuestas por la universidad para abordar este problema.*

La sostenibilidad y el cambio climático se han convertido en un asunto prioritario en tiempos modernos y, en consecuencia, los investigadores y profesionales destacan el cambio de comportamiento como un elemento crucial para abordar estos problemas (Farrukh *et al.*, 2023). Uno de los métodos más efectivos y pragmáticos para aliviar la degradación ambiental es incentivar a las personas a que reciclen, elijan materiales respetuosos con el medio ambiente, consuman ecológicamente, utilicen transporte con bajas emisiones de carbono y otros comportamientos proambientales con respecto a la alimentación, vivienda, ropa, etc. (Wang *et al.*, 2023). Este escenario sería ideal para cumplir con objetivos de desarrollo sostenible; no obstante, los esfuerzos realizados por distintas organizaciones, entre ellas, las universidades, no han conseguido promover cambios de conducta en la sociedad, lo cual, puede deberse a la actitud de los individuos y a la falta de concienciación.

La actitud se describe como un juicio general de una persona sobre las ventajas y desventajas de llevar a cabo un comportamiento especifico (Al-Zaidi *et al.*, 2023), es decir, la actitud es la evaluación general que hace un individuo de una actividad y es el grado en que el comportamiento se evalúa como positivo o

negativo (Harorli y Erciş, 2023). Aunque se ha constatado que la actitud puede predecir la intención conductual hasta cierto punto, algunos otros factores también afectan la intención de comportamiento del individuo (Harorli y Erciş, 2023), entre ellos, la motivación intrínseca y extrínseca. La motivación intrínseca constituye la pasión individual por un comportamiento proambiental y ecológico impulsado por la fuerza de la satisfacción interna, en lugar de las recompensas externas (Ahmed *et al.,* 2021), y por su parte, la motivación extrínseca contrasta con la motivación intrínseca, ya que su objetivo es recibir premios o beneficios de alguna actividad (Chedid *et al.,* 2022). Investigaciones anteriores han probado estas relaciones hipotéticas en diferentes campos de estudio, concluyendo que las actitudes están influenciadas por motivaciones intrínsecas (Tandon *et al*., 2020) y motivaciones extrínsecas (Chedid *et al.,* 2022). Persiguiendo el objetivo específico 4 -"*Explorar si las actitudes hacia el cambio climático influyen en las motivaciones intrínsecas de los miembros de la comunidad universitaria hacia las acciones propuestas por la universidad para abordar este problema*"- y 5 de la Tesis -"*Explorar si las actitudes hacia el cambio climático influyen en las motivaciones intrínsecas de los miembros de la comunidad universitaria hacia las acciones propuestas por la universidad para abordar este problema*"-, en el Artículo 1 se proponen las siguientes hipótesis:

> *HIV: Las actitudes hacia el cambio climático influyen en las motivaciones intrínsecas de los miembros de la comunidad universitaria hacia las acciones propuestas por la universidad para abordar este problema.*
>
> *HV: Las actitudes hacia el cambio climático influyen en las motivaciones extrínsecas de los miembros de la comunidad universitaria hacia las acciones propuestas por la universidad para abordar este problema.*

2.1.6. Comportamiento proambiental

El comportamiento proambiental se refiere a las conductas que dañan lo menos posible el medio ambiente, o incluso lo benefician (Steg y Vlek, 2009). Se trata de un término que se ha utilizado comúnmente para describir el comportamiento que protege el medio donde vivimos, es decir, comprende toda actividad individual que contribuya a mejorar la calidad ambiental o que reduzca el impacto ambiental nocivo de las acciones humanas (Al-Zaidi *et al.,* 2023). Se refiere a acciones tomadas voluntaria y cuidadosamente para cuidar el medio ambiente, ya sea reduciendo el efecto ambiental negativo de los comportamientos propios del individuo o realizando cambios positivos en el medio ambiente mismo (Zeng *et al.,* 2023).

Se distinguen varios tipos de comportamiento proambiental: algunos son más personales e individuales (como el reciclaje), mientras que otros se inclinan más hacia actividades grupales (como participar en

protestas o unirse a organizaciones proambientales). Esto último requiere un alto compromiso y una mayor conciencia ambiental (Barszcz *et al.*, 2023).

Antes de adoptar un comportamiento proambiental, los individuos desarrollan una actitud que repercute en su grado de implicación o participación (Duong y Pensini, 2023); en otras palabras, el comportamiento es un factor conductual al que anteceden preocupaciones, creencias y actitudes (Zeng *et al.,* 2023), por lo que una persona con conocimientos ambientales es posible que desarrolle una actitud favorable o desfavorable con la naturaleza y posteriormente adopte un comportamiento (Huang *et al.,* 2023). Varios estudios han probado que, si una persona siente que una determinada actividad puede aliviar un problema ambiental, entonces esa opinión debería afectar en gran medida su propensión a participar en esa actividad especifica (Zeng *et al.,* 2023). La TPB predice una relación entre actitud y comportamiento (Ryan y Deci, 2000), por lo que, dentro de esa lógica, quienes tienen una buena actitud ambiental, podrían realizar comportamientos proambientales (He *et al*., 2023). Con todo lo anteriormente expuesto, y para alcanzar el objetivo 6 de la Tesis -"*Examinar la influencia de las actitudes hacia el cambio climático sobre el comportamiento proambiental individual de miembros de la comunidad universitaria y de la Generación Z*"-, en los Artículos 1 y 2 se propuso la siguiente hipótesis:

> *HVI: Las actitudes hacia el cambio climático influyen en el comportamiento proambiental individual de los miembros de la comunidad universitaria y, en concreto, de la Generación Z.*

Las universidades, como organizaciones impulsoras de la creación de conocimiento, deben asumir un rol de liderazgo en la transformación sostenible y preparar graduados responsables y capaces de impulsar comportamientos de cuidado medioambiental a sus amigos, familiares y círculos sociales más cercanos (Valls-Val y Bovea, 2022). Para ello, las instituciones de educación superior preparan programas de sostenibilidad que buscan fomentar capacidades como la previsión y el pensamiento anticipatorio, el pensamiento sistémico, la cooperación interdisciplinaria y la participación de todos sus miembros (Zeng *et al.,* 2023). Sin embargo, la implementación efectiva de políticas de sostenibilidad en las universidades depende en gran medida de la voluntad y el compromiso de empleados y estudiantes para participar (Mohammadi *et al.,* 2023). Aquí, las actitudes individuales constituyen un pilar fundamental en la respuesta proambiental de la comunidad universitaria. Si bien es crucial que las instituciones de educación superior lleven a cabo programas o actividades de educación ambiental (Ng y Cheung 2022), estas acciones deben cumplir con el objetivo de generar actitudes positivas y favorables de los miembros de la comunidad con el medio ambiente, pues en caso contrario, carecen de sentido.

La adopción de una actitud proambiental apunta a proteger el medio ambiente y avanzar hacia la sostenibilidad, pero no sólo es una cuestión individual, sino que su importancia va aumentando hasta llegar a la del comportamiento social para proteger el planeta (Farrukh *et al*., 2023). Sobre este supuesto, y para

lograr el objetivo específico 7 de la presente Tesis Doctoral -"*Analizar la influencia de las actitudes hacia el cambio climático de miembros de la comunidad universitaria sobre la respuesta proambiental de la comunidad universitaria"*-, en el Artículo 1 se propuso la siguiente hipótesis:

> *HVII: Las actitudes hacia el cambio climático de miembros de la comunidad universitaria influyen en la respuesta proambiental de la comunidad universitaria.*

Por otra parte, en el estudio de los antecedentes del comportamiento proambiental, se ha señalado que las personas con alta motivación intrínseca o extrínseca adoptan conductas más respetuosas con el medio ambiente que cualquier otro individuo en particular (Barszcz *et al*., 2023). El comportamiento proambiental supone la decisión de los individuos de participar en conductas preventivas de riesgo en función de su motivación para protegerse a sí mismos y a otros miembros de la sociedad de posibles amenazas (Ojo, 2022). La perspectiva convencional es que los individuos y sus conductas están en gran medida influidas por el contexto en el que viven; sin embargo, los avances en el estudio de las transformaciones sociales desafían esta perspectiva y refuerzan la teoría de que los individuos, como agentes de cambio, influyen de manera conjunta en instituciones y sistemas (Thiermann y Sheate, 2020).

En las universidades, y en otro tipo de organizaciones, se pueden promover comportamientos proambientales con políticas internas, como, por ejemplo, obligar a los estudiantes a reciclar, forzar a los empleados a apagar las luces al terminar sus jornadas laborales, o usar menos papel al imprimir (Yuriev *et al*., 2020). Estos comportamientos sociales individuales no son reconocidos explícitamente por el sistema de recompensa formal, pero contribuyen a mejorar la eficacia de la gestión ambiental de las organizaciones (Yuriev *et al*., 2020). En este sentido, lo ideal es que las universidades comprendan qué motiva a sus miembros a alinear sus intereses con los objetivos estratégicos generales (Ojo, 2022), y responder de forma grupal a la trágica situación actual del ecosistema, que es causada principalmente por acciones cotidianas, individuales y altamente expansivas de las personas (Barszcz *et al.*, 2023).

Las personas adoptarán prácticas respetuosas con el medio ambiente si creen que se beneficiarán de alguna manera (por ejemplo, evitando una multa, u obteniendo una recompensa), y también adoptarán dichas prácticas si creen que tienen el potencial para hacerlo o por el disfrute de la actividad en sí (Zeng *et al.*, 2023). Cuando un individuo está motivado intrínsecamente, las acciones propuestas de las universidades son complementarias para inducir una conducta proambiental. No obstante, en el caso de los individuos que necesitan de la motivación extrínseca, se requiere un mayor esfuerzo por parte de la universidad. Aquí, la compensación monetaria no es el único incentivo para motivar extrínsecamente un comportamiento o actitud individual, ya que las oportunidades de aprendizaje, la mejora de la reputación y la promoción profesional también son cuestiones relevantes (Chedid *et al*., 2022). Tomando en consideración todo lo anteriormente expuesto, y para alcanzar el objetivo específico 8 -"*Conocer la influencia de las motivaciones*

intrínsecas de miembros de la comunidad universitaria en la respuesta proambiental de la comunidad universitaria"- y 9 de la presente Tesis -"*Conocer la influencia de las motivaciones extrínsecas de miembros de la comunidad universitaria en la respuesta proambiental de la comunidad universitaria*"-, en el Artículo 1 se propusieron las siguientes hipótesis:

> *HVIII: Las motivaciones intrínsecas de los miembros de la comunidad universitaria influyen en la respuesta proambiental de la comunidad universitaria.*
>
> *HIX: Las motivaciones extrínsecas de los miembros de la comunidad universitaria influyen en la respuesta proambiental de la comunidad universitaria.*

Interconectar los determinantes conductuales con la respuesta que debe dar la universidad en forma de acciones que ayuden a combatir el cambio climático es crucial en la literatura y en la generación de conocimiento. Varias teorías sustentan que existen discrepancias entre el comportamiento de una persona a nivel individual y como parte de un colectivo o comunidad (Zoll *et al*., 2018). El comportamiento proambiental individual, por sí solo, no puede contribuir a resolver los desafíos ecológicos, dado que la crisis medioambiental se origina en el comportamiento humano agregado y requiere colaboración colectiva para resolverse (Peng *et al.*, 2021).

Un comportamiento individual dañino o inconsciente con el cuidado de la naturaleza no puede afectar gravemente al medio ambiente; no obstante, si esa conducta es generada por un grupo de personas, los efectos pueden ser bastantes significativos (Wang *et al.*, 2023). El comportamiento del individuo puede desarrollarse en función de su creencia sobre la contribución de su acción; en este sentido, si un individuo cree que su comportamiento no tiene repercusión, es probable que no lo realice (Chedid *et al.*, 2022). Así, también, puede ser que un individuo que realice comportamientos proambientales en su hogar, como reciclar, apagar las luces, clasificar la basura, etc., opte por no realizar los mismos comportamientos en un contexto grupal debido a su escasa aportación en este ambiente; esto explica la variación entre conductas a nivel individual y grupal (Zoll *et al.*, 2018). Cuando los individuos atribuyen sus conductas a un contexto social, sus decisiones personales son bastante limitadas ya que creen que sus acciones no son parte de la solución.

En el campo de investigación del comportamiento proambiental, las normas sociales a menudo se consideran intervenciones para guiar o restringir comportamientos y acciones de los individuos (Wang *et al*., 2020). Las normas sociales son conjuntos de reglas y estándares formales e informales que son aceptados por los miembros de una organización o grupo, y que pueden reflejar lo que la mayoría de las personas hacen (Wang *et al.*, 2023). Debido a la naturaleza social de los seres humanos, es probable que el comportamiento de los individuos se ajuste a las normas sociales y a las conductas grupales (Zhang *et al.*,

2022), lo que hace que actúen de forma diferente en un ámbito individual y en uno grupal. Por tanto, los comportamientos proambientales dentro de un grupo social solo podrían iniciarse cuando los individuos perciben que otros se comportan de manera similar (Li y Wu, 2020). Teniendo en cuenta la discusión anterior, y para cumplir con el objetivo 10 de la Tesis -"*Explorar si el comportamiento proambiental individual de miembros de la comunidad universitaria influye en la respuesta proambiental de la comunidad universitaria*"-, en el Artículo 1 se propone la siguiente hipótesis:

> *HX: El comportamiento proambiental individual de miembros de la comunidad universitaria influye en la respuesta proambiental de la comunidad universitaria.*

En un contexto de instituciones de educación superior, se espera que el tipo de afiliación a la comunidad universitaria, es decir, estudiante o empleado, juegue un papel moderador en las relaciones discutidas. Chao *et al.* (2023) argumentaron que, a mayor nivel educativo de los estudiantes universitarios, estos son más conscientes de la importancia del comportamiento proambiental y más propensos a adoptar actividades medioambientalmente sostenibles que los alumnos de nuevo ingreso. Esto puede deberse al tiempo que están vinculados a la institución y al sentido de pertenencia que adquieren con el paso del tiempo. Así pues, se puede inferir que los empleados de las universidades, que normalmente se encuentran durante un periodo de tiempo más prolongado en la institución, adoptan un comportamiento más consciente con la naturaleza dentro del campus que los estudiantes (Zeng *et al*., 2023).

Los comportamientos proambientales de estos dos grupos pueden deberse a múltiples razones. Por ejemplo, los estudiantes pueden realizar conductas ambientales principalmente por recompensas académicas o curriculares, mientras que los motivos de los empleados pueden ser, entre otras razones, ganarse buena reputación en el entorno, evitar del sentimiento de vergüenza y culpa, la presión social, o incentivos monetarios (Ojo, 2022).

Además, empleados y estudiantes pertenecen a cohortes generacionales distintas, y aunque en la literatura no se ha probado la existencia de diferencias entre los factores que componen la TPB según la cohorte generacional, numerosos estudios han comprobado que los Millennials tienen un comportamiento más consciente con la naturaleza que los Centennials (Prayag *et al.*, 2022), lo que permite suponer que los estudiantes y empleados se comportan de forma distinta en asuntos relacionados con la sostenibilidad. Así, para cumplir con el objetivo 11 de la Tesis –"*Conocer si la vinculación con la universidad juega un papel moderador en las relaciones entre los diferentes constructos, siendo más fuerte para los empleados de la institución educativa que para los estudiantes universitarios*"-, en el Artículo 1 se propone la siguiente hipótesis:

HXI: La vinculación con la universidad juega un papel moderador en las relaciones entre los diferentes constructos, siendo más fuerte para los empleados de la institución educativa que para los estudiantes universitarios.

Por otro lado, esta Tesis Doctoral también propone incorporar la variable de desafección ambiental y motivación intrínseca como factores previos a la adopción de una actitud para evaluar los comportamientos de la Generación Z. A diferencia de enunciados anteriores, donde las motivaciones preceden a las actitudes de la comunidad universitaria, en este caso, se plantea una relación inversa, donde las motivaciones intrínsecas y la desafección ambiental influyen en la actitud de los miembros de la Generación Z. Esta casuística puede ser relevante dentro de la investigación del comportamiento por cohortes generacionales, ya que se espera que la actitud represente una respuesta afectiva individual negativa por desafección ambiental o positiva por motivación intrínseca. Estos planteamientos están respaldados por estudios de cohortes generacionales (Ribeiro *et al.,* 2023), y por estudios del comportamiento humano, donde las motivaciones influyen en la adopción de una actitud de forma positiva (Al-Jubari *et al.,* 2021; Lavuri *et al.* 2023), y la desafección ambiental de forma negativa (Brosch, 2021). Por tanto, para alcanzar el objetivo 12 -"*Examinar si la desafección ambiental de individuos de la Generación Z tiene una influencia negativa en las actitudes hacia el cambio climático*"- y 13 de la presente Tesis -"*Evaluar si las motivaciones intrínsecas de individuos de la Generación Z influyen positivamente en las actitudes hacia el cambio climático*"-, en el Artículo 2 se proponen las siguientes hipótesis:

HXII: La desafección ambiental de individuos de la Generación Z tiene una influencia negativa en las actitudes hacia el cambio climático.

HXIII: Las motivaciones intrínsecas de individuos de la Generación Z influyen positivamente en las actitudes hacia el cambio climático.

Adicionalmente, la presente Tesis Doctoral propone entrelazar los factores que condicionan las conductas proambientales individuales y, si bien las actitudes son un antecedente destacado y de relevancia, también existen otras variables que condicionan el comportamiento, como la participación previa en iniciativas proambientales y las propias motivaciones intrínsecas. Wang *et al.* (2023) mencionan que las participaciones previas de los individuos en acciones relacionadas con la sostenibilidad generan conciencia ambiental, que es el reflejo de experiencias, emociones, ideas, creencias y conocimientos de los individuos sobre prácticas sostenibles. Por ende, si un individuo ha participado previamente en alguna iniciativa sostenible o en un programa de concienciación ambiental, seguramente tenga una base sólida para adoptar una actitud. Lo importante de esta interacción es que el individuo conocerá los beneficios de actuar a favor del medio ambiente, pero también tendrá conciencia de las consecuencias perjudiciales de no actuar (Saifulina *et al.,* 2023). Por otro lado, la adopción de una actitud implica un proceso de toma de decisiones

que suele estar impulsado por las motivaciones (Wu *et al.*, 2022). Para que individuos y organizaciones implementen prácticas sostenibles y adopten comportamientos proambientales, debe existir la motivación para hacerlo (Dodds *et al.*, 2022). Así, y con la finalidad de cumplir con el propósito del objetivo específico 14 -"*Evaluar si las motivaciones intrínsecas de los individuos de la Generación Z influyen en el comportamiento proambiental individual*"- y 15 de la Tesis -"*Conocer si la participación previa de una persona de la Generación Z en iniciativas ambientales influye en el comportamiento proambiental individual*"-, en el Artículo 2 se proponen las siguientes hipótesis:

> *HXIV: Las motivaciones intrínsecas influyen en el comportamiento proambiental individual de la Generación Z.*
>
> *HXV: La participación previa en iniciativas ambientales influye en el comportamiento proambiental individual de la Generación Z*

A pesar de la popularidad de la TPB para explicar el comportamiento proambiental del individuo, la revisión de la literatura revela que la mayoría de los estudios previos que adoptan este enfoque teórico se han limitado al análisis desde la perspectiva de un solo país o de una sola muestra (Esfandiar *et al.*, 2023). Esto abre una brecha de investigación que requiere de estudios adicionales capaces de generar hallazgos e implicaciones novedosas en el conocimiento. Como referencia, Halder *et al.* (2016) aplicaron la TPB al examinar la intención de estudiantes finlandeses e indios para realizar comportamientos proambientales y encontraron inconsistencias en los efectos de los predictores sobre la intención de los estudiantes entre los dos países. En otro estudio, Bagozzi *et al.* (2001) compararon los efectos de las actitudes y las intenciones entre pueblos chinos y estadounidenses y encontraron diferencias en los resultados. Se ha argumentado que las personas que provienen de culturas europeas o norteamericanas están más concienciadas sobre los daños del medio ambiente por el grado de desarrollo de los países en los que habitan y, por tanto, se deben diferenciar de otras regiones (Esfandiar *et al.*, 2023). A partir de esta noción se origina la necesidad de indagar en el comportamiento de culturas escasamente estudiadas, como es el caso de individuos provenientes de América Latina. Además, pocos estudios han comparado los comportamientos proambientales de miembros de la comunidad universitaria en contextos geográficamente diferentes (Lamiño-Jaramillo *et al.*, 2023). Una selección de 10 trabajos en los que apoyar la investigación sobre aspectos culturales que condicionan el comportamiento se presentan en la Tabla 4. En consecuencia, para el logro del objetivo específico 16 de la Tesis -"*Examinar si la nacionalidad juega un papel moderador en las relaciones entre los diferentes constructos que influyen en el comportamiento proambiental de la Generación Z"-*, en el Artículo 2 se propuso la siguiente hipótesis:

> *HXVI: Existen diferencias entre individuos de distintas nacionalidades en la intensidad de las relaciones propuestas en el modelo.*

Tabla 4. Una selección de 10 trabajos empíricos en los que apoyar la investigación sobre aspectos culturales que condicionan el comportamiento proambiental.

AUTOR	OBJETIVO DEL ESTUDIO	METODOLOGÍA	ESCALA (Número de ítems)	PRINCIPALES RESULTADOS
Riaz *et al.* (2023)	Investigar la influencia de las diferencias de valores culturales individuales en el comportamiento proambiental (PEB) entre estudiantes internacionales de diversos orígenes culturales que actualmente estudian en universidades coreanas.	Encuesta en línea a 224 estudiantes internacionales.	Distancia de poder (3) Colectivismo (3) Masculinidad (3) Evitación de la incertidumbre (4) Orientación a largo plazo (3) Comportamiento proambiental de ámbito privado (4) Comportamiento proambiental de la esfera pública (4)	Los resultados indicaron que los valores de evitación de la incertidumbre, colectivismo y orientación a largo plazo de los estudiantes internacionales tienen un efecto positivo significativo en el PEB, tanto en la esfera pública como en la privada. Sin embargo, la distancia de poder no afecta a el PEB en las esferas pública y privada. En particular, la masculinidad se asocia negativamente únicamente con el PEB de la esfera pública.
Cordano *et al.* (2010)	Comprender las diferencias culturales en los antecedentes del comportamiento proambiental entre estudiantes de negocios de Estados Unidos y Chile.	Encuesta a estudiantes de Estados Unidos (256) y Chile (310).	Intención de comportamiento (6) Actitudes (4) Normas (6) Conciencia de las consecuencias (4) Aceptación de responsabilidad (7) Creencias (9)	Los resultados muestran que los estudiantes de negocios chilenos son más altruistas que los estudiantes de negocios en los Estados Unidos y los estudiantes chilenos sintieron presiones más fuertes por parte de sus padres para participar en comportamientos proambientales. Los estudiantes de negocios chilenos también expresaron mayores niveles de conciencia sobre los problemas ambientales, un mayor sentido de obligación de proteger el medio ambiente, una mayor voluntad de limitar los derechos de propiedad y mayores intenciones de participar en comportamientos proambientales.
Unanue *et al.* (2016)	Explorar vínculos simultáneos y prospectivos entre los objetivos de vida intrínsecos (versus extrínsecos) y el comportamiento ambientalmente responsable autoinformado, comparando datos del Reino Unido y Chile.	Encuesta a graduados británicos (958) y chilenos (257).	Metas de vida intrínsecas y extrínsecas (3) Cosmovisiones medioambientales (3) Identificación medioambiental (3) Comportamiento ambiental responsable (3)	Los resultados muestran que, en ambos países, la importancia de los objetivos de vida intrínsecos (versus extrínsecos) se asocian transversalmente con el comportamiento medioambientalmente responsable, incluso después de controlar los posibles efectos de las cosmovisiones y la identificación ambiental.
Higueras-Castillo *et al.* (2019)	Examinar si el colectivismo como dimensión cultural influye en el comportamiento proambiental, así como en la actitud hacia las energías renovables en una comparativa de 3 países.	Encuesta en línea a personas mayores de 17 años residentes en España (182), Alemania (169), y México (161).	Colectivismo (1) Activismo (2) Ahorro de energía (2) Conocimientos previos sobre energías renovables (3) Actitud hacia energías renovables (2) Intención de adaptar instalaciones de energía renovable (3)	Los resultados del análisis confirman que el país con el nivel más alto de colectivismo desarrolla comportamientos ecológicos más fuertes e intenciones más fuertes de adoptar tecnologías de energía renovable.
Lamiño-Jaramillo *et al.* (2023)	Aplicar la Teoría de la Acción Razonada como predictor del comportamiento ambiental en un estudio comparativo entre	Encuesta en línea a estudiantes de universidades de Texas y Luisiana en	Actitudes ambientales (3) Comportamientos ambientales (3) Normas subjetivas (3).	Los resultados mostraron que las actitudes ambientales, el comportamiento y las normas subjetivas de los estudiantes de Honduras y Luisiana son significativamente diferentes a las de los estudiantes de Texas.

	estudiantes universitarios de Texas, Luisiana y Honduras.	los Estados Unidos, y Honduras (1324).		
McKercher *et al.* (2011)	Analizar si el género y la nacionalidad influyen en las actitudes hacia el turismo y el medio ambiente.	Encuesta en línea a estudiantes de Australia, Nueva Zelanda, Canadá, China, Hong Kong, Macao, Filipinas, Reino Unido, Irlanda y Estados Unidos (1960).	Actitudes proambientales (4) Conocimiento presunto (1) Comportamiento proambiental (1) Intenciones de comportamiento (9)	Los resultados permiten concluir que la nacionalidad mitiga las actitudes entre las mujeres mucho más que entre los hombres. Los autores también concluyen que las actitudes generales hacia el medio ambiente están bien formadas, pero las actitudes medioambientales relacionadas con el turismo son a menudo contradictorias.
Miller *et al.* (2022)	Evaluar las relaciones entre actitudes ambientales, eficacia ambiental y comportamientos proambientales en 11 países.	Encuesta en línea a personas mayores de 18 años de Australia, Brasil, China, Indonesia, Kenia, México, Sudáfrica, Corea del Sur, Emiratos Árabes Unidos, Reino Unido y Estados Unidos (11000).	Actitudes ambientales (3) Eficacia (3) Comportamiento proambiental (3)	Las actitudes ambientales generales son un fuerte predictor de los PEB, mientras que la eficacia tiene un efecto de moderación directo no significativo. Dentro de los países, las relaciones directas y de moderación que implican eficacia son mínimas.
Mansoor y Wijaksana (2023)	Examinar el impacto directo e indirecto del conocimiento ambiental y la preocupación ambiental en el comportamiento proambiental de los ciudadanos mientras se estudia la responsabilidad ambiental percibida como mediador.	Encuesta en línea a ciudadanos de Pakistán (581).	Conocimiento ambiental (10) Preocupación ambiental (6) Responsabilidad ambiental percibida (7) Intercambio de conocimientos (4) Comportamiento proambiental (4)	Los resultados reflejan que el conocimiento ambiental y la preocupación ambiental de los ciudadanos impactan positiva y significativamente en su comportamiento proambiental, así como a través de un mecanismo subyacente de responsabilidad ambiental percibida
Ando *et al.* (2015)	Examinar los procesos mediante los cuales los niños adquieren conductas proambientales en diferentes culturas, centrándose en la influencia de los padres.	Encuesta a parejas que son padres de niños de Alemania (221) y Japón (365).	Comportamientos (2) Normas personales (2) Normas subjetivas (2) Control conductual percibido (1) Gravedad (2)	Los resultados muestran que las normas subjetivas presentan puntuaciones mayores en Alemania, mientras que las normas personales son más altas en Japón. La mayor diferencia se encontró en el caso del control percibido del comportamiento, que mostró que los niños japoneses sienten que clasificar el papel es más difícil que los niños de Alemania.

Fuente: Elaboración propia

2.1.7. Principales motivaciones de estudiantes universitarios

La evidencia científica ha mostrado que las actividades humanas están produciendo cambios sustanciales y alteraciones en el clima, con consecuencias impredecibles pero profundas (Azócar *et al.*, 2021). Por tanto, las organizaciones e individuos de todo el mundo deben trabajar en encontrar soluciones sostenibles para abordar los efectos del cambio climático, diseñando planes que ayuden a la adaptación y mitigación de los efectos adversos causados por esta catástrofe (Ferreira *et al*., 2022).

A pesar de las innumerables investigaciones que proponen distintas soluciones, en la actualidad no se observan cambios significativos de conducta (Shafiei y Maleksaeidi, 2020), y esto se debe en gran medida a que los hallazgos plantean una serie de acciones que podrían complacer o atraer a los miembros de un colectivo, pero no se ha profundizado en la detección de cuáles de las acciones propuestas son las que más motivación generan en la población; si este objetivo se cumple, se pueden dirigir los esfuerzos de forma más sistematizada e involucrar a la sociedad a participar activamente en la adaptación y mitigación del cambio climático (Pham *et al.*, 2022). Otro problema de hallazgos previos puede radicar en que la investigación se ha enfocado en analizar grupos sociales de distintos ámbitos; esto puede generar que acciones que son atractivas para un sector, no lo sean para otros (Filho *et al.*, 2023). Entender el comportamiento de los individuos en función del área de actividad que desempeñan es una tarea realmente compleja. No obstante, un sector que puede englobar a futuros profesionales con distintos perfiles y ámbitos son las universidades (Shafiei y Maleksaeidi, 2020),

Las instituciones de educación superior son lugares ideales para servir como laboratorio vivo para los esfuerzos de mitigación y adaptación climática (D'Adamo y Gastaldi, 2023). Se sostiene que, para comprender todo el potencial de las universidades en las transformaciones ambientales se debe conocer e impulsar las motivaciones de los estudiantes (Cuesta-Claros *et al.*, 2022). Si bien la literatura ha explorado las motivaciones de los estudiantes universitarios, hasta donde sabemos, las motivaciones intrínsecas y extrínsecas no han sido analizadas de forma diferenciada.

El peor escenario para poner en práctica iniciativas sostenibles en universidades es con estudiantes desmotivados y esquivos a este tipo de prácticas; son varias las razones por las que puede ocurrir la desmotivación, por ejemplo, la falta de conocimiento, la sensación de impotencia, el no disfrute de la tarea, la sensación de que la tarea requiere demasiado esfuerzo, etc. (Dodds *et al.*, 2022). Bajo esta perspectiva, las motivaciones intrínsecas y extrínsecas juegan un rol fundamental si se analizan por separado; por un lado, si un estudiante está desmotivado para participar en la adaptación y mitigación del cambio climático, es imprescindible conocer las acciones orientadas a este propósito que le pueden proporcionar mayor disfrute (motivación intrínseca), y, por otro lado, identificar los incentivos o recompensas (motivación

extrínseca) que más le incitan a involucrarse en la mitigación del cambio climático puede ser el engranaje que falta a los hallazgos presentados hasta el momento.

Al mismo tiempo, varios estudios han analizado el papel que juegan los factores afectivos del ser humano en la formación de la motivación (Gao *et al.*, 2023). El afecto recae en sentimientos no reflexivos como el placer o la relajación y como sentimientos instintivos por la experiencia personal, el conocimiento, la ira, el orgullo, el amor o el miedo (Robina-Ramírez *et al*., 2020). Por ello, es relevante evaluar cómo los distintos estados afectivos pueden influir en la motivación de los estudiantes universitarios; esto puede ser una gran aportación al conocimiento sobre los comportamientos proambientales. Dado que la literatura no presenta datos concluyentes en este ámbito, se propone progresar en el desarrollo del conocimiento planteando cuestiones de investigación y no hipótesis. En base a todo lo expuesto con anterioridad y para cumplir con el objetivo 17 de la Tesis -"*Conocer cuáles son las principales motivaciones (intrínsecas y extrínsecas) de los estudiantes universitarios para participar activamente en la lucha contra el cambio climático"*-, en el Artículo 3 se proponen las siguientes cuestiones a investigar:

> *CII: ¿Las acciones que la universidad toma, o debería tomar, para luchar contra el cambio climático son útiles para diferenciar segmentos de estudiantes en función de sus motivaciones intrínsecas para participar en estas iniciativas?*
>
> *CIII: ¿Las acciones que la universidad toma, o debería tomar, para luchar contra el cambio climático son útiles para diferenciar segmentos de estudiantes en función de sus motivaciones extrínsecas para participar en estas iniciativas?*

2.1.8. Principales barreras a la motivación de los empleados de universidades

La participación activa de los empleados es uno de los pilares fundamentales que influyen en la integración exitosa de normas y políticas para proteger el medio ambiente (Farrukh *et al.*, 2023). Cuando los empleados perciben que sus organizaciones se están comportando responsablemente hacia sus partes interesadas y la sociedad en su conjunto, tienden a trabajar más duro haciendo un esfuerzo adicional para cumplir con objetivos de sostenibilidad (Shah *et al.*, 2023). Este comportamiento implica una motivación de por medio, la cual, puede cambiar con el tiempo, a medida que las condiciones cambian o las barreras que obstaculizan la motivación empiezan a aparecer (Al-Zaidi *et al*., 2023).

La motivación de los empleados puede ser intrínseca o extrínseca; mientras que la primera está relacionada con factores internos como el crecimiento personal, incluida la sensación de logro, reconocimiento y trabajo en sí, la segunda es generada por factores externos, como ganancias monetarias y no monetarias, incluido dinero, comida, reconocimiento social, condiciones laborales, y estatus (Kim y Lee, 2022). La motivación es un elemento esencial para garantizar que los empleados cumplan con iniciativas sostenibles (Ojo, 2022).

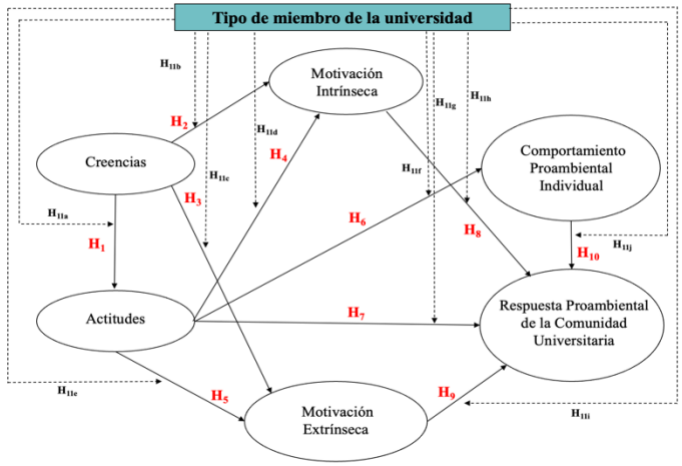
Si bien es vital que en la literatura se detecten los factores impulsores de comportamientos proambientales, también es importante hacer énfasis en las barreras o problemas que desincentivan estas conductas. Las barreras proambientales son frenos u obstáculos de un sistema conductual que evitan que ocurra un comportamiento nuevo o diferente (Yuriev *et al.,* 2018). A pesar de la comprensión por parte del sector público y privado sobre la necesidad de cambiar los comportamientos individuales y domésticos para mitigar el cambio climático, las acciones de cambio de conducta son silenciosas y poco alentadoras debido a que las herramientas utilizadas siguen centradas en fomentar o facilitar el comportamiento a través de impulsores, en lugar de centrarse en las barreras que hay que superar (Graves y Roelich, 2021).

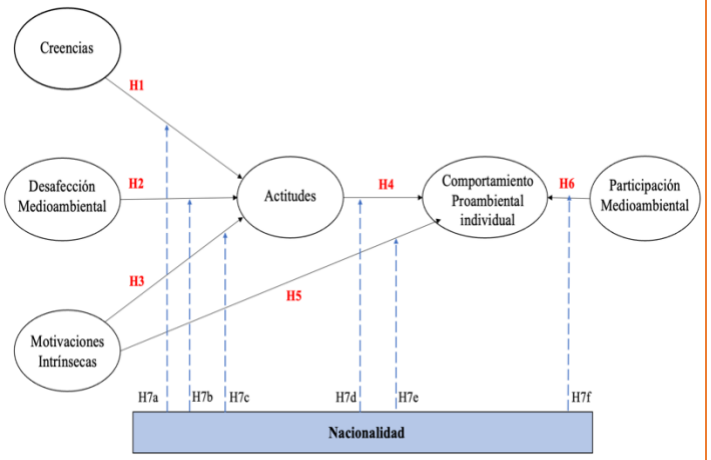
Al explorar las barreras de los empleados para participar en conductas proambientales, nos encontramos con innumerables obstáculos que pueden interferir en la conducta; no obstante, debido al contexto del estudio, nos hemos centrado en las principales barreras que frenan la motivación en un contexto educativo, entre las que destacan, la percepción de que otros no están contribuyendo de forma eficaz, la percepción de que otros se harán cargo de resolver el problema, la incapacidad de ver resultados tangibles, la creencia de que la inacción no producirá ningún daño, o la creencia de que las acciones individuales son en vano (Quimby y Angelique, 2011). Por su parte, otras de las barreras más visibles para los empleados en un entorno organizacional son: la falta de fondos, los problemas administrativos, la falta de infraestructuras para orientar comportamientos ambientalmente responsables, la inexistencia de equipos y ausencia de expertos que asesoren y orienten el desarrollo de prácticas sostenibles (Leal-Filho *et al.,* 2018). En este sentido, todavía no hay consenso sobre las principales barreras que frenan la motivación de los empleados, por lo que se considera necesario avanzar en la creación de conocimiento en este ámbito. En base a todo lo expuesto con anterioridad y para cumplir con el objetivo específico 18 de la Tesis -"*Conocer cuáles son las principales barreras que frenan la motivación (intrínseca y extrínseca) de los empleados de universidades para participar activamente en la lucha contra el cambio climático*"- en el Artículo 4 se proponen las siguientes cuestiones a investigar:

> *CIIII: ¿Cuáles son las principales barreras que influyen en la motivación intrínseca de los empleados de universidad para participar activamente en la lucha contra el cambio climático?*
>
> *CIIV: ¿Cuáles son las principales barreras que influyen en la motivación extrínseca de los empleados de universidad para participar activamente en la lucha contra el cambio climático?*

Con todo, en la Tabla 5 se pretende proporcionar una visión sintética de las hipótesis y cuestiones de investigación que han guiado cada uno de los cuatro trabajos que forman parte de esta Tesis Doctoral, estableciendo el hilo conductor entre el contenido de este Resumen Extenso y los capítulos que, como publicaciones de los resultados de este trabajo, se muestran en los Anexos.

Tabla 5. Hipótesis y cuestiones de investigación sobre las que se sustenta esta Tesis Doctoral.

ARTÍCULO	H/CI	ENUNCIADO	MODELO TEÓRICO/RESULTADOS
A1. Un análisis de los factores que influyen en las intenciones de comportamiento proambientales sobre el cambio climático en la comunidad universitaria	HI (HI)	Las creencias sobre el cambio climático influyen en las actitudes hacia el mismo.	
	HII (H2)	Las creencias sobre el cambio climático influyen en las motivaciones intrínsecas hacia las acciones propuestas por la universidad para abordar este problema.	
	HIII (H3)	Las creencias sobre el cambio climático influyen en las motivaciones extrínsecas hacia las acciones propuestas por la universidad para abordar este problema.	
	HIV (H4)	Las actitudes hacia el cambio climático influyen en las motivaciones intrínsecas hacia las acciones propuestas por la universidad para abordar este problema.	
	HV (H5)	Las actitudes hacia el cambio climático influyen en las motivaciones extrínsecas hacia las acciones propuestas por la universidad para abordar este problema.	
	HVI (H6)	Las actitudes hacia el cambio climático influyen en el comportamiento proambiental individual.	
	HVII (H7)	Las actitudes hacia el cambio climático influyen en la respuesta proambiental de la comunidad universitaria.	
	HVIII (H8)	Las motivaciones intrínsecas influyen en la respuesta proambiental de la comunidad universitaria.	
	HIX (H9)	Las motivaciones extrínsecas influyen en la respuesta proambiental de la comunidad universitaria.	
	HX (H10)	El comportamiento proambiental individual influye en la respuesta proambiental de la comunidad universitaria.	
	HXI (H11)	La vinculación con la universidad juega un papel moderador en las relaciones entre los diferentes constructos, siendo más fuerte para los empleados de la institución educativa que para los estudiantes universitarios.	
	HI (H1)	Las creencias sobre el cambio climático influyen en las actitudes hacia el mismo.	

	HXII (H2)	La desafección ambiental del individuo genera actitudes negativas hacia el cambio climático.	
A2. Comportamientos proambientales de la Generación Z: Un enfoque transcultural	HXIII (H3)	Las motivaciones intrínsecas del individuo influyen positivamente en las actitudes hacia el cambio climático.	
	HVI (H4)	Las actitudes hacia el cambio climático conducen a comportamientos individuales proambientales.	
	HXIV (H5)	Las motivaciones intrínsecas influyen en el comportamiento proambiental individual.	
	HXV (H6)	La participación previa en iniciativas ambientales influye en el comportamiento proambiental individual de la Generación Z	
	HXVI (H7)	Existen diferencias entre individuos de distintas nacionalidades en la intensidad de las relaciones propuestas en el modelo.	
A3. Cómo aumentar la motivación de los estudiantes para participar en iniciativas universitarias hacia la sostenibilidad ambiental	CII (CI1)	¿Las acciones que la universidad toma, o debería tomar, para luchar contra el cambio climático son útiles para diferenciar segmentos de estudiantes en función de sus motivaciones intrínsecas para participar en estas iniciativas?	Estudio exploratorio
	CIII (CI2)	¿Las acciones que la universidad toma, o debería tomar, para luchar contra el cambio climático son útiles para diferenciar segmentos de estudiantes en función de sus motivaciones extrínsecas para participar en estas iniciativas?	Estudio exploratorio
A4. Principales motivaciones y barreras al comportamiento proambiental: Un estudio desde la perspectiva del empleado	CIIII (CI1)	¿Cuáles son las principales barreras que influyen en la motivación intrínseca de empleados de universidades para participar activamente en la lucha contra el cambio climático?	Estudio exploratorio
	CIIV (CI2)	¿Cuáles son las principales barreras que influyen en la motivación extrínseca de empleados de universidades para participar activamente en la lucha contra el cambio climático?	Estudio exploratorio

Nota: H/CI – hipótesis / cuestión de investigación; HI (H1) / CII (CI1) – numeración según la Tesis (numeración según el artículo publicado).
Fuente: Elaboración propia.

2.2. Metodología

2.2.1. Recogida de datos

Para abordar el objetivo general y los objetivos específicos de esta Tesis Doctoral, se llevó a cabo un trabajo de campo para recoger datos de miembros de la comunidad universitaria (empleados y estudiantes) de nueve universidades latinoamericanas (cinco universidades colombianas, dos universidades mexicanas y dos universidades brasileñas) que participan en un proyecto internacional enfocado en realizar acciones de adaptación y mitigación del cambio climático. En concreto, las universidades participantes son: Corporación Universitaria Minuto de Dios (UNIMINUTO), Bogotá (Colombia); Instituto Tecnológico de Monterrey (TEC), Monterrey (México); Pontifícia Universidade Católica do Rio Grande do Sul (PUCRS), Porto Alegre (Brasil); Universidad de Caldas (UCALDAS), Manizales (Colombia); Universidad de Guadalajara (UDG), Guadalajara (México); Universidad de Manizales (UMANIZALES), Manizales (Colombia); Universidad del Quindío (UNIQUINDIO), Armenia (Colombia); Universidad Tecnológica de Pereira (UTP), Pereira (Colombia); y Universidade Católica de Pernambuco (UNICAP), Recife (Brasil). De este trabajo de campo se seleccionaron diferentes variables para los respectivos estudios que componen la presente Tesis Doctoral. La fecha en que se acometió el trabajo de campo fue entre enero y marzo del 2021.

La razón de seleccionar esta población como objeto de estudio es porque, si bien, la crisis ambiental y el cambio climático, en particular, son fenómenos globales, los estudios sobre comportamiento proambiental a nivel individual se han centrado únicamente en los llamados "países desarrollados" (Gómez-Casillas y Gómez-Márquez, 2023), principalmente países europeos, asiáticos o norteamericanos (Chryst *et al.*, 2018; Tuitjer y Dirksmeier, 2021; Rao *et al.*, 2022). Aquí, los países en vías de desarrollo, los que están expuestos a las mayores consecuencias climatológicas, son los que menos atención han recibido en la investigación y es necesario que se tomen acciones al respecto. Leiserowitz *et al.* (2022), mediante el informe *Opinión Pública Internacional sobre el Cambio Climático*, realizado a partir de un estudio en 192 países, muestra que, en comparación con otras regiones del mundo, la preocupación por el cambio climático es alta entre los latinoamericanos. En este sentido, abordamos las actitudes y comportamientos de los miembros de la comunidad universitaria de países de Latinoamérica ya que se espera que esta región sea una de las más perjudicadas por los efectos del cambio climático (Jafino, 2020) y por el rol protagónico que deben tomar las universidades en el desarrollo sostenible.

Es importante señalar que los países que enfrentan problemas sociales apremiantes, como las desigualdades económicas, la reducción de la pobreza, y la inseguridad, entre otros desafíos, no pueden priorizar fácilmente el cambio climático (León, 2023). La desatención de asuntos ambientales también se observa en países desarrollados, pero en menor medida, siendo los aspectos políticos, sociales y económicos los más

prioritarios. Por ello, resulta urgente que desde la investigación se encuentren mecanismos que ayuden a ahorrar tiempo y recursos, y contrarrestar esta problemática que aqueja a la población mundial. En América Latina, en particular, los impactos del cambio climático ya son una realidad y se manifiestan en varios territorios, afectando los medios de vida, la seguridad alimentaria y la salud humana (Azócar *et al.*, 2021). Un estudio realizado por Brechin y Bhandari (2011) señala que la percepción sobre el cambio climático tiende a variar profundamente entre países, lo que correlaciona con el grado de desarrollo. Estudios como este destacan la necesidad de profundizar en el conocimiento sobre la influencia que ejercen las diferencias culturales y de extender la investigación a regiones que se encuentran fuera del mundo desarrollado (León, 2023).

2.2.2. Escalas de medición

Para recopilar los datos para los cuatro artículos que componen la presente Tesis Doctoral, se desarrolló un cuestionario *ad hoc* estructurado que se autoadministró en línea. Las escalas de medición utilizadas en los cuatro artículos fueron adaptadas de la literatura previa (véase Tabla 6). El cuestionario se suministró en español y portugués, dependiendo del país donde se ubica la universidad. Así, únicamente se proporcionó el cuestionario en idioma portugués a los encuestados de universidades brasileñas, debido a que es la única parte de la población encuestada que no es hispanoparlante. Los ítems han sido adaptados y traducidos del inglés al español y al portugués, y luego sometidos a traducción inversa para garantizar la equivalencia de los resultados. Previamente, se verificó la validez de contenido de las escalas y la adecuación del enunciado de los ítems mediante la validación de expertos. Se utilizaron escalas tipo Likert de siete puntos, siendo 1 "totalmente en desacuerdo" y 7 "totalmente de acuerdo".

Tabla 6. Variables e indicadores analizados y procedencia de las escalas de medida utilizadas en los cuatro artículos.

CONSTRUCTO	ESCALA	ARTÍCULOS
Creencias	Adaptado de Maibach *et al.* (2011)	1 y 2
Actitudes	Adaptado de Maibach *et al.* (2011)	1 y 2
Comportamiento proambiental individual	Adaptado de Maibach *et al.* (2011)	1 y 2
Respuesta proambiental de la comunidad universitaria	Adaptado de Maibach *et al.* (2011)	1
Desafección ambiental	Adaptado de Maibach *et al.* (2011)	2
Participación ambiental	Propuesta *ad hoc*	2
Motivaciones intrínsecas	Adaptado de Guay *et al*. (2000)	1, 2, 3 y 4
Motivaciones extrínsecas	Adaptado de Guay *et al*. (2000)	1, 3, 4
Barreras al comportamiento proambiental	Adaptado de Leal-Filho *et al.* (2018)	4

Fuente: Elaboración propia

Los ítems relativos a creencias, actitudes, comportamiento proambiental individual, respuesta proambiental de la comunidad universitaria y desafección ambiental han sido extraídos de la escala de medición de Maibach *et al.* (2011), y se adaptaron para el cambio climático y la sostenibilidad medioambiental, dado que la escala original se utilizó para evaluar el calentamiento global. Únicamente se retuvieron algunas dimensiones de la propuesta de Maibach *et al.* (2011) debido a la relevancia de los ítems para explicar los factores que incentivan comportamientos proambientales relacionados con el cambio climático. Por su parte, los ítems considerados para medir participación en acciones medioambientales se realizaron como una propuesta *ad hoc* con el fin de recopilar datos sobre interacciones previas de los encuestados con acciones ambientales y explorar si esto influye o no en las demás variables del estudio. En relación con las motivaciones intrínsecas y extrínsecas, los ítems incluidos en el cuestionario han sido extraídos y adaptados a partir de las escalas propuestas por Guay *et al*. (2000), en la que se desarrollan y validan medidas para los constructos de motivación intrínseca y motivación extrínseca, por nuestro interés por conocer cómo estos factores condicionan los comportamientos de los empleados y estudiantes de la comunidad universitaria. Por último, las barreras al comportamiento proambiental se evaluaron a través de los ítems propuestos por Leal-Filho *et al.* (2018), que provienen de un estudio centrado en la investigación acerca del cambio climático.

En la fase de recolección de información, se utilizó la técnica de muestreo no probabilístico de bola de nieve, que es uno de los métodos más comunes en la investigación de Ciencias Sociales y del comportamiento (Winton y Sabol, 2022). El método de muestreo de bola de nieve es una técnica que se basa en encontrar individuos estratégicos que cumplen los criterios de investigación, y estos, a su vez, se encargan de contactar con otros miembros con características similares (Penn *et al.*, 2023). Siguiendo esta metodología, se compartió el cuestionario con profesores de las universidades involucradas en el proyecto de adaptación y mitigación del cambio climático anteriormente descrito, y ellos fueron responsables de suministrar el cuestionario a los alumnos y otros empleados a través de su red institucional de contactos. Con el propósito de aumentar la fiabilidad de los resultados, se explicó el contexto y el objetivo de investigación, se proporcionaron instrucciones precisas para completar el cuestionario, junto con una declaración que garantiza que todas las respuestas serán procesadas de forma confidencial, analizadas globalmente y no serán difundidas individualmente.

2.2.3. Muestra del estudio

Para el estudio publicado en el Artículo 1, la muestra seleccionada proviene de empleados (546) y estudiantes (1445) de las universidades colaboradoras, considerándose como muestra final 1991 cuestionarios válidos. El perfil sociodemográfico de los participantes del Artículo1 se presenta en la Tabla 7.

Tabla 7. Perfil demográfico del Artículo 1

VARIABLES	UNIMINUTO	TEC	PUCRS	UCALDAS	UDG	UMANIZALES	UQUINDIO	UTP	UNICAP	TOTAL	%
TOTAL	447	143	60	205	288	87	66	283	412	1991	100%
Género											
Masculino	97	61	31	97	140	33	39	127	162	787	39.53%
Femenino	349	79	28	108	140	53	26	155	248	1186	59.57%
N / A	1	3	0	0	8	1	1	1	2	17	0.85%
Edad											
18–21	95	47	16	50	90	11	27	116	148	600	30.14%
22-25	96	48	15	55	49	10	15	70	102	460	23.10%
26–35	168	12	13	39	61	30	6	37	38	404	20.29%
36–45	64	18	9	20	40	21	6	22	34	234	11.75%
46–60	21	14	5	35	39	14	9	28	65	230	11.55%
>60	3	4	2	6	9	1	3	10	25	63	3.16%
Afiliación											
Alumno	398	100	49	132	160	57	48	211	290	1445	72.58%
Docente	27	40	10	71	125	16	12	62	98	461	23.15%
Personal de administración y servicios	16	1	0	0	1	1	3	5	1	28	1.41%
Otros	6	2	1	2	2	13	3	5	23	57	2.86%

Fuente: Elaboración propia

De otro lado, se llevó a cabo un segundo estudio con el fin de analizar diferencias transculturales de miembros de la comunidad universitaria en función de la cohorte generacional. Para el Artículo 2 la población definida fueron miembros de la Generación Z de 18 a 25 años. La generación Z es ampliamente considerada la generación más concienciada con el medio ambiente (Ribeiro *et al.*, 2023), por lo que puede ayudar a otros miembros de la sociedad a involucrarse en la lucha contra el cambio climático. La comprensión de las prácticas y comportamientos generacionales está siendo objeto de observación en una gran variedad de campos académicos debido a la trascendencia que este grupo ejerce en las familias y sociedades (Seyfi *et al.*, 2023). Por ello, es importante profundizar en el análisis del comportamiento de la Generación Z. Las nacionalidades que se tomaron como referencia para el análisis transcultural fueron Colombia, México y Brasil. La información recolectada permitió considerar una muestra final de 1050 cuestionarios válidos. El perfil sociodemográfico de los participantes del Artículo 2 se presenta en la Tabla 8.

Tabla 8. Perfil demográfico del Artículo 2

VARIABLES	FRECUENCIA	%
Género		
Masculino	362	34%
Femenino	678	65%
Prefiere no identificarse	10	1%
Edad		
18-21 años	595	57%
22-25 años	455	43%
Nacionalidad		
Colombiana	544	52%
Mexicana	229	22%
Brasileña	277	26%

Fuente: Elaboración propia

Seguidamente, se llevó a cabo el Artículo 3, en el cual, se consideró a los estudiantes como población objeto de investigación. Los estudiantes tienen la obligación de involucrarse activamente en asuntos de mitigación contra el cambio climático, tanto por su deber ciudadano como por la trascendencia e impacto que generan en la sociedad (Filho *et al.*, 2023). Es una realidad que los estudiantes se centran más en los aspectos económicos y sociales que en los ambientales (Tang, 2023); por ello, es fundamental identificar las acciones que mayor motivación generan a este grupo para acometer acciones proambientales, y, de esta manera, contribuir a la lucha y mitigación del cambio climático. Los estudiantes que participaron en la investigación provienen de diferentes áreas de estudio, entre ellas, artes y humanidades, ciencias sociales aplicadas, ciencias, ingeniería y arquitectura, y, por último, ciencias de la salud. El perfil sociodemográfico de los participantes del Artículo 3 se presenta en la Tabla 9.

Tabla 9. Perfil demográfico del Artículo 3

VARIABLES	FRECUENCIA	%	ÍTEMS	FRECUENCIA	%	ÍTEMS	FRECUENCIA	%
Género			**Universidades**			**Área de estudio**		
Hombre	498	34.4%	UNIMINUTO	398	27.5%	Artes y Humanidades	196	13.6%
Mujer	937	68.4%	TEC	100	6.9%	Ciencias Sociales Aplicadas	356	24.6%
Edad			PUCRS	49	3.4%	Ciencias	264	18.3%
18-21	599	41.4%	UCALDAS	132	9.1%	Ingeniería y Arquitectura	409	28.3%
22-25	445	30.8%	UDG	160	11.1%	Ciencias de la Salud	221	15.3%
26-35	285	19.7%	UMANIZALES	57	3.9%			
36-45	84	5.8%	UNIQUINDIO	48	3.3%			
46-60	29	2.0%	UTP	211	14.6%			
>60	4	0.3%	UNICAP	291	20.1%			

Fuente: Elaboración propia.

Por último, se llevó a cabo el Artículo 4, en el cual, el foco de trabajo fueron los empleados de las universidades. Tu *et al.* (2023) afirman que los empleados desempeñan un papel esencial en el desarrollo sostenible, ya que pueden transmitir su pasión proambiental a través de interacciones sociales, lo que ayuda a los demás miembros de la sociedad a reflexionar y participar activamente en iniciativas sostenibles. Los empleados pueden influir en el desempeño medioambiental de una organización mediante sus acciones (Farooq *et al.*, 2022); no obstante, en la actualidad no se observan comportamientos favorables con el medio ambiente por parte de este colectivo. Además, la literatura existente sobre el comportamiento proambiental de los empleados no proporciona consenso acerca del uso de indicadores integrales para iniciar el comportamiento ecológico de los empleados en el lugar de trabajo (Farooq *et al.*, 2023); por tal motivo, es relevante ahondar en el análisis particular y especifico de las principales motivaciones de este grupo. El perfil sociodemográfico de los participantes del Artículo 4 se presenta en la Tabla 10.

Tabla 10. Perfil demográfico del Artículo 4

VARIABLES	FRECUENCIA	%	ÍTEM	FRECUENCIA	%
Género			**Universidad**		
Masculino	291	53.3%	UNIMINUTO	49	9.0%
Femenino	249	45.6%	TEC	43	7.9%
Prefiero no responder	6	1.1%	PUCRS	11	2.0%
Edad			UCALDAS	73	13.4%
18-21	1	0.2%	UDG	128	23.4%
22-25	15	2.7%	UMANIZALES	30	5.5%
26-35	119	21.8%	UNIQUINDIO	18	3.3%
36-45	150	27.5%	UTP	72	13.2%
46-60	202	37.0%	UNICAP	122	22.3%
>60	59	10.8%			

Fuente: Elaboración propia.

2.2.4. Técnicas de análisis de datos

Una vez aplicado el instrumento de recolección de información, se procedió a definir las técnicas de análisis de datos para los cuatro artículos que componen la presente Tesis Doctoral. Para los Artículos 1 y 2 se diseñaron distintos modelos de ecuaciones estructurales, y, por su parte, para los Artículos 3 y 4 se aplicó una técnica de segmentación basada en el algoritmo CHAID.

Para el tratamiento estadístico de los Artículos 1 y 2, se realizó un Análisis Factorial Exploratorio mediante un análisis de componentes principales con el fin de comprobar cómo se agrupan los ítems en factores. Luego, se procedió a realizar un Análisis Factorial Confirmatorio (en adelante AFC) con el fin de validar el instrumento de medición. De esta forma, se constató que los constructos reflectivos propuestos en el

Artículo 1 y 2 cumplían con las propiedades psicométricas de fiabilidad y validez convergente y discriminante, siendo aceptables desde la literatura valores superiores a 0.7 para los indicadores del Alfa de Cronbach y los coeficientes de fiabilidad compuestos (Nunnally, 1994); valores superiores a 0.5 para el análisis de varianza extraída (AVE) (Fornell y Larcker, 1981); y valores inferiores a 0,85 para los coeficientes de validez discriminante (Fornell y Larcker, 1981). En el caso del Artículo 1 se aplicó adicionalmente un análisis de colinealidad y relación peso-carga, ya que uno de los constructos que conforman el modelo es formativo, mostrando los factores de inflación de la varianza valores aceptables para este indicador, al ser inferiores a 3.3 (Petter *et al.,* 2007).

Tras la validación del instrumento de medición, se estimaron los modelos estructurales siguiendo los pasos propuestos por Anderson y Gerbing (1988), comprobando cómo influyen unos constructos sobre otros. En concreto, para contrastar las hipótesis, en primer lugar, se verificó el poder explicativo y predictivo de los modelos, y, en segundo lugar, la aceptación de las relaciones estructurales a través del algoritmo *bootstrapping* basado en 5000 ejecuciones (Hair *et al.,* 2017). Estos análisis se realizaron mediante la técnica de mínimos cuadrados parciales (PLS-SEM), utilizando la aplicación Smart PLS 3.0 y el software IBM SPSS versión 25. Como resultado, se confirmó la riqueza del concepto, al permitir una aproximación al conocimiento de los factores que influyen en el comportamiento proambiental de los distintos miembros de la comunidad universitaria. Se utilizaron estas técnicas estadísticas debido a su amplia aceptación en el campo del marketing (Henseler *et al.,* 2015) y, por la precisión que ofrecen en el análisis avanzado de datos (análisis multigrupo) (Hair *et al.,* 2017).

En vista de que los Artículos 1 y 2 incluyen variables de moderación, de forma complementaria se aplicó un análisis multigrupo, el cual permite identificar si existen diferencias significativas en la intensidad de las relaciones entre constructos en función de la pertenencia a grupos con distintas características (Henseler *et al.* 2015). Los métodos implementados para la interpretación de los resultados fueron la prueba de Welch-Satterthwaite (Welch, 1947) y el método MGA de Henseler. Los resultados del valor p inferiores a 0,05 o superiores a 0,95 señalan diferencias significativas entre grupos (Henseler *et al.,* 2015). Después de la aplicación de estas técnicas estadísticas, se ha podido contrastar cómo se relacionan los distintos constructos planteados en los modelos de los Artículos 1 y 2, y, adicionalmente, se han podido distinguir si existen diferencias entre grupos en función del tipo de afiliación con las universidades o según la nacionalidad, respectivamente.

Por su parte, para los Artículos 3 y 4, se realizó un análisis de segmentación basado en el algoritmo Detección Automática de Interacciones (CHAID) con Chi- cuadrado. Esta técnica fue propuesta por Kass (1980) y se utiliza como un instrumento de segmentación para identificar qué ítems (predictores) contribuyen en mayor medida a explicar una variable (Kumar y Kaur, 2023). Estos segmentos se dividen

considerando características homogéneas y selectivas, lo que permite una representación visual de las relaciones encontradas entre los datos en forma de árboles de decisión. La metodología CHAID se utiliza para detectar los factores más significativos en la formación de segmentos y facilita una mejor comprensión de la jerarquía de las variables analizadas (Magidson, 1993). Este método se divide en tres partes: fusionar, dividir y retener. La primera etapa reduce al máximo el número de variables predictoras; la segunda etapa se utiliza como separador de nodos; y la tercera etapa consiste en detener la etapa de fusión y división y retener los subgrupos más significativos (Gunduz y Al-Ajji, 2022). La metodología CHAID ha sido ampliamente utilizada en la literatura en diferentes campos de estudio (Kumar y Kaur, 2023) y más concretamente, en estudios que analizan los comportamientos proambientales y el cambio climático (Ferreira *et al*., 2022). Así pues, en la presente Tesis Doctoral se ha utilizado esta técnica estadística para los Artículos 3 y 4, y se ha logrado identificar cuáles son las acciones que más motivan a los estudiantes de las universidades, a comprometerse en iniciativas sostenibles y, además, se ha logrado reconocer las principales barreras que frenan la motivación de los empleados para participar activamente en la lucha contra el cambio climático.

3. DISCUSIÓN Y CONTRIBUCIONES TEÓRICAS

A continuación, los resultados alcanzados en los cuatros artículos que componen esta Tesis Doctoral se irán desgranando uno a uno junto con el avance del conocimiento en cada caso logrado. Para ello se utilizará como hilo conductor de la exposición el enunciado de cada uno de los objetivos específicos descritos en la parte introductoria de esta Tesis:

1. *Conocer la influencia de las creencias sobre el cambio climático en las actitudes hacia el mismo, tanto para miembros de la comunidad universitaria en general como para la Generación Z.*

A partir de los resultados obtenidos en los Artículos 1 y 2, se confirma que las creencias sobre el cambio climático influyen en las actitudes, tanto en miembros de la comunidad universitaria en general, como para la Generación Z. Este hallazgo es coherente con la Teoría Comportamiento Planificado (TPB) propuesta por Ajzen (1991), y con las conclusiones reportadas en los estudios de Yuriev *et al.* (2020), Dąbrowski *et al.* (2022) Shanmugavel y Balakrishnan (2023), y Zeng *et al*. (2023). Además, nuestros hallazgos permiten progresar en la relevancia del constructo creencias, al identificar la variable como el factor que origina que los individuos adopten una actitud ya sea positiva o negativa para realizar comportamientos que ayuden a la mitigación del cambio climático.

2. *Examinar la influencia de las creencias sobre el cambio climático en la motivación intrínseca de los miembros de la comunidad universitaria hacia las acciones propuestas por la universidad para abordar este problema.*

Las creencias sobre el cambio climático tienen influencia en la motivación intrínseca de los miembros de la comunidad universitaria. Encontrar apoyo a esta relación supone una notable aportación en el entendimiento del comportamiento proambiental. La TPB, hasta ahora, ha sido considerada la mejor predictora del comportamiento humano a nivel individual (Armitage y Conner, 2001). No obstante, ha sido cuestionada cuando trata asuntos de sostenibilidad, por carecer de factores explicativos (Gansser y Reich, 2023). Los hallazgos del Artículo 1 permiten ampliar esta teoría y destacar su validez en comportamientos proambientales cuando se consideran a las motivaciones intrínsecas como impulsoras de la conducta. La relación entre creencias y motivaciones intrínsecas ha sido respaldada por estudios previos, como el de Lange y Dewitte (2019), o el de Ali *et al*. (2020).

3. *Evaluar la influencia de las creencias sobre el cambio climático en la motivación extrínseca de los miembros de la comunidad universitaria hacia las acciones propuestas por la universidad para abordar este problema.*

Las evidencias alcanzadas en el Artículo 1 no apoyan la relación entre las creencias sobre el cambio climático y la motivación extrínseca. Este resultado se puede entender a partir de la literatura previa, en la línea, por ejemplo, de Ali *et al.* (2020), quienes sostienen que la motivación extrínseca no surge naturalmente del interior de los individuos, sino que se activa en función del tipo de incentivo, es decir, puede ser que un individuo que tenga conciencia de las consecuencias de realizar actos irresponsables con el medio ambiente decida no participar activamente en mitigar este problema porque no hay un incentivo que le incite a participar (Ahmed *et al.*, 2021). De forma similar, Pham *et al.* (2022) afirman que las fuentes extrínsecas de incentivos para motivar conductas proambientales comparten una característica común, que, cuando desaparecen, también lo hará su impacto en las conductas. En consecuencia, no se encuentra apoyo a esta hipótesis, como en estudios previos (Dang *et al.*, 2022) y se corrobora que para que la motivación extrínseca se active, no basta únicamente con que el individuo tenga conocimientos previos sobre sostenibilidad o conciencia de las consecuencias de no comportarse de forma proambiental, sino que la conducta depende del tipo de recompensa o incentivo, ya sea monetario o no.

4. *Explorar si la actitud hacia el cambio climático influye en la motivación intrínseca de los miembros de la comunidad universitaria hacia las acciones propuestas por la universidad para abordar este problema.*

Los resultados del Artículo 1 permiten afirmar que la actitud hacia el cambio climático influye significativamente en la actitud; de este modo, nuestros resultados se alinean con la contribución de Tandon *et al.* (2020), y se sostiene que, cuando un individuo adopta una actitud hacia la sostenibilidad en función de sus creencias, posteriormente se origina una motivación interna de placer o disfrute por contribuir a la adaptación y mitigación del cambio climático. De forma consistente con Chao *et al*. (2023), podemos

afirmar que la motivación intrínseca incentiva conductas proambientales y suele ser más duradera y tener una relación más fuerte que las motivaciones extrínsecas. Por tanto, las motivaciones intrínsecas en un contexto universitario pueden moldearse y modificarse mediante acciones educativas que promuevan la adopción de actitudes. La estrategia básica debería centrarse en aumentar la sensibilidad hacia los problemas ambientales de la actualidad, satisfaciendo al mismo tiempo las necesidades básicas de los individuos (Barszcz *et al.*, 2023)

5. *Evaluar la influencia de la actitud hacia el cambio climático en la motivación extrínseca de los miembros de la comunidad universitaria hacia las acciones propuestas por la universidad para abordar este problema.*

Los resultados obtenidos en el Artículo 1 no respaldan la relación entre la actitud hacia el cambio climático y las motivaciones extrínsecas, a diferencia de estudios previos como el de Chedid *et al.* (2022). Cuando las personas adoptan una actitud positiva hacia la sostenibilidad, sienten un alto grado de motivación intrínseca porque se identifican plenamente con el valor de su actividad. No obstante, en el caso de la motivación extrínseca, no es suficiente con una actitud favorable para participar activamente en la lucha contra el cambio climático, sino que es necesario un impulso adicional, que es el incentivo o la recompensa (Thiermann y Sheate, 2020). Este factor es incierto y bastante volátil, ya que el tipo de estímulo siempre tiende a variar y puede ser posterior a que el individuo adopte una actitud hacia el medio ambiente, o puede que el sujeto considere que el incentivo o la recompensa no es lo suficientemente atractiva como para incitar su conducta o participación en iniciativas sostenibles.

6. *Examinar la influencia de las actitudes hacia el cambio climático sobre el comportamiento proambiental individual de los miembros de la comunidad universitaria y de la Generación Z*

En concordancia con nuestro marco teórico, los resultados de los Artículos 1 y 2 muestran la influencia significativa de las actitudes hacia el cambio climático sobre el comportamiento proambiental individual, tanto para miembros de la comunidad universitaria en general, como para los individuos que pertenecen a la Generación Z. El hallazgo permite apoyar, entre otras, las investigaciones de Duong y Pensini (2023), Zeng *et al.* (2023), Huang *et al.* (2023), y de He *et al.* (2023), pudiéndose concluir que, para que un individuo realice un comportamiento proambiental, antes debe adoptar una actitud positiva o negativa basada en conocimientos previos sobre la sostenibilidad, o en concreto, sobre el cambio climático. Esta afirmación apoya la Teoría del Comportamiento Planificado (TPB) propuesta por Ajzen (1991), y permite concluir que esta teoría es adecuada para predecir la conducta humana en términos de comportamientos proambientales.

7. *Analizar la influencia de la actitud hacia el cambio climático de miembros de la comunidad universitaria sobre la respuesta proambiental de la comunidad universitaria.*

En línea con los resultados derivados de nuestro Artículo 1 podemos concluir que la actitud hacia el cambio climático influye en la respuesta proambiental de la comunidad universitaria. Esto implica que la adopción de una actitud a nivel individual promueve una respuesta proambiental a nivel grupal (Peng *et al.,* 2021). Cuando las personas son conscientes de las repercusiones de no actuar de forma respetuosa con el medio ambiente y se preocupan por la naturaleza, es probable que se vean a sí mismas como responsables del cuidado del medio ambiente (Wang *et al.,* 2021). Por tanto, esta actitud genera una respuesta conductual individual y posteriormente, una respuesta grupal de toda la comunidad universitaria. Estos resultados son novedosos para la literatura del comportamiento, ya que permiten identificar un factor adicional, no contemplado en la TPB, que ayuda a ampliar esta teoría y mejorar el entendimiento de la conducta humana en términos de sostenibilidad.

8. *Conocer la influencia de la motivación intrínseca de miembros de la comunidad universitaria en la respuesta proambiental de la comunidad universitaria.*

En la misma línea, los resultados obtenidos en el Artículo 1 permiten concluir que las motivaciones intrínsecas de los miembros de la comunidad universitaria influyen en la respuesta proambiental de los colectivos de esta institución – i.e. estudiantes y empleados. Asumiendo la noción de que las motivaciones intrínsecas se orientan a satisfacer necesidades psicológicas en términos de autonomía, competencia, afiliación y sentido de comunidad (Tabernero y Hernández, 2011), se considera que las motivaciones intrínsecas son buenas predictoras del comportamiento proambiental. No obstante, los individuos pueden estar motivados intrínsecamente a realizar comportamientos proambientales en sus hogares, pero no en el lugar de trabajo o de estudio, debido a la percepción de que su contribución no tiene gran efecto, al observar que otras personas se comportan de forma inconsciente con la naturaleza (Faraz *et al.,* 2021). Esta situación puede ocasionar que la conducta pueda variar en función del escenario en el que el individuo se encuentre. El presente hallazgo permite asegurar que la motivación intrínseca, que deriva del placer o disfrute del individuo, influye en la respuesta proambiental de la comunidad universitaria.

9. *Conocer la influencia de las motivaciones extrínsecas de los miembros de la comunidad universitaria en la respuesta proambiental de la comunidad universitaria.*

De otro lado, los resultados obtenidos en el Artículo 1 no respaldan la suposición de que las motivaciones extrínsecas influyen en la respuesta proambiental de la comunidad universitaria. Esto puede deberse a que la motivación extrínseca necesita un estímulo mayor que la motivación intrínseca para desarrollarse (Budzanowska-Drzewiecka y Tutko, 2021). La motivación extrínseca se describe en la literatura como un

factor condicionado por el tipo de estímulo ofrecido para promover la conducta, es decir, si un individuo no percibe el premio o incentivo como atractivo, puede no involucrarse en conductas proambientales a menos que el tipo de recompensa cambie (Chedid *et al*., 2022). Los hallazgos obtenidos en nuestro estudio llevan a corroborar que el factor de motivación extrínseca no influye en los factores que conforman la TPB, como sí lo hacen las motivaciones intrínsecas.

10. *Explorar si el comportamiento proambiental individual de los miembros de la comunidad universitaria influye en la respuesta proambiental de la comunidad universitaria.*

Los resultados obtenidos en el Artículo 1 permiten confirmar la relación entre el comportamiento proambiental individual y la respuesta proambiental individual, lo que significa que, si un individuo opta por realizar una conducta de cuidado medioambiental en la universidad, otros empleados y estudiantes también estarán incentivados a realizar las mismas conductas; esto generará una respuesta proambiental de la comunidad universitaria que probablemente ayudará a que otros miembros de la sociedad se involucren en los problemas ambientales, y en concreto, en el cambio climático. Este hallazgo está en concordancia con los obtenidos por Zoll *et al.* (2018), Wang *et al.* (2020), y Zhang *et al.* (2022), y permite concluir que, si bien, las universidades pueden desempeñar un papel esencial en la sostenibilidad, como agentes clave en la formación de profesionales que contribuirán a la difusión de los principios de los ODS (D'Adamo y Gastaldi, 2023), el comportamiento individual es el pilar fundamental que puede impulsar que toda la sociedad se involucre en la adaptación y mitigación del cambio climático.

11. *Conocer si la vinculación con la universidad juega un papel moderador en las relaciones entre los diferentes constructos, siendo más fuerte para los empleados de la institución educativa que para los estudiantes universitarios*

A partir de los resultados obtenidos en el Artículo 1, se ha confirmado que el estamento al que pertenece el individuo dentro de la comunidad universitaria juega un papel moderador en varias de las relaciones propuestas en el modelo, es decir, existen diferencias entre empleados y estudiantes a la hora de adoptar comportamientos proambientales. En concreto, los hallazgos del Artículo 1 permiten comprobar que el vínculo entre actitud y motivación intrínseca es más fuerte para los estudiantes en comparación con los empleados; por su parte, la influencia de la motivación intrínseca en la capacidad de respuesta proambiental de la comunidad universitaria es más fuerte para los que estudiantes que para los empleados. En cambio, las relaciones entre creencias y motivación intrínseca, y la actitud y el comportamiento proambiental individual son más fuertes para los empleados. Estos resultados podrían explicarse por diversas razones, entre ellas, como han afirmado Zeng *et al.* (2023), que los empleados de las universidades suelen estar vinculados por un mayor periodo de tiempo a la universidad que los estudiantes, lo que puede generar una diferencia en el sentido de pertenencia entre unos y otros. Además, otra de las razones que puede explicar

estas diferencias es la cohorte generacional, ya que, según Van Breda *et al.* (2023), los empleados, que normalmente pertenecen al grupo de los Millennials y otras generaciones precedentes, están más comprometidos a realizar conductas proambientales que los Centennials, que representan los jóvenes universitarios de la actualidad. Esta idea está respaldada por resultados obtenidos en estudios generacionales del comportamiento proambiental, como el de Ribeiro *et al.* (2023) y D' Arco *et al.* (2023).

12. *Examinar si la desafección ambiental de los individuos de la Generación Z tiene una influencia negativa en la actitud hacia el cambio climático.*

A partir de los resultados obtenidos en el Artículo 2, se confirma que la desafección ambiental influye negativamente en la actitud hacia el cambio climático. Este hallazgo concuerda con el planteamiento realizado por Brosch (2021) y permite concluir que los individuos de la Generación Z que han desarrollado una emoción o estado afectivo negativo adoptarán una actitud desfavorable con el medio ambiente y con las iniciativas proambientales. Estos resultados intentan extender el conocimiento de la conducta humana por grupos generacionales, ampliando la TPB desarrollada por Ajzen (1991) en un contexto de sostenibilidad. Si bien, se ha cuestionado la TPB cuando se centra en los comportamientos proambientales (Yuriev *et al.*, 2020), este hallazgo puede ser relevante en la creación de conocimiento y en la mejora de la capacidad explicativa de esta teoría.

13. *Evaluar si las motivaciones intrínsecas de los individuos de la Generación Z influyen positivamente en las actitudes hacia el cambio climático.*

Los resultados obtenidos en el Artículo 2 muestran que la desafección ambiental genera una influencia negativa en la actitud hacia el cambio climático mientras que las motivaciones intrínsecas generan una influencia positiva. Este resultado permite apoyar los obtenidos por Al-Jubari *et al.* (2021) y muestra el efecto opuesto a la relación planteada en el Artículo 1 de esta Tesis Doctoral. Esta diferenciación en la cadena actitud-motivación intrínseca y motivación intrínseca-actitud es un descubrimiento novedoso en el estudio de cohortes generacionales, ya que los factores conductuales que intervienen en los comportamientos proambientales de la comunidad universitaria en general son distintos a los de la Generación Z. Promover cambios de conducta a nivel personal requiere una comprensión más amplia de los seres humanos, lo que solo puede lograrse sumergiéndose en el dominio de la Psicología (Thiermann y Sheate, 2020), atendiendo a las diferencias individuales en factores como, en este caso, las cohortes generacionales.

14. *Evaluar si las motivaciones intrínsecas de los individuos de la Generación Z influyen en el comportamiento proambiental individual.*

A partir de los resultados obtenidos en el Artículo 2, se ha confirmado que las motivaciones intrínsecas influyen en el comportamiento proambiental individual. Este hallazgo se suma a las evidencias obtenidas por Budzanowska-Drzewiecka y Tutko (2021), quienes enfatizan que las motivaciones intrínsecas juegan un papel importante en la adopción de la actitud y, por tanto, en la determinación del comportamiento. Estos hallazgos permiten apoyar la literatura previa que sostiene que la motivación intrínseca es el principal impulsor del ser humano, ya que se basa en el amor, la pasión y el disfrute (Ahmed *et al.,* 2021), incluso promueve más comportamientos que la motivación extrínseca, siendo esta altamente aleatoria debido a la incertidumbre de los incentivos o recompensas secundarias que provocan esta motivación (Faraz *et al.,* 2021). Este descubrimiento aporta luz a la literatura del comportamiento proambiental y a la TPB, al evidenciar que la motivación intrínseca es un factor adecuado para predecir conductas favorables con el medio ambiente.

15. *Conocer si la participación previa en iniciativas ambientales influye en los comportamientos proambientales individuales de la Generación Z.*

En el Artículo 2 se obtiene evidencia del efecto que ejerce la participación previa en iniciativas ambientales en los comportamientos proambientales de individuos de la Generación Z. Los hallazgos reportan evidencias alineadas con planteamientos similares, como el de Wang *et al.* (2023), quienes consideran la conciencia ambiental generada por interacciones de sostenibilidad previas como un antecedente adecuado para predecir conductas respetuosas con el medio ambiente. Nuestros resultados son novedosos frente a la literatura existente, ya que, a pesar de los esfuerzos de investigación realizados en este ámbito, los estudios sobre participaciones previas, conciencia o preocupación ambiental, han mostrado resultados no concluyentes. Así, algunos trabajos han encontrado que los individuos más concienciados con el medio ambiente son proclives a adoptar comportamientos proambientales (Yang *et al.,* 2021), mientras que otros han concluido que la conciencia medioambiental no siempre se traduce en un comportamiento proambiental (Fu *et al.,* 2020). Por este motivo, los hallazgos obtenidos en nuestro Artículo 2 confirman que la participación previa en iniciativas de sostenibilidad influye en el desarrollo de conductas proambientales, ofreciendo un sustento empírico a la contribución teórica que amplía el entendimiento de la TPB en la cohorte generacional de la Generación Z.

16. *Examinar si la nacionalidad juega un papel moderador en las relaciones entre los diferentes constructos que influyen en el comportamiento proambiental de la Generación Z.*

Los resultados obtenidos del Artículo 2 confirman que todas las hipótesis planteadas encuentran apoyo, y que la TPB, integrando factores como las motivaciones intrínsecas, la desafección ambiental y las participaciones previas en iniciativas ambientales, predicen de forma adecuada el comportamiento proambiental de individuos de la Generación Z. Más allá de este importante hallazgo, se han contrastado

las posibles diferencias entre grupos de diferentes nacionalidades, considerando muestras de estudiantes colombianos, mexicanos y brasileños, complementando así estudios previos de la TPB que se han limitado a considerar un solo país (Esfandiar *et al.*, 2023) y únicamente en contextos de países desarrollados (Riaz *et al.*, 2023). Este análisis se alinea con estudios previos cross-culturales como los de Lamiño-Jaramillo *et al.* (2023), Ifegbesan *et al*. (2022), y Miller *et al.* (2022). Los resultados confirman que las actitudes y comportamientos individuales proambientales varían entre las nacionalidades colombiana y brasileña. Esta diferencia puede deberse a que, por ejemplo, en la línea de León (2019), los individuos que participan en un mismo idioma, historia, entorno político y económico comparten una cantidad considerable de programación común y, por tanto, al ser Colombia y Brasil países con lenguas y políticas diferentes, esto puede condicionar su actitud y explicar en cierta medida las discrepancias en su comportamiento. Las razones de estas diferencias deberán seguir explorándose; no obstante, este hallazgo presenta una base sólida en el estudio del comportamiento proambiental por cohortes generacionales en función de las distintas nacionalidades.

17. *Conocer las principales motivaciones (intrínsecas y extrínsecas) de los estudiantes universitarios para participar activamente en la lucha contra el cambio climático.*

A partir de los resultados obtenidos en el Artículo 3, se responde a las preguntas de investigación planteadas sobre si las acciones que la universidad toma, o debería tomar, para luchar contra el cambio climático son útiles para diferenciar segmentos de estudiantes en función de sus motivaciones intrínsecas y extrínsecas para participar en iniciativas sostenibles. Esta contribución se suma a las evidencias obtenidas por Shafiei y Maleksaeidi (2020) y Chao *et al.* (2023) en las que se investigan las motivaciones de los estudiantes universitarios en un contexto de sostenibilidad. Los resultados obtenidos en el Artículo 3 sugieren que tanto las motivaciones intrínsecas como extrínsecas, y la importancia percibida de las acciones contra el cambio climático propuestas por las universidades contribuyen a definir segmentos de estudiantes con diferentes comportamientos, lo que puede ayudar a los gestores universitarios a tomar las mejores decisiones en relación con el cuidado del medio ambiente.

Además, los hallazgos obtenidos en el Artículo 3 permiten concluir que la inclusión de nuevas materias sobre sostenibilidad en el currículo es la acción que más motiva a los estudiantes tanto intrínseca como extrínsecamente. De forma similar, los estudiantes que están menos motivados intrínsecamente perciben que la co-creación de soluciones entre estudiantes y universidad es un factor motivacional que puede impulsar el desarrollo de comportamientos proambientales entre los estudiantes. Por otro lado, como resultado del estudio de la existencia de diferencias entre segmentos para diferentes niveles de motivación intrínseca y extrínseca en función del estado afectivo o la actitud del estudiante hacia el cambio climático (i.e., alarmado, preocupado, ansioso, indiferente, escéptico o negador), se obtuvieron cuatro segmentos de

estudiantes para la motivación intrínseca y tres para la motivación extrínseca, destacando en ambos casos los más alarmados o preocupados por el cambio climático los más motivados tanto intrínseca como extrínsecamente.

Esta contribución puede ayudar a dirigir mejor los esfuerzos de las universidades y otros agentes sociales para que más miembros de la sociedad se involucren en la adaptación y mitigación del cambio climático y se cumpla con los ODS, que representan una de las mayores preocupaciones de la actualidad (Serafini *et al.*, 2022).

18. *Conocer las principales barreras que frenan la motivación (intrínseca y extrínseca) de los empleados de las universidades para participar activamente en la lucha contra el cambio climático.*

Por último, los resultados obtenidos en el Artículo 4, permitieron identificar que la principal barrera que frena la motivación intrínseca de los empleados de las universidades para adoptar comportamientos proambientales y luchar contra el cambio climático es la cultura universitaria. Una segunda barrera que obstaculiza esta participación es la falta de equipamiento. Las universidades constantemente realizan esfuerzos para cumplir con los ODS proponiendo distintas acciones que tienen como objetivo involucrar a toda la comunidad universitaria en acciones proambientales (Cuesta-Claros *et al.*, 2022). Sin embargo, los comportamientos de los miembros de la comunidad universitaria siguen siendo poco respetuosos con el medio ambiente, y no se observan cambios de conducta. Este hallazgo permite concluir que los empleados perciben esta inconsistencia, y que si bien, pueden sentir disfrute por realizar conductas a favor de la naturaleza, los comportamientos de otros miembros y la cultura que se ha desarrollado en el seno de las universidades frenan su motivación para participar en comportamientos proambientales (Desrochers y Zelenski, 2023). De forma similar, las infraestructuras, si bien, podrían ser altamente tecnológicas y aptas para la actividad académica de los estudiantes, en opinión de los empleados, son insuficientes para promover actitudes y comportamientos proambientales.

En esta misma línea, los resultados obtenidos en el Artículo 4 permitieron detectar que la principal barrera que frena la motivación extrínseca de los empleados de universidades para adoptar comportamientos proambientales y luchar contra el cambio climático es la falta de infraestructura, coincidiendo con los resultados obtenidos para la motivación intrínseca y con otros planteamientos como el de Leal-Filho *et al.* (2018), quienes afirman que las barreras para acometer acciones orientadas a mitigar el cambio climático en las universidades están relacionada tanto con la falta de conciencia como con el diseño de las instituciones. Estos hallazgos son relevantes y novedosos, ya que ofrecen a los gestores universitarios las pautas para que los empleados se involucren y estén motivados en la adaptación y mitigación del cambio climático.

Con el fin de ofrecer valorar el cumplimiento del objetivo principal y de los objetivos específicos de la presente Tesis Doctoral, a continuación, exponemos una representación gráfica de los principales hallazgos de este trabajo de investigación (véase Tabla 11), revisando el enunciado de cada uno de los objetivos, y los resultados alcanzados.

Tabla 11. Resumen de los resultados de la Tesis Doctoral.

Nº	OBJETIVOS ESPECÍFICOS	RESULTADOS
1	Conocer la influencia de las creencias sobre el cambio climático en las actitudes hacia el mismo, tanto para miembros de la comunidad universitaria como para la Generación Z.	Las creencias hacia el cambio climático influyen en las actitudes hacia el mismo, tanto para miembros de la comunidad universitaria en general, como para la Generación Z.
2	Examinar la influencia de las creencias sobre el cambio climático en la motivación intrínseca de los miembros de la comunidad universitaria hacia las acciones propuestas por la universidad para abordar este problema.	Las creencias sobre el cambio climático influyen en la motivación intrínseca de los miembros de la comunidad universitaria.
3	Evaluar la influencia de las creencias sobre el cambio climático en la motivación extrínseca de los miembros de la comunidad universitaria hacia las acciones propuestas por la universidad para abordar este problema.	**Las creencias sobre el cambio climático NO influyen en la motivación extrínseca de los miembros de la comunidad universitaria.**
4	Explorar si la actitud hacia el cambio climático influye en la motivación intrínseca de los miembros de la comunidad universitaria hacia las acciones propuestas por la universidad para abordar este problema.	La actitud hacia el cambio climático influye en la motivación intrínseca de los miembros de la comunidad universitaria
5	Evaluar la influencia de la actitud hacia el cambio climático en la motivación extrínseca de los miembros de la comunidad universitaria hacia las acciones propuestas por la universidad para abordar este problema.	**La actitud hacia en cambio climático NO influye en la motivación extrínseca de los miembros de la comunidad universitaria.**
6	Examinar la influencia de las actitudes hacia el cambio climático sobre el comportamiento proambiental individual de miembros de la comunidad universitaria y de la Generación Z.	La actitud hacia el cambio climático influye en el comportamiento proambiental individual de miembros de la comunidad universitaria, en general, y de aquellos que pertenecen a la Generación Z, en particular.
7	Analizar la influencia de la actitud hacia el cambio climático de miembros de la comunidad universitaria sobre la respuesta proambiental de la comunidad universitaria.	La actitud hacia el cambio climático de los miembros de la comunidad universitaria influye en la respuesta proambiental de la comunidad universitaria.
8	Conocer la influencia de la motivación intrínseca de miembros de la comunidad universitaria en la respuesta proambiental de la comunidad universitaria.	La motivación intrínseca de los miembros de la comunidad universitaria influye en la respuesta proambiental de la comunidad universitaria.
9	Conocer la influencia de las motivaciones extrínsecas de miembros de la comunidad universitaria en la respuesta proambiental de la comunidad universitaria.	**La motivación extrínseca de los miembros de la comunidad universitaria NO influye en la respuesta proambiental de la comunidad universitaria.**
10	Explorar si el comportamiento proambiental individual de miembros de la comunidad universitaria influye en la respuesta proambiental de la comunidad universitaria.	**El comportamiento proambiental individual de los miembros de la comunidad universitaria NO influye en la respuesta proambiental de la comunidad universitaria.**
11	Conocer si la vinculación con la universidad juega un papel moderador en las relaciones entre los diferentes constructos, siendo más fuerte para los empleados de la	Sí existen diferencias significativas entre empleados y estudiantes en las siguientes relaciones: creencia y motivación intrínseca; actitud y motivación intrínseca; actitud y

	institución educativa que para los estudiantes universitarios	comportamiento proambiental individual; y, motivación intrínseca y respuesta proambiental de la comunidad universitaria.
12	Examinar si la desafección ambiental de individuos de la Generación Z tiene una influencia negativa en la actitud hacia el cambio climático.	La desafección ambiental de individuos de la Generación Z genera una actitud negativa hacia el cambio climático.
13	Evaluar si las motivaciones intrínsecas de individuos de la Generación Z influyen positivamente en la actitud hacia el cambio climático.	Las motivaciones intrínsecas de individuos de la Generación Z generan una actitud positiva hacia el cambio climático.
14	Evaluar si las motivaciones intrínsecas de individuos de la Generación Z influyen en el comportamiento proambiental individual.	Las motivaciones intrínsecas de individuos de la Generación Z generan un comportamiento proambiental individual.
15	Conocer si la participación previa en iniciativas ambientales influye en los comportamientos proambientales individuales de la Generación Z.	La participación previa en iniciativas ambientales influye en los comportamientos proambientales individuales de la Generación Z.
16	Examinar si la nacionalidad juega un papel moderador en las relaciones entre los diferentes constructos que influyen en el comportamiento proambiental de la Generación Z.	No existen diferencias significativas en las barreras que frenan las motivaciones de miembros de Generación Z de nacionalidad colombiana, mexicana y brasileña.
17	Conocer las principales motivaciones (intrínsecas y extrínsecas) de los estudiantes universitarios para participar activamente en la lucha contra el cambio climático.	La principal motivación intrínseca y extrínseca de estudiantes universitarios para participar activamente en la lucha contra el cambio climático es, en primer lugar, la inclusión de nuevos cursos en el currículum, y, en segundo lugar, la co-creación de soluciones.
18	Conocer las principales barreras que frenan la motivación (intrínseca y extrínseca) de los empleados de universidades para participar activamente en la lucha contra el cambio climático.	La principal barrera que frena la motivación intrínseca de los empleados de universidades para participar activamente en la lucha contra el cambio climático es la cultura universitaria, y, por su parte, la falta de infraestructura es la principal barrera a la motivación extrínseca.

Fuente: Elaboración propia.

4. CONCLUSIONES, RECOMENDACIONES PRÁCTICAS, LIMITACIONES Y PROPUESTAS DE INVESTIGACIÓN FUTURA

4.1. Conclusiones

El cambio climático, la degradación ambiental y sus implicaciones políticas y socioeconómicas han inspirado el surgimiento del concepto de desarrollo sostenible, que se considera que impulsa las capacidades de adaptación al cambio climático y alivia los problemas ambientales (Tang, 2023). Para cumplir con los objetivos de desarrollo sostenible (ODS), las universidades juegan un rol trascendental y se enfrentan cada vez más a una presión global para ser ejemplo y contribuir al cumplimiento de estos objetivos. Para que esto suceda, deben tener la capacidad de integrar iniciativas y planes de acción que fomenten la participación de todos los miembros de la comunidad universitaria en comportamientos proambientales (Adhikari y Shrestha, 2023). En la actualidad, son limitadas las conductas a favor del medio ambiente en

las universidades o en la sociedad en general, lo que deriva en graves consecuencias provocadas por los actos no respetuosos con el medio ambiente.

A medida que la universidad convierte la sostenibilidad en una prioridad central en su labor docente y de investigación, se fomenta la transición hacia una sociedad protectora de la naturaleza. Su carácter pionero en la implementación de nuevas prácticas y su influencia dentro de la sociedad, pueden conceder a las universidades una capacidad especial para crear e influir en la transición hacia una economía baja en carbono (Mohammadi *et al.*, 2023). Instituciones públicas, empresas privadas y organizaciones no gubernamentales participan en diversas iniciativas de desarrollo sostenible y, en cada paso, intentan atraer la atención de las partes interesadas para cumplir con sus objetivos particulares como organizaciones responsables con el medio ambiente y, al mismo tiempo, mejorar su reputación (Popowska y Sady, 2023). Sin embargo, estos objetivos pueden resultar únicamente en conductas obligadas en los lugares de trabajo, que no se reflejan en comportamientos proambientales en hogares o en un ámbito social. Por ello, las universidades están llamadas a ser el pilar fundamental para aplicar iniciativas de sostenibilidad ya que es un sector que reúne a futuros profesionales de todas las áreas de actividad social y económica (Adhikari y Shrestha, 2023).

Los desafíos que enfrentan las universidades al implementar los ODS en su estructura incluyen un nivel de concienciación insuficiente, falta de atención, escaso interés en la participación voluntaria, compromiso limitado, falta de cooperación entre los propios miembros y los agentes externos, planes de estudios que no contemplan los ODS, falta de comunicación con agentes de la comunidad no universitaria, etc. (Mohammadi *et al.*, 2023). A pesar de todo ello, el principal problema que afrontan las universidades es la conducta humana, de la que derivan la mayoría de los problemas relacionados con el cambio climático y la sostenibilidad (Wallace y Buil, 2023).

En base todo lo anteriormente mencionado, la presente Tesis Doctoral evalúa los factores que influyen en el comportamiento de los miembros de la comunidad universitaria realizando un análisis desde múltiples perspectivas. En el Artículo 1 se analizó a la comunidad universitaria en general; en el Artículo 2 se analizó a la generación Z con perfiles de distintas nacionalidades; en el Artículo 3 se analizó a los estudiantes universitarios, y, por último, en el Artículo 4 se analizó a los empleados de universidades.

Para los Artículos 1 y 2, la base fue la Teoría del Comportamiento Planificado (TPB) propuesta por Ajzen (1991), ampliamente reconocida como una de las mejores teorías predictoras de la conducta humana. El propósito de estos dos artículos fue comprobar la fiabilidad de esta teoría a la hora de explicar comportamientos proambientales, ya que ha sido cuestionada por la falta de predictores explicativos en relación con la sostenibilidad (Savari y Khaleghi, 2023). En ambos estudios se detectó que las motivaciones son un pilar fundamental en la adopción de actitudes y conductas. Por ello, en el Artículo 3 y 4 se analizaron,

respectivamente, las motivaciones intrínsecas y extrínsecas con el fin de ofrecer a los gestores de las universidades y a las partes interesadas algunas pautas sobre las acciones más motivadoras para adoptar comportamientos proambientales; y en el caso de los empleados, las barreras que frenan su motivación.

En concreto, en el Artículo 1, los resultados indican que, a medida que la comunidad universitaria aumenta su conocimiento sobre el cambio climático y la sostenibilidad, se construyen creencias y actitudes que conducen al desarrollo de una motivación intrínseca por participar en la adaptación y mitigación del cambio climático, y posteriormente determina el comportamiento proambiental. Este comportamiento cambiará según lo que haga el individuo de forma individual y grupal. A partir de los resultados obtenidos, concluimos que las creencias, actitudes, motivaciones intrínsecas y conductas individuales son buenas predictoras del comportamiento humano, siendo las motivaciones intrínsecas el factor explicativo que contribuye a mejorar o ampliar la TPB. En cambio, no se encuentra apoyo a la inclusión de las motivaciones extrínsecas como predictoras en la TPB; esto puede deberse a su naturaleza y a la variabilidad de los incentivos o recompensas externas que activan este tipo de motivación (Ali *et al.*, 2020).

Por lo que respecta al Artículo 2, se concluye que, cuando se trata de cuestiones de sostenibilidad, existen otros factores antecedentes en el marco de la TPB que contribuyen a la comprensión del comportamiento humano, y en concreto, de los miembros de la Generación Z. En este sentido, la desafección ambiental influye negativamente en las actitudes, mientras que la motivación intrínseca lo hace de forma positiva, y por su parte, las participaciones previas de los individuos en iniciativas medioambientales influyen en el comportamiento proambiental individual. Además, se confirmó la existencia de diferencias significativas en la intensidad de las relaciones entre ciertas variables del modelo en función de la nacionalidad en la comparativa entre individuos colombianos y brasileños. Este hallazgo se suma a la corriente de investigaciones de análisis transculturales sobre las conductas proambientales realizados por Higueras-Castillo *et al.* (2019) y Lamiño-Jaramillo *et al.* (2023).

En el Artículo 3, se corrobora que, tanto las motivaciones intrínsecas como extrínsecas, contribuyen a definir segmentos de estudiantes con distintos comportamientos. La principal motivación intrínseca de los estudiantes es la inclusión de nuevos cursos en el currículo, seguido de la co-creación de soluciones. Por otro lado, para las motivaciones extrínsecas, se detecta que la inclusión de nuevos cursos en el currículo vuelve a ser una acción determinante que motiva a los estudiantes a adoptar comportamientos a favor del medio ambiente y del cambio climático, lo cual es vital para que las universidades cumplan con los ODS (Abd-Mutalib *et al.*, 2023).

En el Artículo 4, se concluye que la principal barrera que frena la motivación intrínseca de empleados de las universidades con relación a las acciones encaminadas a la mitigación y adaptación al cambio climático es la cultura universitaria y, en menor medida, la falta de equipamiento. Por otro lado, la barrera que frena

en mayor medida la motivación extrínseca de los empleados es la falta de infraestructuras. Aquí, cabe señalar que los empleados más motivados (tanto intrínseca como extrínsecamente) son los que encuentran más barreras, mientras que los menos motivados valoran los obstáculos al comportamiento proambiental como menos relevantes, lo que permite inferir que su falta de participación en iniciativas sostenibles se debe a la falta de estímulo por recompensas externas desalentadoras y no por las propias barreras (Desrochers y Zelenski, 2023).

Por último, en la sección 1.3 se describió el objetivo principal de esta Tesis que consiste en *"Examinar los factores que influyen e impulsan el comportamiento proambiental de los miembros de la comunidad universitaria en un contexto de sostenibilidad, y determinar cómo contribuyen variables como creencias, actitudes, motivaciones intrínsecas y extrínsecas, desafección medioambienta y/o participación medioambiental en el comportamiento proambiental individual de la comunidad universitaria; y, además, analizar cuáles son las principales motivaciones y las barreras que frenan la motivación a participar activamente en la lucha contra el cambio climático".* **Como resultado de la presente Tesis Doctoral, se puede extraer a modo de conclusión final que variables tales como las creencias, actitudes, motivaciones intrínsecas ayudan a explicar el comportamiento proambiental de miembros de la comunidad universitaria, y, a su vez, de forma complementaria, la desafección ambiental y participación medioambiental ayudan a describir el comportamiento proambiental de miembros de la comunidad universitaria de la Generación Z. Además, se reconoce que la inclusión de nuevos cursos en el currículo y la co-creación de soluciones son las acciones que más motivan a los estudiantes para involucrase en la mitigación y adaptación del cambio climático; mientras que la cultura universitaria, la falta de equipamiento e infraestructuras son las mayores barreras que perciben los empleados de universidades (docentes y personal de administración y servicios) para realizar conductas a favor del medio ambiente y el cambio climático.**

4.2. Recomendaciones prácticas para la gestión

A partir de las conclusiones arriba presentadas, exponemos a continuación diversas implicaciones que pueden orientar a los gestores de universidades para fomentar comportamientos proambientales en la comunidad universitaria y ayudar a la adaptación y mitigación del cambio climático.

En primer lugar, las universidades deberían centrar sus esfuerzos en realizar acciones que no sólo brinden información sobre el cuidado del medio ambiente, sino que también generen un vínculo emocional que permita a sus miembros desarrollar una actitud positiva (D'Adamo y Gastaldi, 2023) y motivadora hacia el cuidado de la naturaleza. Cuando las acciones propuestas por las universidades superen la brecha entre simple información y conexión emocional, motivacional y conductual, se conseguirá que más miembros de la comunidad universitaria participen activamente en la adaptación y mitigación del cambio climático y,

además, esto influirá para que otros miembros de la sociedad adopten las mismas conductas (Kovaleva, 2023). Se recomienda a los directivos o gestores universitarios que analicen más detalladamente las acciones proambientales antes de implementarlas, con el fin de reconocer cuáles de ellas generan un mayor vínculo emocional. En este sentido, tal vez la solución no está en la cantidad de acciones propuestas, sino en la consistencia y efectividad para generar concienciación y estados afectivos positivos que deriven en comportamientos proambientales.

Adicionalmente, se ha detectado que las motivaciones extrínsecas no ejercen la influencia esperada en los comportamientos proambientales. Esto puede explicarse por el hecho de que los incentivos ofrecidos por las universidades están siendo percibidos como insuficientes (Hurth y Stewart, 2022) y, por tanto, se sugiere a los directivos universitarios replantear los métodos de recompensa actuales y proponer otro tipo de premios o distinciones, como, por ejemplo, reconocimientos académicos o de prestigio social.

Por otra parte, se ha constatado que el comportamiento proambiental individual no influye en la respuesta proambiental de la comunidad universitaria. Esto puede deberse al hecho de que las personas suelen adoptar distintas conductas en entornos individuales y grupales (Barszcz *et al.,* 2023). Por ello, se sugiere a los gestores o representantes universitarios dirigir sus esfuerzos a que los estudiantes o empleados perciban su contribución como importante para la transformación medioambiental y que, a pesar de que haya conductas que perjudican el medio ambiente provocadas por otros individuos, esto no afecte en gran medida al comportamiento grupal de la comunidad universitaria.

Seguidamente, se sugiere a los gestores de las universidades enfocarse en cambiar la forma en que transmiten la información relacionada a la sostenibilidad. Actualmente, se desarrolla una serie de campañas que buscan generar conciencia o preocupación ambiental. Sin embargo, en ocasiones, el efecto que genera es el contrario y cada vez se observa más desapego y falta de compromiso (France *et al.,* 2022). La sociedad ha cambiado y ya no se siente atraída por anuncios o campañas en medios tradicionales, que pueden llegar a generar rechazo. Es necesario apostar por la comunicación boca-oído a través de nuevas tecnologías y herramientas de difusión de información, videos, imágenes, animaciones, etc. Tal vez si se rediseña la estrategia y la información se presenta de forma más atractiva y entretenida, se podrán desarrollar los cambios de conducta esperados.

En las universidades, y en el entorno educativo en general, se ha constatado que las actividades recreativas son las que mayor vínculo emocional generan. Por tanto, destinar un espacio para que los estudiantes y otros miembros de la comunidad puedan interactuar o socializar a través de la *gamificación*, podría ser una forma más amena de aprendizaje que no está estrictamente ligada al aspecto académico o laboral.

Así también, se ha constatado que las motivaciones son un pilar fundamental para la adopción de comportamientos proambientales. Por ello, se sugiere a los gestores universitarios y otras partes interesadas, no enfocar sus acciones únicamente en incentivos económicos o académicos que no perduran en el tiempo. Es necesario que se propongan actividades que generen placer (Ali *et al.*, 2020), por ejemplo, promover acciones ambientales que permitan a los miembros de las universidades competir entre sí, y en función de su desempeño obtener gradualmente reconocimiento individual y colectivo por sus interacciones e iniciativas específicas.

De igual forma, se sugiere a los gestores universitarios implementar nuevas asignaturas en el plan de estudios, ya que se ha constatado que es la acción que contribuye en mayor medida a la motivación de los estudiantes. De forma similar, se recomienda que se tenga en cuenta la opinión de los miembros de la comunidad antes de implementar cualquier acción medioambiental, ya que los estudiantes consideran que sentirse parte en la co-creación de soluciones es un condicionante clave para impulsar su motivación.

Por último, se ha evidenciado que la principal barrera que frena la motivación interna de los empleados de universidades es la cultura universitaria. Como se ha señalado anteriormente, esto se podría contrarrestar mostrando que cada contribución aporta un granito de arena para construir el cambio de conducta que la sociedad necesita. Además, otra de las grandes barreras que frenan la motivación de los empleados de las universidades es la falta de equipamiento e infraestructuras. Es probable que las instituciones de educación superior estén destinando recursos para que los estudiantes y otros empleados tengan un ambiente idóneo para el aprendizaje mediante la implementación de nuevas tecnologías, equipamiento sofisticado, etc., pero se esté descuidando su repercusión medioambiental. Por tanto, las universidades deberán mejorar sus infraestructuras y equipos, pero al mismo tiempo, ser consistentes con el cuidado del medio ambiente.

4.3. Limitaciones y propuesta de investigación futura

A nuestro juicio, la presente Tesis Doctoral está sujeta a una serie de limitaciones que necesitan ser consideradas para matizar los hallazgos y las conclusiones derivadas de las mismas, las cuales, a su vez, emergen como oportunidades de investigación futura, tal y como se comenta a continuación.

En primer lugar, si el tamaño de la muestra es aceptable para el análisis estadístico, la inclusión de datos de un mayor número de sujetos permitiría explorar la existencia de diferencias entre grupos de individuos identificados con diversos criterios de clasificación. Asimismo, el momento en que se recopilaron los datos fue una etapa posterior a la no presencialidad en las universidades debido a las restricciones en las interacciones sociales motivadas por la pandemia COVID19. Por tanto, se podría explorar la existencia de posibles diferencias en los resultados tras haber retomado la completa normalidad. Además, el procedimiento de muestreo no probabilístico adoptado en este estudio (bola de nieve) conlleva que, en el

caso de algunas universidades participantes del estudio, la muestra sea comparativamente más pequeña en unas universidades frente a otras, lo que implica un sesgo que no permite garantizar completamente la representatividad respecto al grupo del que se extrae (Penn *et al.*, 2023). La recogida de un mayor número de observaciones y de forma aleatoria podría contribuir a mejorar la validez de los resultados.

En segundo lugar, el contexto geográfico en el que se llevó la investigación, tres países latinoamericanos, donde la sensibilidad a cuestiones ambientales aún no se ha desarrollado al nivel de Europa, Asia o Norteamérica, permite explorar este tópico en entornos previamente desatendidos por la literatura, pero limita la generalización de los hallazgos en un contexto global (Gómez-Casillas y Gómez-Márquez, 2023). Futuros trabajos de investigación podrían replicar el estudio en otros países y con otras universidades, permitiendo análisis comparativos, por ejemplo, entre universidades latinoamericanas frente europeas.

En tercer lugar, se podría evaluar la inclusión de otras variables en el estudio que ayuden a conocer en mayor profundidad los distintos comportamientos de los miembros de la comunidad universitaria con relación a la sostenibilidad y el cambio climático. Entre estas variables, se podrían contemplar, por ejemplo, la concienciación ambiental, la satisfacción, la atribución de responsabilidad, la autoestima, o la norma subjetiva, que han sido tenidas en consideración en otros estudios del comportamiento humano (Balakrishnan, 2023; Zeng *et al.*, 2023).

En cuarto lugar, se podría profundizar en el análisis de las diferencias entre generaciones, a través de un análisis comparativo entre, por ejemplo, Millennials *versus* Centennials. Asimismo, se podría contrastar la existencia de diferencias en función del género para explorar si esta característica puede ser influyente en los resultados. Además, se podría explorar si los hallazgos obtenidos de la comunidad universitaria varían si se aplican en otras áreas, por ejemplo, el sector empresarial o industrial. Esto podría generar que las implicaciones sugeridas en un área sean diferentes en relación con otras (Ojo, 2022).

Finalmente, los datos de los estudios se recopilaron únicamente mediante encuestas, lo que podría implicar un sesgo por utilizar un método único. Por lo tanto, investigaciones futuras podrían aplicar otros tipos de diseño de investigación, por ejemplo, de tipo experimental.

En definitiva, consideramos que las conclusiones anteriormente expuestas deben ser interpretadas con cautela, siendo necesarias futuras investigaciones que puedan sustentar los resultados descritos anteriormente. Por ello, la Tesis Doctoral aquí presentada no debe ser contemplada como una serie de análisis que finalizan en esta investigación, sino que abre nuevos retos que esperamos poder asumir en trabajos posteriores, especialmente en aquellos aspectos relativos a la forma de medición, la naturaleza, la delimitación conceptual y la mejor comprensión de las variables centrales de este trabajo, y de las relaciones que entre ellas se han establecido.

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PARTE 2. ANEXOS: ARTÍCULOS DE LA TESIS POR COMPENDIO

A1. Artículo 1. Un análisis de los factores que influyen en las intenciones de comportamiento proambientales sobre el cambio climático en la comunidad universitaria

Juma-Michilena, I., Ruiz-Molina, M. E., Gil-Saura, I., & Belda-Miquel, S. (2023). An analysis of the factors influencing pro-environmental behavioural intentions on climate change in the university community. *Economic Research-Ekonomska Istraživanja*, Vol. 36, Nº 3, 2264373. https://doi.org/10.1080/1331677X.2023.2264373.

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2. Según **Scopus**, 2022 **CiteScore (2022): 6.2.** Highest percentile 85%. 103/705, Economics and Econometrics, CiteScore Quartil **Q1**.
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An analysis of the factors influencing pro-environmental behavioural intentions on climate change in the university community

Israel-Javier Juma-Michilena[a], María Eugenia Ruiz-Molina[a], Irene Gil-Saura[a] and Sergio Belda-Miquel[b]

[a]Polibienestar, University of Valencia, Valencia, Spain; [b]Social Work and Social Services Department, University of Valencia, Valencia, Spain

ABSTRACT

Universities play an essential role in promoting economic prosperity, social welfare and environmental protection through education and research. However, discrepancies have been pointed out between what consumers express about their environmental concerns and their environmental behaviour is, thus posing a challenge for the effective adaptation and mitigation of climate change. The purpose of this study is to analyse the sequence 'beliefs-attitudes-behaviours' applying the Theory of Planned Behaviour to the context of the university community. To achieve this objective, the hypothesised relations are tested using Partial Least Squares structural equation modeling in a sample of 1991 responses from students and staff at nine Latin American universities. Results show that beliefs and attitudes positively influence intrinsic motivation towards participation in actions related to climate change, and this, together with attitude, influences the pro-environmental behaviour of the university community. Neither extrinsic motivations or individual pro-environmental behaviour do not influence conduct as a member of the community. Affiliation (student vs. employee) moderates some of these relationships. A series of implications for university administrators (e.g., actions oriented towards raising awareness, identification of suitable incentives) are inferred to promote the participation of the community members in pro-environmental actions.

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1. Introduction

The United Nations' Brundtland Report defined sustainable development as 'development that meets the needs of the present without compromising the ability of future generations to meet their own needs' (Brundtland et al., 1987, p. 41). The pursuit of sustainable development for individuals, societies, and nations is important for

CONTACT Sergio Belda-Miquel Sergio.Belda@uv.es

the global community given its emphasis on pursuing a harmonious balance between societal, economic, and environmental imperatives (Ferguson et al., 2021). In particular, climate change and its environmental implications is a major issue nowadays, as the fate of the planet literally depends on how society responds to the climate catastrophe (IPCC, 2021).

In educating citizens about climate change and promoting pro-environment behaviour, higher education institutions play a vital role (Prasad & Mkumbachi, 2021). Indeed, they have long been agents of change in society, not only because they educate the majority of the world's leaders, managers, teachers and professionals specialising in their respective fields, but also because they play an important role in economic, social and environmental spheres (Flórez-Parra et al., 2021; Osmond et al., 2013). For some years now, universities have been launching various initiatives focused on playing a leading role in education for sustainable development and responding to present global challenges, i.e., formal, informal, and non-formal learning and teaching approaches, including nature-immersive field projects (Leal Filho et al., 2021). Through these various formats, education should be centred on training responsible individuals who participate in a sustainable society and who help provide solutions to the current environmental problems (Sousa et al., 2021).

Previous studies have focused on university students as a key group for research since 'they will be the consumers and the intellectual vanguard of the future and, therefore, a reference group for other consumers' (Izagirre-Olaizola et al., 2015, p. 25). Notwithstanding, it has been observed that even though university students have extensive knowledge of environmental issues, they make little commitment to developing pro-environmental behaviours (Mkumbachi et al., 2020). Wide research has been conducted on the sequence 'beliefs-attitudes-behaviours' based on the Theory of Planned Behaviour (TPB) proposed by Ajzen (1991). However, behaviour is also guided (or constrained) by intuitive, automatic decisions, routines and similar habitual behaviours (Walawalkar et al., 2023). Several studies have called the TPB into question when it relates to sustainability issues, as it is thought that attitudes are not an adequate indicator for describing behaviour when it comes to environmental issues. Moraes et al. (2012) state that although consumers may have ethical concerns, their conduct and actions may contradict the approach required to respond to these concerns. This discrepancy between what consumers express about their environmental concerns and their environmental behaviour is what has been called the 'green gap phenomenon' and poses a challenge from a marketing perspective. That said, the antecedents of the lack of involvement of the members of the university community when it comes to environmental issues have not been clearly identified, and in this sense, we understand that shedding light on this issue is highly important in view of the role of members of the university community as agents of society who can contribute to getting more people involved in actions fighting against climate change, not only in the university environment, but also in the business, family and social spheres.

Therefore, the research conducted proposes an innovative model partially based on the Theory of Planned Behaviour (TPB) proposed by Ajzen (1991), to fill the gap of previous studies which, to our knowledge, have not considered the sequence beliefs-

attitudes-motivations-behaviours as antecedents for predicting the pro-environmental behaviour of members of the university community. In this sense, this research aims to contribute to the literature through the identification of factors that explain that favourable attitudes towards caring for the environment and the fight against climate change do not always involve a consistent pro-environmental behaviour. Additionally, the moderating role that the type of the link to the university (student or employee) can have on the relationships between these variables is analysed.

After this introduction, the present work will be divided into four main parts. First, we define the theoretical framework of the present research. Second, we propose a model to be tested and we develop and support the research hypotheses. Third, we establish the methodology used in the empirical research and evaluate the results. Finally, we report the most relevant conclusions that can be drawn from this study and the possible managerial implications, as well as potential future lines of research.

2. Theoretical background

Climate change is one of the greatest threats facing humanity due to the repercussions it can have. Human beings live, produce and consume in a world of finite and vulnerable natural resources in which the global ecosystem has changed radically in recent years (IPCC, 2021). Some of the main consequences of climate change include droughts and floods, rising sea levels, heatwaves, increased health problems and a decline in flora and fauna, among others. To respond to these challenges, previous literature states that governmentality mechanisms in cities create two new identities: the 'good citizen', who aims at reducing his impact on climate change, and the 'model city', a laboratory that may orientate further actions to adapt and mitigate climate change at the city level (Berquier & Gibassier, 2019). Nowadays, universities have considered sustainability strategy as a part of their responsibility and even though higher education plays a crucial role in sustainable development, its contribution to sustainable society and economic growth has been underestimated (Lam-Huu-Phuoc et al., 2022). In an analogous fashion, it has been argued that the only way to curb the damage caused by climate change is through continuous awareness-raising of the issue and in behavioural changes throughout the university community (Van den Berg & Cando-Noordhuizen, 2017).

The Theory of Planned Behaviour (herinafter referred to as TPB), developed by Ajzen (1991), provides a model for understanding an individual's behaviour and commitment. This theory studies individual behaviour from the perspective of psychology, and a central factor in the theory is the intention of an individual to perform a given behaviour (Ma et al., 2022). In this context, TPB places the origin of behaviour in an individual's beliefs, the latter being formed through a sequence of constructs (beliefs, attitude, intention, behaviour). This theory maintains that an individual's attitudes are beliefs that direct behaviour. Therefore, it centres on the idea that human beings, prior to acting, make systematic use of the information they possess about the implications of carrying out a behaviour, i.e., it focuses on the rationality of behaviour. In this sense, it is assumed that most behaviour is under the individual's control and, consequently, that the fundamental factor for predicting behaviour is a wilful intention or motivation

to act (Ajzen, 1991). TPB provides a useful framework for understanding how attitudes may influence both planned and realised behaviour (Bansal & Taylor, 1999). According to the TPB, a 'behavioural intention' indicates how willing an individual is to engage in a particular behaviour, such that it likewise constitutes the most accurate factor of that individual's actual behaviour (Lin et al., 2021).

In the literature, it has been claimed that the TPB makes it possible to identify the drivers of an individual's pro-environmental behaviour. In fact, a number of studies focusing on environmental protection have applied this theoretical framework in both domestic and institutional contexts (e.g., Ferdous, 2010; Rex et al., 2015; Si et al., 2020; Tommasetti et al., 2018; Yazdanpanah & Forouzani, 2015; Yuriev et al., 2020). For this reason, we believe that the TPB can help us to understand the attitudes and intentions of the university community regarding actions relating to the fight against climate change.

Beliefs are judgements or evaluations that people make on the basis of prior knowledge; they are acquired through learning and represent descriptive thinking about something in particular (Fishbein & Ajzen, 1975). Basically, beliefs derive from knowledge that emerges from the interaction of individuals with society through their cognitive processes (Durr et al., 2017). Attitudes are a set of beliefs that form an enduring predisposition on how to think, feel, perceive and behave towards an object or event (Mainieri et al., 1997). In the context of attitudes towards the environment, Ugulu et al. (2013) argue that it is important to study and influence attitudes, especially in students, as individuals with negative attitudes towards the environment underestimate environmental problems and do not adopt pro-environmental behaviours. Attitude towards behaviour refers to the extent to which an individual has a favourable or unfavourable evaluation of a certain behaviour, thus, it seeks to understand why individuals are attracted to certain behaviours, and empirical research suggests that TPB can effectively predict individuals' intentions (Chang et al., 2022). In the context of our research, we understand that beliefs may play a fundamental role in predicting the behaviour of the university community because if individuals have an ideological judgement about the causes and actions that affect climate change, this might strongly influence the way they behave.

Motivation can be described as a driving force that arises from hidden sources within each human being, and it is closely related to emotions because it reflects the extent to which a person is prepared to act physically and mentally in a focused way (Guay et al., 2000). Motivation is the reason upon which one acts, being an important antecedent to behaviour (Graafland & de Bakker, 2021). In particular, we motivation as a driver that may be private (intrinsic motivations) or social (extrinsic motivations).

On one hand, intrinsic motivations refer to internal motivations that are not associated with external rewards or pressures (Wasiuzzaman et al., 2021), this motivation stems from personal interests, enjoyment and the challenges of performing a task (Ma et al., 2023). Therefore, a motivation is considered to be intrinsic if it includes internal elements capable of satisfying basic psychological needs (Ryan & Deci, 2000).

On the other hand, extrinsic motivations are those that come from the external environment and function as an impetus to do something, with the reward being the

outcome of this motivation (Guay et al., 2000). In this sense, a behaviour practiced because it leads to desired outcomes, including verbal praise or monetary rewards (Yang & Thøgersen, 2022). In other words, they require some kind of external incentive such as social or economic recognition in order for them to be carried out. Intrinsic motivation can therefore be defined as the willingness to make an effort and the enjoyment of the work itself, while extrinsic motivation is the willingness to make an effort to obtain results external to the work itself (Grant, 2008).

In this vein, Hamby and Laer (2022) argue that decades of research in psychology and consumer behaviour show that, in general, people who act for intrinsic reasons (i.e., performing an activity for its own sake) experience higher levels of well-being than people who act for extrinsic reasons (i.e., to earn a reward or avoid punishment). More precisely, behaviour elicited by one's own will leads to the complete engagement of the behaviour, whereas a behaviour encouraged by internal or external pressure causes a tepid engagement of the behaviour (Hur et al., 2022). Human behaviour plays a key role in the rise and severity of environmental problems, and drastic changes in human behaviour are needed to mitigate climate change (Jans, 2021).

Pro-environmental behaviour is a way of acting towards the environment that does not harm it but is beneficial to it (Steg & Vlek, 2009). Environmentally friendly behaviours improve the quality of the environment to some degree (Venhoeven et al., 2016). In recent years, even though university students claim to have a high level of environmental knowledge and a positive attitude towards environmental protection, they still demonstrate behaviours that run counter to environmental sustainability, such as a preference for cars over public transport (Sousa et al., 2021). Indeed, previous studies have pointed out the existence of discrepancies in the 'beliefs-attitudes-behaviours' chain so that attitudes towards the environment do not always drive to environmental-friendly behaviour (Moraes et al., 2012) and the literature calls for research to shed light in this 'green gap phenomenon' (El Haffar et al., 2020).

Numerous studies have analysed the types of actions and behaviours that can be considered pro-environmental conduct (Kollmuss & Agyeman, 2002; Wang et al., 2021). However, being such a broad field, we will define it in essence as responsible environmental behaviour. On the other hand, in the context of this research we refer to individual pro-environmental behaviour, which to some extent builds on the same concept, but focuses on what the member of the university community (student or employee) does from the perspective of personal or consumer behaviour. Pro-environmental behaviour, in essence, is a type of behaviour developed by individuals to protect the environment, many authors see it as a behaviour that organisations expect their members to adopt in order to sustain their lives (Donmez-Turan & Kiliclar, 2021).

In relation to the latter, we consider that the pro-environmental behaviour of not only the individual, but also of the community to which the community member belongs, should be analysed. Therefore, we introduce the variable of the pro-environmental response of the university community, in relation to the effort that, in the individual's opinion, the university community (of which the individual is a member) is making or should make to fight against climate change.

3. Hypotheses and proposed model

Within the framework of our research, we propose a model that, based on the TPB, attempts to integrate the model proposed by Tabernero and Hernández (2012) regarding responsible environmental behaviour. Accordingly, we have developed a revised model in order to understand the way the university community acts in the fight against climate change, considering the sequence beliefs-attitude-behaviour, with the intrinsic and extrinsic motivations of the individual as an additional explanatory factor of behavioural intentions. Specifically, we analyse behaviour from an individual perspective, at the level of the individual as a consumer, and in terms of how the university community, of which the individual is a member, should respond to combat this global emergency.

However, environmental attitudes have been defined as 'concern for the environment or caring about environmental issues' (Gifford & Sussman, 2012, p. 65–66). According to the TPB, beliefs about the advantages and disadvantages of engaging in a certain behaviour influence attitudes towards the behaviour and, indirectly, behavioural intentions (Yuriev et al., 2020). On the basis of the fact that beliefs precede attitude, several hypotheses originate that are understood as behavioural indicators. It can thus be stated that beliefs not only generate an attitude, but also a motivation, which may be intrinsic or extrinsic and which subsequently determines the way an individual behaves. Motivation is one of the most important explanatory keys to human behaviour with respect to why we behave the way we do (Deci & Ryan, 1985). Therefore, we present the following hypotheses:

H1: Beliefs about climate change influence attitudes towards it.

H2: Beliefs about climate change influence intrinsic motivation towards actions proposed by the university to address this problem.

H3: Beliefs about climate change influence extrinsic motivation towards actions proposed by the university to address this problem.

Additionally, in this paper we also propose the incorporation of intrinsic and extrinsic motivation variables subsequent to the adoption of an attitude as relevant factors in defining behaviour. Taylor and Todd (1995) indicate that attitudes play a major role in behaviour when other factors prevent this behaviour from being carried out, especially in consumption behaviour and environmental participation.

According to some earlier studies, attitude is a factor that directly influences motivation (Tian et al., 2020). However, several studies look at the relationship the other way around (motivation as a determinant of attitude). For example, Giefer et al. (2019) confirm the relationship between motivation and attitude in a study on pro-environmental behaviour. In the context of our research, we understand that even if the beliefs and attitudes the university community has about climate change can generate pro-environmental behaviour, however, it may also be that many of them do not take any action towards the environment, which is why motivation must be taken into account as a connecting link that drives behaviour. In particular, it may be inferred that, if a member of the university community has an intrinsic motivation about climate change, this might influence his or her behaviour, as human beings

tend to perform actions that generate pleasure regardless of external factors that may affect them. Alternatively, human beings are not only moved by activities that generate pleasure, but also by external issues that, although not pleasurable, help them to achieve an objective. Therefore, we assume that the university community can be involved in the fight against climate change without the need for this to represent a personal delight, due to external incentives. Thus, the following hypotheses are put forward:

H4: Attitude towards climate change influences intrinsic motivation towards actions proposed by the university to address this problem.

H5: Attitude towards climate change influences extrinsic motivation towards actions proposed by the university to address this problem.

Similarly, it has been highlighted that people who are concerned about the environment are more likely to protect it (Bamberg & Möser, 2007). While some studies support this statement (Huang & Yore, 2005; Wang et al., 2021), other research has demonstrated that pro-environmental attitudes do not always lead to environmentally sustainable behaviour (Missimer et al., 2017; Oskamp et al., 1991; Vicente-Molina et al., 2013). From this perspective, it should be noted that favourable attitudes towards environmentally sustainable products do not always lead to behaviour consistent with these attitudes (Moraes et al., 2012).

The relationship between attitude and pro-environmental behaviour is a controversial issue. Even though the TPB approach proposed by Ajzen (1991) indicates a relationship between attitude and behaviour, in the field of sustainability, favourable attitudes towards environmental protection do not always influence pro-environmental behaviour, which can also be affected by other factors (El Haffar et al., 2020).

Furthermore, it is also important to mention the role played by universities in pro-environmental behaviour. Currently, several initiatives have been launched to respond to the global challenges of today's society (Osmond et al., 2013). However, there is still little research on whether such initiatives generate a favourable attitude in the members of the university community, or whether they lead to pro-environmental behaviour. By way of example, Wee et al. (2017) claim that university students' awareness and attitudes towards sustainable development lead to a greater intention to adopt pro-environmental behaviours. They argue for the role of higher education institutions globally in forming a generation that is not only sensitive to sustainability issues but also contributes effectively to achieving the United Nations Sustainable Development Goals (UN, 2015). On the basis of these criteria, the following hypotheses arise.

H6: Attitudes towards climate change influence individual pro-environmental behaviour.

H7: Attitudes towards climate change influence the pro-environmental response of the university community.

In this vein, Tableernero and Hernández (2012) suggest that people with high intrinsic and extrinsic motivation engage in more environmentally friendly behaviours than any other individuals in comparison. Some of the models designed to try to explain, describe and predict the performance of environmentally responsible behaviour posit that individuals only engage in such behaviour when they are informed

about environmental problems and motivated to solve them. Nevertheless, the influence of motivation emanating from altruistic and social values may be counteracted by other more immediate motivations, such as convenience and saving time and money (Kollmuss & Agyeman, 2002). Motivation has been identified as a determinant of pro-environmental behaviour in a number of consumer studies (Zoll et al., 2018). Based on these deductions, we consider the possibility that an individual may have an internal motivation to care for the environment and try to contribute individually, but if they observe in their social environment that effective actions are not implemented and their contribution does not represent a significant impact, the individual's group behaviour may change.

H8: Intrinsic motivation influences the pro-environmental response of the university community.

Moreover, the motivation to perform an action may depend on the expectation of obtaining direct or indirect results from that action, and external incentives can generate pro-environmental behaviour (Shafiei & Maleksaeidi, 2020). One of the main determinants of an individual's behaviour is the influence of those around them, i.e., their peer group (Burnkrant & Cousineau, 1975). Therefore, the individual may act differently in personal and group settings. Festinger and Carlsmith (1959) proposed the theory of cognitive dissonance, which deals with an individual's behaviour in a group setting, arguing that when a person is faced with another person who thinks differently, he keeps up the appearance that his or her arguments are correct, even though internally he may think that they are not. Additionally, it has been noted that perceived social pressure can influence an individual's pro-environmental behaviours (Qi & Ploeger, 2019). In this way, individual and group decisions or behaviours may vary. Based on this reasoning, the following hypothesis arises.

H9: Extrinsic motivation influences the pro-environmental response of the university community.

Furthermore, our proposal seeks to interlink behavioural determinants with the response that the university should provide in the form of actions that help to combat climate change. This assertion is supported by theories that support the congruence between behaviour at the individual level and as part of a collective and community (Zoll et al., 2018). However, other theoretical approaches claim there is a discrepancy between a person's behaviour in individual and group contexts. One such example is attribution theory, which argues that people show two main causes for their behaviour: an internal one, centred on the person; and an external one, centred on social conditions (Bascoul et al., 2015). When individuals attribute their decisions to others, or to the social context, their personal decisions are quite limited. Therefore, at a global level, people end up not perceiving themselves as the cause of environmental damage, so they believe that their decisions are not part of the solution (Teng et al., 2015).

Another theory that may help explain the relationship between individual pro-environmental behaviour and the pro-environmental response of the university community is the value-belief-norm (VBN) theory proposed by Stern (2000). According to this theory, actions that reduce environmental impacts are determined by awareness of the

consequences of those actions (Gifford & Nilsson, 2014). Therefore, without a value being placed on environmental care in a group context, awareness cannot be generated, and it becomes difficult for the individual to make pro-environmental choices from their perspective as individual consumers. Drawing on these findings, the following hypothesis arises:

> H10: Individual pro-environmental behaviour influences the pro-environmental response of the university community.

Finally, it is expected that the type of affiliation to the university community, i.e., student or employee, will play a moderating role in the relationships discussed. Firstly, the employee's link to the university extends over a longer period of time than that of the student. In fact, many employees, whether teaching and/or research staff or administrative service workers, have long-term relationships with the university institution as public servants or through open-ended contracts, while for students the relationship is often limited to the period of their undergraduate or postgraduate studies. This may explain why, in previous studies, employees of the university institution displayed higher levels of pro-environmental behaviours on campus in comparison with students (Durr et al., 2017).

Furthermore, employees and students belong to different generational cohorts, although there is no consensus in the literature on the existence of any differences in pro-environmental beliefs, attitudes and behaviours according to age. Some previous studies have found different patterns of pro-environmental behaviour according to generations, with Millennials being the most sensitive to environmental issues (Smith & Brower, 2012), whereas others argue that Generation Xers are more involved in environmental issues (Cline et al., 2020). In contrast, there are studies that have concluded that there are no differences between younger and older adults when it comes to environmental concerns and the willingness to act to mitigate the risk of climate change (Gray, Raimi et al., 2019). Nonetheless, we formulate the final hypothesis as follows:

> H11: University attachment plays a moderating role in the relationships between the different constructs, being stronger for employees of the educational institution than for university students.

In light of the above and based on a review of the literature, a theoretical model is proposed that includes the variables that may determine pro-environmental behaviour and help in the fight against climate change, and which is based on the hypothesised relationships between them on the part of the university community. This model is represented visually in Figure 1.

4. Methodology and sample characteristics

4.1. Measurement of variables

In order to achieve the proposed objective, a quantitative investigation was carried out, opting for the creation of a structured ad hoc questionnaire for data collection. To contrast our model at the theoretical level, the selection of constructs was primarily based on two theoretical frameworks presented in the literature. On the

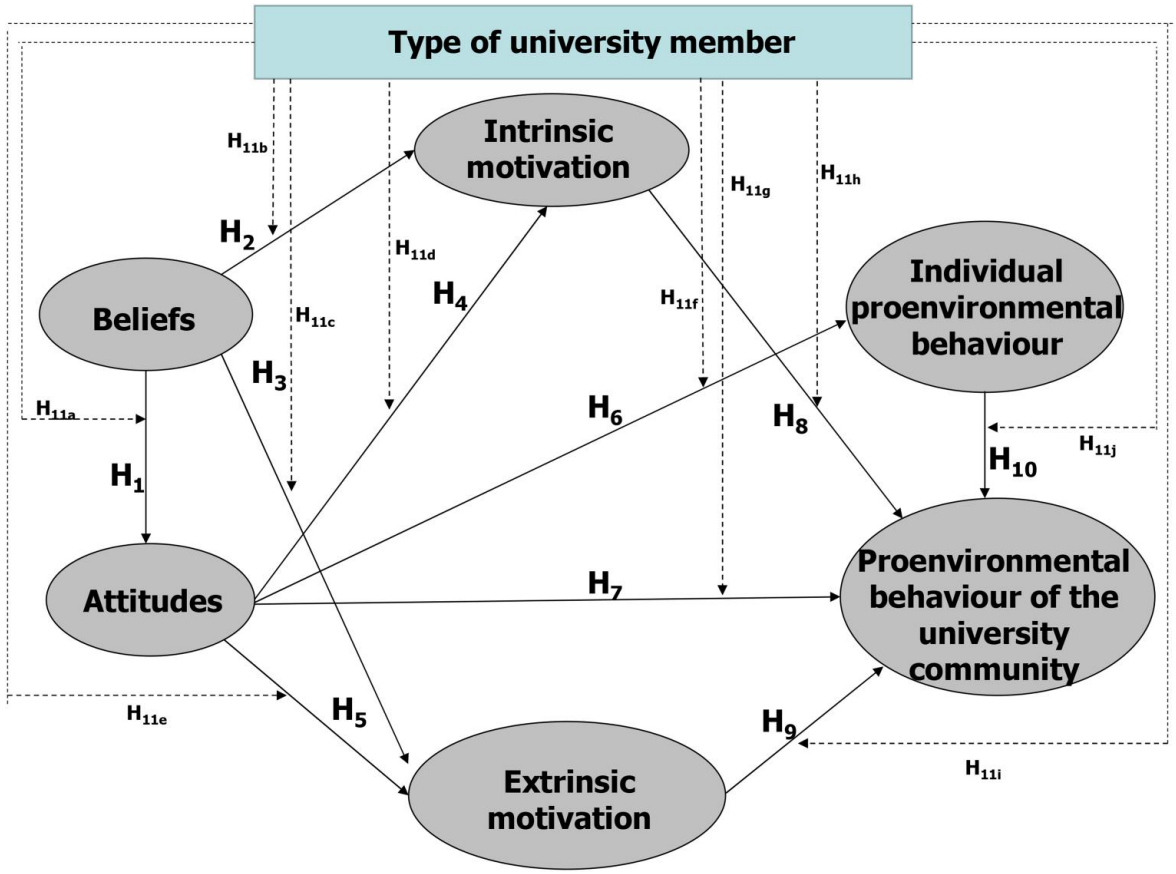

Figure 1. Proposed model.
Source: Authors' proposal.

one hand, the variables of beliefs, attitudes and behaviours were adopted from the TPB proposed by Ajzen (1991), while the variables of intrinsic and extrinsic motivations and pro-environmental behaviour were included by following the model proposed by Tableernero and Hernández (2012). In addition, based on theories of psychology concerned with an individual's sense of internal consistency, we introduced a variable on the response the university should make in the fight against climate change. We combine these approaches to explain the factors that influence members of the university community in making the decision to participate in actions related to the fight against climate change and adopting pro-environmental behaviours.

Having selected the constructs relevant to the study, we proceed to the selection of the items for the construction of the scales for measuring the constructs. These items are adapted from two approaches in the literature: first, Maibach et al. (2011) for the variables Beliefs, Attitude, Individual Pro-environmental Behaviour and the Pro-environmental Response of the university community; and second, Guay et al. (2000) for the variables of Intrinsic Motivations and Extrinsic Motivations. Due to the content of the items and the low correlations between the items corresponding to each scale, the constructs Beliefs about climate change and Pro-environmental response of the university community are considered formative; while Attitudes, Intrinsic Motivations, Extrinsic Motivations and Individual Pro-environmental Behaviour are considered to be reflective constructs.

Table 1. Research details.

Geographic scope	• Corporación Universitaria Minuto de Dios (UNIMINUTO), Bogotá (Colombia) • Instituto Tecnológico de Monterrey (TEC), Monterrey (Mexico) • Pontifícia Universidade Católica do Rio Grande do Sul (PUCRS), Porto Alegre (Brazil) • Universidad de Caldas (UCALDAS), Manizales (Colombia) • Universidad de Guadalajara (UDG), Guadalajara (Mexico) • Universidad de Manizales (UMANIZALES), Manizales (Colombia) • Universidad del Quindío (UNIQUINDIO), Armenia (Colombia) • Universidad Tecnológica de Pereira (UTP), Pereira (Colombia) • - Universidade Católica de Pernambuco (UNICAP), Recife (Brazil)
Universe	Members of the university community (staff and students) in Latin American universities
Sampling procedure	Non-probabilistic sampling procedure ("snowball")
Data collection method	Online self-administered questionnaire
Sample size	1991 valid questionnaires (546 staff members y 1445 students)
Data collection period	January–March 2021
Statistical analysis	Principal Component Analysis Estimation of Structural Equation Model through Partial Least Squares (PLS-SEM)
Software	IBM SPSS version 25 SmartPLS 3.0

Source: Authors' proposal.

4.2. Samples and data collection

The information was gathered from members of the university community (staff and students) of nine Latin American universities (five Colombian universities, two Mexican universities and two Brazilian universities) participating in an international project focused on developing actions in the field of climate change adaptation and mitigation. In order to obtain the necessary information, non-probabilistic 'snowball' sampling was used: the teachers directly involved in the project were responsible for disseminating the questionnaire amongst their own students, students from other teaching groups, and personal contacts from their respective institutions, obtaining a final sample of 1991 valid questionnaires between January and March 2021 (both inclusive). Table 1 presents the main characteristics of the research.

Moreover, Table 2 presents the distribution of the sample according to the classification variables.

4.3. Data analysis

In the first step, an Exploratory Factor Analysis was carried out through Principal Component Analysis for the items of the reflective constructs in order to check how the items were grouped into factors. Subsequently, the measurement instrument was validated and the structural model was estimated, following the steps proposed by Anderson and Gerbing (1988). Both analyses were performed using the partial least squares regression technique (PLS-SEM).

With regard to the validation of the measurement instrument, it was found that the reflective constructs met the psychometric properties of reliability and convergent and discriminant validity; while for the formative constructs, collinearity and weight-load relationship analyses were carried out. Once it had been verified that the constructs of the study were adequate, the structural equation model was estimated using the partial least squares technique. This type of regression has been widely used in recent years by researchers in the field of marketing (Henseler et al., 2015). PLS-SEM

Table 2. Sample descriptive statistics.

	UNIMINUTO	TEC	PUCRS	UCALDAS	UDG	UMANIZALES	UQUINDIO	UTP	UNICAP	TOTAL	%
TOTAL	447	143	60	205	288	87	66	283	412	1991	100%
Gender											
Male	97	61	31	97	140	33	39	127	162	787	39.53%
Female	349	79	28	108	140	53	26	155	248	1186	59.57%
NA	1	3	0	0	8	1	1	1	2	17	0.85%
Age											
18–21	95	47	16	50	90	11	27	116	148	600	30.14%
22–25	96	48	15	55	49	10	15	70	102	460	23.10%
26–35	168	12	13	39	61	30	6	37	38	404	20.29%
36–45	64	18	9	20	40	21	6	22	34	234	11.75%
46–60	21	14	5	35	39	14	9	28	65	230	11.55%
>60	3	4	2	6	9	1	3	10	25	63	3.16%
Affiliation											
Student	398	100	49	132	160	57	48	211	290	1445	72.58%
Lecturer	27	40	10	71	125	16	12	62	98	461	23.15%
Administr.staff	16	1	0	0	1	1	3	5	1	28	1.41%
Others	6	2	1	2	2	13	3	5	23	57	2.86%

Source: Authors' proposal.

analysis is a non-parametric statistical procedure that does not require normalisation in the distribution of the data (Hair et al., 2014). Furthermore, using the non-parametric bootstrap procedure, the significance of the loadings and paths obtained from the regression estimation can be tested (Efron & Tibshirani, 1986). Finally, the explanatory and predictive power of the model was analysed.

5. Results

In order to carry out the analysis of the results, an exploratory analysis was first performed through Principal Component Analysis with VARIMAX rotation for the items of the scales measuring the reflective constructs and to check the factor structure, taking into consideration the highest loadings of each factor and simplifying the interpretation of the factors (Thompson et al., 2005). As a result of this analysis, having purged items with factor loadings of less than 0.6 in absolute value, four factors were obtained which were identified as the constructs: Attitude towards climate change, Intrinsic motivation and Extrinsic motivation to participate in activities oriented towards the fight against climate change proposed by the university, and Individual pro-environmental behaviour, being reflective constructs. This is followed by the validation of the measurement instrument and the estimation of the structural equation model.

5.1. Validation of the measurement instrument

As a result of the confirmatory factor analysis, the values shown in Table 3 were obtained. Regarding the Cronbach's Alpha and composite reliability coefficients to assess the reliability of the reflective variables, the literature indicates that values above 0.7 are acceptable (Nunnally, 1994) and those above 0.8 are ideal (Carmines & Zeller, 1979). In our case, all our reflective constructs (attitudes, intrinsic motivation, extrinsic motivation, and individual pro-environmental behaviour) obtained values for Cronbach's Alpha and composite reliability coefficients between 0.766 and 0.913,

respectively. We can therefore confirm the adequate reliability of the scales used to measure the reflective constructs.

In relation to the analysis of average variance extracted (AVE), the value of this indicator must be greater than 0.5 (Fornell & Larcker, 1981). In our study, the extracted variance values fluctuated between 0.618 and 0.810. This allows us to confirm the reliability and convergent validity of the scales measuring the reflective constructs of the model.

For discriminant validity analysis, two criteria were applied: the extracted variance test (Fornell & Larcker, 1981) and the Heterotrait-Monotrait Ratio (HTMT) criterion (Henseler et al., 2015). The former is based on the principle that a construct should share more variance with its indicators than with other constructs in the model; and the latter is based on the principle that if MT correlations (relationships between indicators of the same construct) are greater than HT correlations (relationships between indicators measuring different constructs) discriminant validity can be confirmed; therefore, all coefficients should be below 0.85 (Clark & Watson, 2016; Kline, 2015). In our case, in view of the results shown in Table 4, the two criteria applied are fulfilled, which enables confirmation of the discriminant validity of the reflective constructs included in the model. Therefore, we affirm that the scales used to measure our variables meet the psychometric properties of reliability and validity and, thus, the measurement model is suitable for measuring the relationships hypothesised.

With regard to the formative constructs, we proceeded to verify that the constructs Beliefs and Pro-environmental responsiveness of the university community did not present problems of collinearity or significant correlations. In this case, we ensured that there was no multicollinearity by verifying the variance inflation factor (VIF) index (Diamantopoulos et al., 2006). It is recommended that the value of the VIF of the formative constructs should be lower than 3.3 (Petter et al., 2007), or alternatively, lower than 5 (Hair et al., 2013). In our study, none of the VIF values exceeded the value of 3.3; thus, we were confident that there were no collinearity problems. In addition, we found the weights of the indicators to be significant (see Table 3), which allowed us to affirm the appropriateness of the items used to measure the formative constructs.

5.2. Estimation of the structural equations model

The calculation of the structural equations model through the partial least squares regression technique (PLS-SEM) and the bootstrapping procedure are presented in Table 5. From the results, we conclude that beliefs have a positive influence on attitude and intrinsic motivations; attitude significantly influences intrinsic motivations, individual pro-environmental behaviour and the pro-environmental response of the university community; and finally, that intrinsic motivation influences the university's behaviour and response to climate change. Therefore, supporting evidence is found for all the hypotheses proposed in the research except for the relationships derived from the variable Extrinsic Motivation and the relationship between individual pro-environmental behaviour and the pro-environmental response of the university

Table 3. Confirmatory factor analysis results.

Factor	Item	Stand. loading	Weight	t	CA	CR	AVE
Beliefs	B1. How much do you think global warming will harm you personally?		0.482*	11.35	NA	NA	NA
	B2. How much do you think global warming will harm plant & animal species?		0.156*	3.15			
	B3. When do you think global warming will start to harm people in your country?		0.281*	6.45			
	B4. New technologies can solve global warming, without individuals having to make big changes in their lives.		0.117*	3.16			
	B5. Think back to the energy-saving actions you're already doing and those you'd like to do over the next 12 months. If you did most of these things, how much do you think it would reduce your personal contribution to global warming?		0.278*	6.52			
	B6. If most people in the world did these same actions, how much would it reduce global warming?		0.245*	4.68			
	B7. On a scale from −3 (Very Bad) to +3 (Very Good) do you think global warming is a bad thing or a good thing?		0.266*	6.18			
Attitude	A1. How worried are you about global warming?	0.829*		93.63	0.794	0.866	0.618
	A2. How much had you thought about global warming before today?	0.782*		68.34			
	A3. How important is the issue of global warming to you personally?	0.804*		76.39			
	A4. How often do you discuss global warming with your family and friends?	0.726*		49.01			
Intrinsic motivation	I am motivated to participate in actions of my University to fight against climate change because … IM_1. I think these activities are interesting.	0.849*		79.76	0.857	0.903	0.701
	IM_2. I enjoy these types of activities.	0.906*		168.05			
	IM_3. These activities are fun.	0.733*		44.30			
	IM_4. I feel good doing these activities.	0.851*		99.64			
	I am motivated to participate in actions of my University to fight against climate change because … EM_1. There is recognition of academic credits for my degree or master's degree for my participation (if I am a student).	0.890*		8.22	0.880	0.913	0.725

(*continued*)

Table 3. Continued.

Factor	Item	Stand. loading	Weight	t	CA	CR	AVE
Extrinsic motivation	EM_2. There is academic recognition of some kind that allows me to improve my CV or employability.	0.875*		9.08			
	EM_3. It has some type of compensation for the time spent.	0.773*		6.23			
	EM_4. I have recognition and prestige from my peers.	0.861*		7.40			
Individual pro-environmental behaviour	IPB1. Over the past 12 months, how often have you rewarded companies that are taking steps to reduce global warming by buying their products?	0.913*		152.47	0.766	0.895	0.810
	IPB2 Over the past 12 months, how often have you punished companies that are opposing steps to reduce global warming by NOT buying their products?	0.887*		110.29			
Pro-environmental response of the university community	PRUC1. Do you think global warming should be a low, medium, high, or very high priority for your university/campus?		0.497*	12.13	NA	NA	NA
	PRUC2. Do you think the university community (students and staff) should be doing more or less to address global warming?		0.492*	12.45			
	PRUC3. How big an effort should your university/campus make to reduce global warming?		0.392*	9.91			

CA: Cronbach's alpha; CR: Composite Reliability; AVE: Average Variance Extracted; NA: Non-applicable. *Significant at $p < 0.05$. Source: Authors' proposal.

Table 4. Discriminant validity.

	F1	F2	F3	F4	F5	F6
F1. Beliefs	NA	NA	NA	NA	NA	NA
F2. Attitudes	0.518	0.618	0.498	0.043	NA	0.505
F3. Intrinsic motivation	0.324	0.424	0.701	0.269	NA	0.263
F4. Extrinsic motivation	0.019	−0.011	0.225	0.725	NA	0.037
F5. Pro-environmental response of the university community	0.414	0.454	0.385	0.039	NA	NA
F6. Individual pro-environmental behaviour	0.193	0.389	0.217	−0.018	0.204	0.810

Diagonal: square root of average variance extracted (AVE).
Below the diagonal: correlations between factors.
Above the diagonal: HTMT criterion.
NA: Non-applicable. Source: Authors' proposal.

community. Thus, to get the members of the university engaged with pro-environmental behaviour, it is important to tap the factors that intrinsically motivate them. Furthermore, attitudes positively influence pro-environmental behaviour, both privately and as a member the university community through intrinsic motivation, in contrast to the 'green gap phenomenon' discussed in previous research (El Haffar et al., 2020).

The values of the coefficients of determination of the variables of the attitudes and pro-environmental response of the university community are above 0.2, which is

Table 5. Structural equations model results.

Hypothesis	Standardized beta	Bootstraping t	Decision
H1: Belief → Attitude	0.518	27.703*	Supported
H2: Belief → Intrinsic Motivation	0.143	4.427*	Supported
H3: Belief → Extrinsic Motivation	0.034	1.007	Not supported
H4: Attitude → Intrinsic Motivation	0.350	13.501*	Supported
H5: Attitude → Extrinsic Motivation	−0.029	1.014	Not supported
H6: Attitude → Individual pro-environmental behaviour	0.389	20.734*	Supported
H7: Attitude → Pro-environmental response of the university community	0.347	14.281*	Supported
H8: Intrinsic Motivation → Pro-environmental response of the university community	0.236	8.944*	Supported
H9: Extrinsic Motivation → Pro-environmental response of the university community	−0.010	0.445	Not supported
H10: Individual pro-environmental behaviour → Pro-environmental response of the university community	0.018	0.838	Not supported

R2 (Attitude) = 0.268; R2 (Intrinsic motivation) = 0.194; R2 (Extrinsic motivation) = 0.001; R2 (Individual pro-environmental behaviour) = 0.151; R2 (Pro-environmental response of the university community) = 0.251.
Q2 (Attitude) = 0.154; Q2 (Intrinsic motivation) = 0, 127; Q2 (Intrinsic motivation) = 0.000; Q2 (Individual pro-environmental behaviour) = 0.117; Q2 (Pro-environmental response of the university community) = 0.124.
*Significant at $p < 0.01$.
Source: Authors' proposal.

considered acceptable in Social Science research and, specifically, in behavioural research standards (Hair et al., 2014). However, for motivations and individual pro-environmental behaviour, this reference value is not reached. This leads to the inference that other variables that had not been included in the model may have been contributing, which would largely explain the variability presented by these constructs.

5.3. Multigroup analysis

In order to test Hypothesis 11 concerning the moderating role played by the type of link to the institution, a multi-group analysis was carried out, dividing the members of the university community into two groups, students and employees, involving 1445 and 546 observations, respectively. Given that the current study aims to compare a model over two groups *via* PLS-SEM, the measurement invariance of composites (MICOM) has been performed, as suggested by Henseler et al. (2015). MICOM is a three-step process involving (1) configural invariance assessment; (2) the establishment of compositional invariance assessment; and (3) an assessment of equal means and variances. Both the configural invariance and the compositional invariance requirements have been met for all the constructs. Regarding the assessment of equal means and variances, full measurement invariance has been established for Intrinsic Motivation, whereas partial measurement invariance requirements have been met for the rest of constructs, thus allowing to comparing and interpreting the MGA group-specific differences of PLS-SEM results.

Once the invariance of the constructs had been verified, we proceeded to the analysis of the results of the multi-group analysis presented in Table 6. The methods implemented for interpretation were the Welch-Satterthwaite test and Henseler's MGA method. The former is a parametric test that performs the analysis with unequal variances (Welch, 1947), and the latter method is a non-parametric test that

Table 6. Results of hypotheses testing.

	Path Coefficient		Confidence Interval (95%)			P-Value Difference (One-Tailed)		
Relationships	Students	Employees	Students	Employees	Path Coefficient Difference	Welch-Satterthwait Test	Henseler's MGA	Supported
H1: Belief → Attitude	0.519	0.506	(0.470; 0.558)	(0.427; 0.563)	0.012	0.765	0.386	No/No
H2: Belief → Intrinsic Motivation	0.106	0.241	(0.023; 0.185)	(0.118; 0.339)	0.135	0.053	0.972	No/Yes
H3: Belief → Extrinsic Motivation	0.010	0.102	(–0.093; 0.099)	(–0.046; 0.193)	0.092	0.229	0.890	No/No
H4: Attitude → Intrinsic Motivation	0.381	0.270	(0.322; 0.439)	(0.180; 0.365)	0.111	0.048	0.024	Yes/Yes
H5: Attitude → Extrinsic Motivation	0.016	−0.044	(–0.059; 0.079)	(–0.141; 0.065)	0.061	0.343	0.172	No/No
H6: Attitude → Individual pro-environmental behaviour	0.340	0.342	(0.281; 0.391)	(0.249; 0.423)	0.002	0.965	0.520	Yes/No
H7: Attitude → Pro-environmental response of the university community	0.385	0.339	(0.340; 0.427)	(0.262; 0.413)	0.046	0.305	0.153	No/No
H8: Intrinsic Motivation → Pro-environmental response of the university community	0.266	0.153	(0.205; 0.328)	(0.052; 0.254)	0.113	0.061	0.031	No/Yes
H9: Extrinsic Motivation → Pro-environmental response of the university community	−0.024	0.036	(–0.091; 0.024)	(–0.050; 0.108)	0.060	0.218	0.894	No/No
H10: Individual pro-environmental behaviour → Pro-environmental response of the university community	0.009	0.035	(–0.035; 0.057)	(–0.055; 0.126)	0.026	0.620	0.690	No/No

Note: In Henseler's MGA and Welch-Satterthwait method, the *p*value lower than 0.05 or higher than 0.95 indicates at the 5% level significant differences between specific path coefficients across two groups.
$^{*}p < 0.05$, $^{**}p < 0.01$. Source: Authors' proposal.

directly compares subsamples created from randomly exchanged observations from the original data set (Henseler et al., 2009). The reason we decided to run both types of tests was because we detected through the MICOM analysis that the variances were not equal in some of our variables.

Depending on the methods used, *p*value of differences between path coefficients of less than 0.05 or greater than 0.95 indicate a 5% level of significant differences between specific path coefficients in two groups (Henseler et al., 2009). Therefore, we found that there were significant differences between students and employees in several of the hypotheses we raised. Specifically, the link between attitude and intrinsic motivation is significantly stronger for students in comparison with employees, both in the Welch-Satterthwait test and Henseler's MGA analysis, which guarantees the robustness of this finding. It was also observed that the influence of intrinsic motivation on the pro-environmental responsiveness of the university community was stronger for students compared with other members of the university community. On the other hand, the relationships between beliefs and intrinsic motivation and individual pro-environmental attitude and behaviour were stronger for employees. These stronger relations may be explained by the usually longer permanence of employees as members of the university community, or their relatively higher matureness, that would lead them to act more consistently in comparison to students.

6. Conclusions and discussions

This paper examines the pro-environmental behaviour of the University community contributing to a better understanding of the behaviour of the university community in matters related to caring for the environment and the fight against climate change. The findings make a significant contribution to previous theories and research on consumer behaviour, given that, in general, the results obtained indicate that, as the university community increases its knowledge on issues related to climate change, beliefs are constructed and attitudes are elicited, which leads to the development of intrinsic motivation to engage in climate change mitigation actions and subsequently determines pro-environmental behaviour. This behaviour will vary according to what the individual does individually and what he does in a group setting. Therefore, we can deduce that when it comes to issues related to climate change or sustainability; beliefs, attitudes, motivations and behaviours are good predictors of human behaviour. All these findings make it possible to make substantial progress in the knowledge of how individual behaviour develops, as well as the generation of the response that the university community as a collective should give, as judged by the individual.

6.1. Theoretical implications

The present study thereby supports the relationship between beliefs-attitudes-motivations-behaviours in the individual and social spheres in the context of the actions undertaken by the university to adapt to and mitigate climate change that are aimed at the university community (students and employees). From this research, it can be highlighted that beliefs are a key factor in order for members of the university

community to adopt attitudes that will subsequently lead to pro-environmental behaviour. In other words, in order for an individual to have a positive or negative attitude towards environmental protection, he must first have prior knowledge that allows him or her to develop an accurate assessment in a variety of situations. We recognise beliefs as being points of view which, even if not consciously formulated by the individual, act as self-evident assumptions, without which what one does would be meaningless (Braun, 2012). Therefore, we conclude that beliefs have a significant influence on the development of an attitude and also determine the degree of a person's internal motivation. In this regard, beliefs have a significant influence on intrinsic motivations, but not on extrinsic motivations. These results may be explained by the fact that the latter type of motivation is linked to other external factors (academic recognition, financial remuneration, prestige), which do not depend on the individual's beliefs.

On the other hand, empirical evidence was found to demonstrate that when members of the university community adopt an attitude, they subsequently develop an internal motivation to participate in university actions oriented towards climate change, pro-environmental behaviour in the private sphere and a critical judgement about the response that the university community should make regarding issues related to climate change.

Based on the TPB proposed by Ajzen (1991), which postulates that behaviour is preceded by beliefs, attitudes and intentions, the model tested in this study also included motivations. Consequently, this variable was found to be a suitable indicator to describe behaviour and to have a significant influence on members of the university community to adopt pro-environmental behaviour to help in the fight against climate change, provided that these motivations were internal.

Finally, this study aimed to measure whether there is a relationship between individual pro-environmental behaviour and the pro-environmental response of the university community. This hypothesis stems from the idea that a person with pro-environmental behaviour would certainly expect universities to be more involved in issues related to climate change. However, we were unable to verify this connection and, therefore, did not observe a relationship between individual behaviour and the expected response of the university community—of which the individual forms part. This finding supports the theories that claim there is a discrepancy between a person's behaviour in individual and group contexts, as outlined in previous sections. Moreover, although some hypotheses had already been confirmed in other contexts, to the best of our knowledge, this is the first analysis of the factors influencing pro-environmental behavioural intentions on climate change in the university community.

6.2. Managerial implications

The results obtained in this study could help the participating universities to understand what really motivates members of the university community to get involved in the fight against climate change and could provide them with a theoretical and practical basis for knowing where to direct their activities. Furthermore, the findings have important organisational implications that require strategic action on the part of the

universities. Members of the university community receive ever more information about the importance of caring for the environment; however, many of the actions that seek to promote pro-environmental behaviour are not effective. This is why, with this study, we have demonstrated that effectiveness not only depends on information but on a structured process that goes beyond knowledge alone.

Based on the results obtained in this study, universities should focus their efforts not only on providing information about caring for the environment but also on generating an emotional bond that will allow all their members to develop a positive attitude, which will motivate them to behave in a pro-environmental manner. Once this gap between simple information and an emotional, motivational and behavioural connection is bridged, many members of the university community will become more involved in the fight against climate change.

To make effective pro-environmental actions, it is essential for society in general to be involved and to feel an increasing sense of participation in the preservation of the planet. At the university level, it is recommended that the board and the management groups analyse the actions carried out more extensively in order to identify and recognise which of them generate a greater emotional bond in the members of this community, segmenting them according to the links the various members have with the university. Specifically, while university communications to increase students' intrinsic motivation should focus more on fostering their attitudes towards environmental protection, in the case of employee-oriented communications, the focus should be on climate change beliefs, given the differences observed between different members of the university community.

Furthermore, we were able to detect that extrinsic motivation does not lead to a pro-environmental response from the university community. This may be explained by the fact that the incentives in academic or financial terms for participating in these actions are perceived as being insufficient. Therefore, the university must identify the right incentives in order to support the relationship between extrinsic motivation and the efforts that should be made by the university.

Finally, we note that individual pro-environmental behaviour does not influence the pro-environmental response of the university community. This may be due to the fact that people develop a tendency to behave differently in individual and group settings. In this regard, universities should strive for effective actions that generate greater involvement and awareness among their members so that they do not feel that their individual efforts are not having an impact on a group level, but instead feel a greater desire for the university to become involved in the problems caused by climate change.

6.3. Limitations and future research

This study considers a model of predictor variables to explain, to some degree, the level of involvement of members of the university community in the fight against climate change, from the perspective of several Latin American universities. However, a number of factors limit the possibility of generalising the results. Firstly, the type of sampling (non-probabilistic snowball sampling) means that in the case of some

universities participating in the study, the final sample is comparatively smaller than in others and has a certain bias that does not guarantee its representativeness with respect to the group from which it is drawn. In addition, the geographical context in which the research was carried out, three Latin American countries, where sensitivity to environmental issues has not yet developed to the level of European countries, limits the generalisability of the findings in a global context.

Furthermore, despite the relevance of the constructs included in this research, the explanatory power of the model, as measured by the coefficient of determination, is relatively low. This suggests that there may be other factors that determine the pro-environmental behaviour of the members of the university community and the perception of the response that should be given by the university to combat climate change. In this regard, other variables could be included, such as the subjective norm, which refers to the importance of people, friends, or authority figures for pro-environmental behaviour.

Alternatively, this relatively low explanatory power of the model may be due to the use of self-reported assessments instead of measures of actual behaviour. Due to the relatively lower accuracy of self-reports and their effect on tests of attitude-behaviour relationships (Manfredo & Shelby, 1988), we would recommend that further research should measure, test and model both self-reports and past behaviour separately in examining attitude-behaviour relationships.

Future lines of research could carry out this same study in other countries and with other universities, in order to verify whether the results obtained are similar or vary for each of the variables considered in this study. In this sense, it may be possible that the cultural dimension influences behaviour positively or negatively.

Moreover, we have posit the chain 'beliefs-intrinsic motivation-proenvironmental behaviour of the university community' based on the Theory of Planned Behaviour. The mediating effect of intrinsic motivation between beliefs and proenvironmental behaviour of the university community, using alternative statistical analysis techniques, is a research line to be explored more in depth.

Last, additional variables could be included to improve the explanatory power of the model. It is thought that variables such as Subjective Norm or Satisfaction could contribute towards explaining pro-environmental behaviour, as the influence of friends, family or peer groups and simple wellbeing or pleasure in caring for the environment may be adequate predictors to describe such behaviour.

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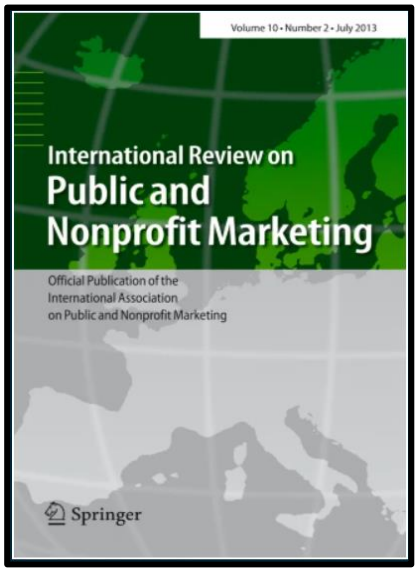
A2. Artículo 2. Comportamientos proambientales de la Generación Z: Un enfoque transcultural

Juma-Michilena, I., Ruiz-Molina, M., Gil-Saura, I., & Belda-Miquel, S. (2024). Pro-environmental behaviours of generation Z: A cross-cultural approach. *International Review on Public and Nonprofit Marketing*, https://doi.org/10.1007/s12208-024-00395-9

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ORIGINAL ARTICLE

Pro-environmental behaviours of generation Z: A cross-cultural approach

Israel-Javier Juma-Michilena[1] · Maria-Eugenia Ruiz-Molina[2] · Irene Gil-Saura[2] · Sergio Belda-Miquel[3]

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Abstract
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Keywords Pro-environmental Behaviour · Climate Change · Generation Z · Beliefs · Attitudes · Intrinsic Motivations

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1 Introduction

More than two decades of scientific research have shown that human exposure to air pollutants has a major impact on health (Weinmayr & Forastiere, 2022). This problem has become particularly relevant worldwide due to greenhouse gases and the frequency of extreme weather events (Wu et al., 2022). Without mitigation, climate change will result in severe temperature disturbances, droughts, sea level rise, species loss, and food insecurity, and will threaten the social and economic growth of the world's population (Hurst & Walker, 2022). Therefore, it is increasingly important that actions are taken to raise awareness in society about the importance of pro-environmental behaviours.

Human behaviour plays a key role in the increase or decrease of issues caused by climate change (He et al., 2023), and it is necessary to make drastic changes in current behaviours in order to successfully tackle these matters. Unfortunately, some people do not engage with pro-environmental behaviours (Jans, 2021), but it is clear that everyone's support is necessary to help fight this problem. Consequently, it is necessary to establish a pattern of behaviour that helps to improve the effectiveness of the actions taken up to now.

Several studies have validated the Theory of Planned Behaviour (hereinafter TPB) proposed by Fishbein and Ajzen (1975) as a good predictor of human behaviour, which ensures that beliefs determine or guide attitudes and behavioural intentions (Kumar & Nayak, 2022). The TPB has a flexible model and has been widely used to measure behaviour in a business and industrial context. However, this theory is not without limitations (Ashaduzzaman et al., 2022) and the fundamental model may not comprise sufficient components when it comes to pro-environmental behaviours.

Similarly, previous studies have highlighted the importance of using generational cohorts in behavioural research (Kamenidou et al., 2019), so it is considered essential to analyse this factor to obtain optimal prediction results. The coexistence of several generational cohorts is a challenge, since each cohort has preferences for different styles of motivation and communication (Maan & Srivastava, 2022) and, on the other hand, individuals from the same generational cohort share similar attitudes, beliefs and values (Seyedimany & Koksal, 2022), so it is essential to know how to increase the effectiveness of actions carried out for pro-environmental purposes.

A generational cohort is understood as a group of people born in the same period of time, united by age and lived cultural circumstances (Llopis-Amorós et al., 2019). The generation considered for this study is Generation Z, individuals born after 1995 (Cuic et al., 2022). There are several reasons why this generational group has been considered as a research objective, not least that it is the most numerous generation worldwide and represents a large part of the planet's labour force (Sakdiyakorn et al., 2021). Several of its members are about to graduate from university, which makes them a vital focus for any type of initiative. In turn, this group is classified as technologically intelligent, educated, innovative and creative, which, to a large extent, shapes their pro-environmental behaviour and their basic social values (Parzonko et al., 2021).

Also, it should not be overlooked that the young members of this generational group will experience greater effects of climate change in adulthood than adults today (Wallis & Loy, 2021), therefore, it can be assumed that this generational cohort should be the most committed to adopting pro-environmental attitudes, since they are the ones who will have to face the consequences of poor environmental management (Dąbrowski et al., 2022). In turn, there is only scant evidence in the literature of studies applying this TPB to Generation Z on pro-environmental issues, which is important to analyse because this relatively young group will experience the main future consequences, suggesting that they should be the most interested in adopting pro-environmental attitudes and behaviours (Dąbrowski et al., 2022). Therefore, this study aims to explore moderating factors that may influence the pro-environmental behaviour of Generation Z.

It is important that the beliefs, attitudes, and behaviours of Generation Z favour a positive future for the environment because these individuals will not only act in their own personal interest, but rather, they will transmit part of their identity, their knowledge and emotional attachment to social groups (Jans, 2021) that will help preserve the planet in both the medium and long term.

Additionally, a cross-cultural approach has been adopted using a sample of individuals belonging to generation Z considering different nationalities (Colombian, Mexican and Brazilian) to see if there are significant differences in the results and to validate whether or not cultural impact influences the behaviours of this generational cohort. The reason why these countries have been considered as the focus of research is because there are several studies that analyse and compare pro-environmental behaviour within the contexts of European, Asian, or North American countries (Culiberg & Elgaaied-Gambier, 2016; Lange & Iwasaki, 2020; Punzo et al., 2019; Rao et al., 2022; Soyez, 2012), while research in other regions (e.g., Latin America) is rather scarce. Paradoxically, developing countries, where most environmental challenges occur, with their associated impacts, have received little research attention (Amoah & Addoah, 2021). Consequently, this work contributes to the previous literature on causal models of pro-environmental behaviour prediction by answering the following questions:

RQ1: Does TPB explain Generation Z's individual pro-environmental behaviour?
RQ2: Does culture influence Generation Z's pro-environmental behaviour?

These questions are relevant for both researchers and managers, since they can help to create a roadmap that will establish actions aimed at mitigating the problems caused by climate change based on a behaviour prediction approach.

In order to achieve the proposed objective, firstly, an analysis of the main bibliographical sources of studies related to the subject of this paper is carried out. This literature review allows us to propose a theoretical model to identify the variables that lead to the pro-environmental behaviour of Generation Z and to propose hypotheses to be tested. Next, we describe the methodology followed to carry out the fieldwork in order to verify the existence of relationships between the proposed variables through a structured questionnaire or survey. This is followed by the

results obtained, from which, finally, conclusions are drawn, and some limitations and future lines of research are pointed out.

2 Literature review

The TPB, proposed by Fishbein and Ajzen (1975), is considered one of the best predictors of human behaviour and has been widely used to predict individual decision-making processes (Rao et al., 2022). This theory states that the individual's behaviour is conditioned by attitude and beliefs (Correia et al., 2022); however, when it comes to environmental issues, individuals are often influenced by other surrounding factors when deciding whether or not to adopt environmentally friendly behaviours. At this point, situational or motivational factors are considered important variables affecting individual pro-environmental behaviours (Cao et al., 2022).

Pro-environmental behaviour is defined as a conduct adopted by a person that is seen by societies as preserving the environment (Basiru et al., 2022) or, in turn, actions taken to avoid damage to and/or protect the environment (Correia et al., 2022). Along these lines, within the framework of the TPB, it is considered that before the individual opts for a pro-environmental behaviour, they must acquire a belief and later an attitude.

Beliefs are created by knowledge acquired by the individual in which different cognitive processes interact, such as attention, perception, and memory (Connors & Halligan, 2022), and are the result of cumulative experiences that are socially transferred to a large extent through education, organisational and cultural settings, and the exposure of individuals to the media and various sources of information (Laukkanen, 2022).

Attitudes are defined as the positive or negative evaluation of a specific behaviour (Ateş, 2020) and indicate to what extent the behaviour in question is agreeable, desirable, pleasant, useful (Karimi et al., 2021) or it can be the opposite and negatively influenced by disengagement.

Disengagement involves active and observable behaviours, for example giving up on a challenge due to negative emotions such as anxiety, sadness, and boredom (Taboada et al., 2017). Likewise, the condition is conceptualised as a lasting feeling guided by positive emotions that generates greater emotional empathy (Kim et al., 2018). In this sense, environmental disengagement is understood as the detachment of the individual towards nature.

On the other hand, motivations also play an important role in the adoption of the attitude and, therefore, in the determination of the behaviour. In this work, intrinsic motivation has been considered because it is positively linked to behaviour (Budzanowska-Drzewiecka & Tutko, 2021) and is more durable than external motivation, which is highly random due to the uncertainty of secondary incentives. Intrinsic motivation is defined as internally driven interest, that is, the passion, enjoyment, or satisfaction of performing a certain behaviour for pure pleasure (Faraz et al., 2021).

Similarly, an individual who has had previous experience in environmental matters is much more likely to develop pro-environmental behaviours compared to a

person who has never interacted in matters related to environmental protection or adaptation. Therefore, the more frequently individuals become involved in environmental issues, the greater their willingness and enthusiasm for environmental protection (Ye et al., 2022).

Finally, it is also considered that the low effectiveness of the actions carried out with pro-environmental intentions is due to the attitudes and behaviours exhibited by the different generational cohorts (Prayag et al., 2022). Mannheim (1970) defines the generational cohort as a set of individuals born within a similar time span who share a life stage. More specifically, the generational cohort is a group of people who are of comparable age and experience similar economic, social, and cultural events (Lin & Chen, 2022). It should be noted that generational differences are not determined by the age of an individual, but rather by shared experiences within specific periods of time (Eger et al., 2021).

In the generational studies literature, there has been controversy in the categorisation of generations; however, for the purposes of this study, the most widely accepted categorisation has been considered: Baby Boomers (1946–1964), Generation X (1965–1979), Generation Y or Millennials (1980–1995), and Generation Z or Centennials (1996–2003) (Yawson & Yamoah, 2020).

With the aim of improving the effectiveness of the pro-environmental actions carried out so far, the pro-environmental behaviours of Generation Z have been analysed. This choice is due to the fact that the most interesting characteristic of this generational group is their focus on improving their skills and knowledge (Casalegno et al., 2022), which is vital in the environmental fight and can help to influence other generational groups.

3 Hypotheses and proposed model

The Theory of Planned Behaviour (TPB), which explains that beliefs and attitudes influence the onset of a certain behaviour, has been used as the theoretical framework of the study. Numerous approaches support this theory in different fields of research (Carfora et al., 2021; Jung et al., 2020; Moon, 2021; Raghu & Rodrigues, 2022; Stehr et al., 2021; Youn et al., 2021; Yuriev et al., 2020). In all of them, attitudes are explained by beliefs, which can favour both negative and positive affective responses (Dąbrowski et al., 2022). Consequently, in the context of this study we present the following approach:

H1: Beliefs about climate change influence attitudes towards it.

On the other hand, this work also proposes to incorporate variables of environmental disengagement and intrinsic motivation as relevant factors prior to adopting an attitude. In this regard, it can be expected that the attitude represents a negative individual affective response due to environmental disengagement or a positive one due to intrinsic motivation. As a result, attitude becomes an essential determinant for an individual to commit, or not, to practising pro-environmental behaviours (Razali et al., 2020). These approaches are supported by studies implemented in

different areas of knowledge, in which, from a positive perspective, intrinsic motivations influence the adoption of an attitude (Pihu et al., 2008; Cho et al., 2020; Qin & Tao, 2021; Al-Jubari et al., 2021), and from a negative and unfavourable point of view, disengagement acts as a predecessor of attitude, when studied from different approaches. For example, Brosch (2021) affirms that emotions are affective states that can be positive or negative and that to a certain extent condition attitudes. On the other hand, Ahn and Kwon (2020) mention that negative anticipated emotions are predecessors of attitude, or in turn, D'Arcy and Lowry (2019) affirm that a negative affective state precedes attitude. Environmental disengagement can also be understood as a lack of environmental commitment, which is supported by previous studies that corroborate that the tendency to morally disengage with pro-environmental initiatives is negatively associated with pro-environmental attitude (Nicolai et al., 2022). Similarly, previous studies have found that intrinsic motivation positively influences pro-environmental attitude and behaviour (Faraz et al., 2021). In light of the above, and within the context of this study, we outline the following hypotheses:

H2: Environmental disengagement of the individual generates a negative attitude towards climate change.
H3: Intrinsic motivations of the individual generate a positive attitude towards climate change.

Likewise, it has been highlighted that, once the individual adopts an attitude, behaviour subsequently follows. This statement is supported by the TPB raised by Fishbein and Ajzen (1975). Therefore, as it is a more specific field, there may be variation in behaviour when it comes to pro-environmental issues. However, several studies support the relationship between pro-environmental attitude and behaviour (Bissing-Olson et al., 2013; Whitburn et al., 2019; Shafiei & Maleksaeidi, 2020; Chwialkowska et al., 2020; Davignon et al., 2022; Hossain et al., 2022). Based on this evidence, the following approach is proposed:

H4: Attitudes towards climate change lead to individual pro-environmental behaviours.

In this way, our proposal is aimed at intertwining the factors that condition individual pro-environmental behaviours and although attitudes are an outstanding antecedent, there are also other factors that influence behaviour, such as previous participation in pro-environmental initiatives and the same intrinsic motivations that influence attitude. Cheng et al. (2022) affirm that, for an individual to be committed to carrying out an individual behaviour, first, they must be aware of the outcome of not participating in a pro-environmental behaviour; second, they must perceive that the stronger they are, the more likely they are to implement pro-environmental behaviours. Finally, they must have a sense of responsibility, which is acquired through awareness of the consequences. Therefore, it is assumed that people who have previously participated in pro-environmental activities will be more aware and will be more predisposed to perform individual pro-environmental behaviours.

In turn, intrinsic motivation also plays an important role before the behaviour is adopted, as supported by previous literature in different areas of knowledge (Afsar et al., 2016; Budzanowska-Drzewiecka & Tutko, 2021; Faraz et al., 2021). Based on this evidence, the following hypotheses are proposed:

H5: Intrinsic motivations influence individual pro-environmental behaviours.
H6: A person's previous participation in environmental initiatives influences individual pro-environmental behaviours.

Lastly, in the environmental context, several studies have examined the moderating role of nationality when analysing pro-environmental behaviours (Capstick et al., 2019; Higueras-Castillo et al., 2019; Lamiño-Jaramillo et al., 2022; Phuphisith et al., 2020) due to the importance of knowing whether culture influences these behaviours. Chwialkowska et al. (2020) propose a model of cultural influences on pro-environmental consumer behaviour extending the TPB framework by including additional variables showing that pro-environmental attitudes, intentions and behaviours vary by cultural differences. Similarly, Vicente-Molina et al. (2013) show that pro-environmental behaviour from motivations and attitudes vary by nationality. Furthermore, cross-cultural studies show that there are significant differences in pro-environmental behaviour with different cultural backgrounds (Mi et al., 2020).

In addition, other studies consider that factors such as beliefs, disengagement, intrinsic motivations, attitudes, and previous involvement in pro-environmental behaviour and climate change can be influenced by nationality from a cross-cultural approach. More specifically, McKercher et al. (2011) argue that beliefs and attitudes towards climate change and pro-environmental behaviours differ significantly across nationalities. Similarly, in research conducted by Wolf and Moser (2011), lack of commitment and negative attitudes towards climate change are influenced by nationality and cultural aspects.

Also, Gainsburg et al. (2023) support the possibility that country-level variables are directly linked to pro-environmental attitudes and behaviors, and thus to climate change. Likewise, Kim et al. (2013) validate the hypothesis that attitudes toward climate change are positively related to pro-environmental behavior. These allusions are supported by studies that consider nationality as a factor influencing pro-environmental behaviors (Pisano & Lubell, 2017; Wang et al., 2021).

At the same time, studies such as Capstick et al. (2022) show how nationality influences intrinsic motivations and pro-environmental behaviors. And, finally, previous participations in pro-environmental initiatives can influence individual pro-environmental behaviors being supported by studies that over the years have been tested considering nationality as a determinant factor in pro-environmental behaviors (Cordano et al., 2011; Culiberg & Elgaaied-Gambier, 2016; Izagirre-Olaizola et al., 2015; Morren & Grinstein, 2016; Poortinga et al., 2019; Punzo et al., 2019; Tam & Chan, 2017; Unanue et al., 2016).

In this sense, concern about environmental damage is increasingly pressing and several experts have analyzed differences between countries, such as studies analyzing the United States, Japan, Mexico and Peru (Bechtel et al., 2006); China and Japan (Branzei et al., 2001); Costa Rica-Mexico-Venezuela-Brazil (Christen

et al., 1998); Switzerland and Sweden (Kaiser & Biel, 2000). Some research has incorporated a larger sample of countries: studies of 27 countries (Oreg & Katz-Gerro, 2006); and 43 countries (Inglehart, 1995). Therefore, it is important to know whether the model proposed in this study shows variations according to nationality. Consequently, we posit:

H7: There are differences between individuals of different nationalities in the intensity of the following relationships:

(7a) Beliefs about climate change influence the attitude towards it.
(7b) The individual's environmental disengagement generates a negative attitude towards climate change.
(7c) The intrinsic motivations of the individual generate a positive attitude towards climate change.
(7d) Attitudes towards climate change generate individual pro-environmental behaviours.
(7e) Intrinsic motivations influence individual pro-environmental behaviours.
(7f) An individual's prior involvement in environmental initiatives influences individual pro-environmental behaviours.

Based on the above, and on the literature review, an innovative theoretical model is proposed that includes TPB variables and combines them with additional factors that influence pro-environmental behaviours, with the aim of finding an adequate mechanism to help in the fight against climate change by individuals belonging to Generation Z. This model is represented visually in Fig. 1.

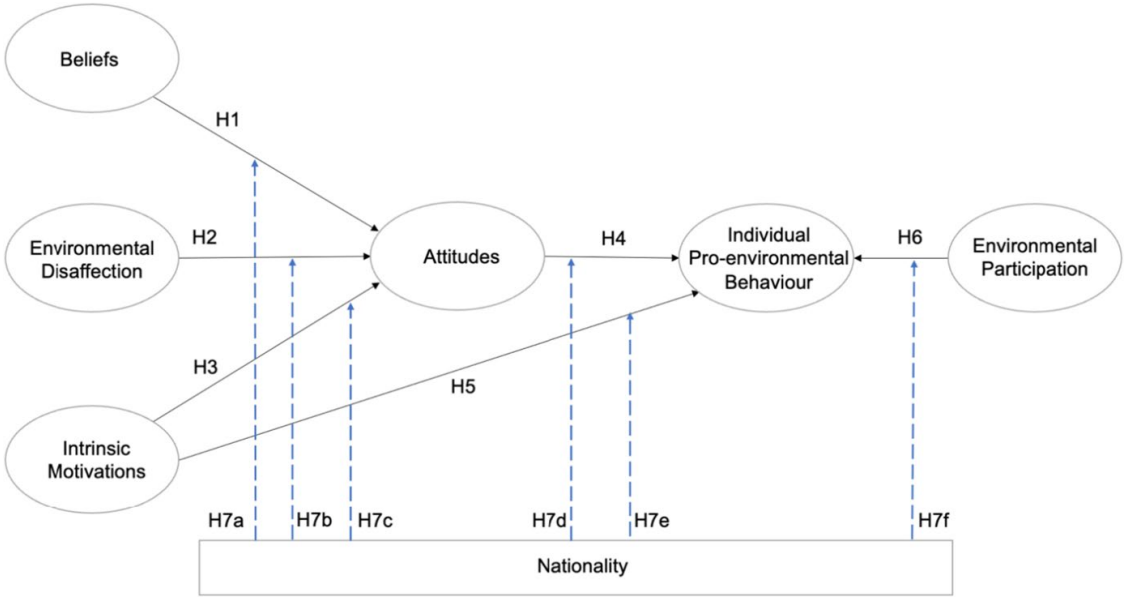

Fig. 1 Proposed Model. Source: Made by the authors

4 Materials and methods

4.1 Measurement of the variables

To achieve the proposed objective and contrast the model and the hypotheses, a quantitative investigation was carried out through a structured questionnaire. The scales used were adapted from previous studies and an ad hoc proposal for data collection was also implemented. Specifically, the scales of the Beliefs, Attitudes, Individual pro-environmental behaviours, and Environmental disengagement variables were adapted from the scale proposed by Maibach et al. (2011) and measured using Likert-type scales as in the original proposal. Regarding the Intrinsic motivation variable, the proposed items were adapted from Guay et al. (2000) and measured using 7-point Likert scales. Finally, the items considered for the variable Environmental participation were based on an ad hoc proposal in order to gather information on previous interactions of respondents with environmental actions and explore whether or not this influences the other variables considered in this study; the items are measured using 5-point Likert scales ranging from 1 = never to 5 = very often.

On the other hand, all the variables of the questionnaire have been considered as reflective constructs, with the exception of the Beliefs variable, which has been conceived as formative. In this sense, the formative constructs have indicators that are the source of the variable, so any change or modification does not affect the other indicators, while in a reflective construct the minimum change in the variable is reflected in the other indicators (Hanafiah, 2020).

4.2 Sample and information collection

Information was gathered on Generation Z members of Colombian, Mexican, and Brazilian nationality. Although there is still no consensus regarding the exact age range of Generation Z, most academics agree that they are individuals born after 1995 (Cuic et al., 2022). Therefore, for the purposes of this research, the age range is between 18 and 25 years old. In this way, it is intended to evaluate a pattern of behaviour by comparing different nationalities in order to identify variables that help explain the phenomenon under study.

To obtain the necessary information, a non-probability "snowball" sampling was used, obtaining 1050 valid questionnaires as a final sample. Table 1 shows the main characteristics of the research.

Regarding the demographic profile of the respondents (Table 2), Generation Z was taken into consideration, which includes relatively young individuals, due to the repercussion that this generational cohort has in caring for the environment and because it is a group that has a high level of education, is technology savvy (Su et al., 2019), and has the ability to instil a sense of responsibility in other community members to lead the fight against climate change both now and in the future. In this sense, the generational cohort is explained as a group of people born in the same time span and who have been exposed to the same social, political, or economic

Table 1 Technical data of the research

Data	Description
Universe	Citizens of Colombian, Mexican and Brazilian nationality belonging to generation Z between 18 and 25 years of age, both included
Sampling procedure	Non-probabilistic snowballing
Method	Structured questionnaire administered online
Measuring technique	Likert type scales
Sample size	1050 valid questionnaires
Survey data collection period	January—March 2021
Geographical scope	Latin American countries: Colombia, Mexico and Brazil
Statistical techniques	Principal component analysis—Partial least squares structural equation model estimation (PLS-SEM)
Statistical programmes	IBM SPSS version 25 and SmartPLS 4.0

Source: Authors' proposal

Table 2 Sample characteristics

Variables	N	%
Gender		
Male	362	34%
Female	678	65%
Prefers not to identify	10	1%
Age		
18–21 years	595	57%
22–25 years	455	43%
Nationality		
Colombian	544	52%
Mexican	229	22%
Brazilian	277	26%

Source: Authors' proposal

events (Moise et al., 2020). Therefore, the population or generational cohort taken into consideration for this study is Generation Z, also known as "Centennials", with an age range from 18 to 25 years.

It should be noted that, due to the non-probabilistic sampling procedure considered for this study, the sample is not representative of the population, but due to the high number of valid questionnaires collected, it can be considered as a suitable sample to test the validity of the hypotheses put forward.

4.3 Data analysis techniques

The analysis of the results obtained was carried out in two phases. First, an exploratory factor analysis with Varimax rotation was carried out for the items of the

reflective constructs in order to demonstrate how the indicators were grouped in each of the factors. Secondly, the formative indicators of the model were evaluated through an analysis of collinearity and load weighting relationship. Finally, the measurement instrument was evaluated and the structural model estimated using the partial least squares regression technique (PLS-SEM) (Bagozzi, 1994; Bagozzi & Yi, 1988; Fornell & Larcker, 1981).

5 Results

5.1 Measurement instrument validation

Following the exploratory analysis, and once the formative and reflective items of each of the study variables had been established, a confirmatory analysis was carried out with the aim of validating the measurement instrument. Table 3 shows the results of this study, in which all reliability indicators, both Cronbach's alpha coefficient (CA) and the composite reliability coefficient (CR), have values higher than the reference value of 0.7 recommended by Nunnally (1994). Similarly, the AVE values exceed 0.6, higher than the reference value of 0.5 (Fornell & Larcker, 1981), indicating adequate convergent validity of the model.

Regarding the discriminant validity analysis, for all the constructs the condition is met that the square roots of the AVE for a certain construct are greater than the correlations with the other constructs of the model, according to the criteria of Fornell and Larcker (1981). Likewise, it is corroborated that the monotrait (MT) correlations (relationships between indicators of the same construct) are greater than the heterotrait (HT) correlations (relationships between indicators that measure different constructs), following the HTMT theory proposed by Henseler et al. (2016), observing in this case that all the coefficients are below 0.90 (Gold et al., 2001; Teo et al., 2008). Table 4 shows that the two criteria applied are met and thereby confirms the discriminant validity of the reflective constructs considered in the structural model.

Lastly, since the convergent and discriminant validity analysis is applicable only for reflective constructs Chin (1998), to verify the veracity of the items implemented in the formative construct of the model, it was evaluated, on the one hand, the existence of a possible multicollinearity through the variance inflation factor (VIF), and, on the other hand, the magnitude and significance of their weights. In this study, none of the VIF exceeds the limit value of 3.3 indicated by Petter et al. (2007). Additionally, it was found that the weights of the indicators are significant and it was confirmed that none of the assumptions is violated (Daoud, 2017), which is why it is assumed that the model is reliable and it is possible to proceed with the next verification step.

5.2 Structural equation model estimation and hypotheses testing

Once the psychometric properties of the measurement instrument had been verified, the model was estimated by applying the bootstrapping technique (Henseler,

Table 3 Confirmatory factor analysis results

Factor/Item	M	SD	loading	weight	t-value	CA	CR	AVE
Beliefs						N/A	N/A	N/A
CR1. How much do you think climate change will harm you personally?	0.892	0.029		0.897*	30.939			
CR2. When do you think climate change will start to harm people in your country?	0.486	0.060		0.487*	8.130			
CR3. On a scale of -3 (very negative) to + 3 (very positive), do you think climate change is a positive or negative thing?	0.560	0.059		0.563*	9.630			
Attitudes						0.857	0.777	0.601
ACT1. How concerned are you about climate change?	0.835	0.011	0.835*		78.767			
ACT2. How much had you thought about climate change before today?	0.795	0.014	0.796*		57.316			
ACT3. How important is the issue of climate change to you personally?	0.778	0.017	0.778*		46.890			
ACT4. How often do you talk about climate change with your family and friends?	0.681	0.023	0.682*		29.615			
Individual Pro-environmental Behaviour						0.884	0.738	0.792
CPI1. Over the past 12 months, how often have you valued companies that are taking action to reduce climate change by purchasing their products?	0.894	0.009	0.894*		94.534			
CPI2. Over the past 12 months, how often have you penalized companies that oppose steps to reduce climate change by NOT buying their products?	0.886	0.011	0.887*		84.376			
Environmental Disaffection						0.838	0.722	0.634
DM1. Disengaged (no serious consideration of climate change)	0.843	0.021	0.843*		40.500			
DM2. Doubtful (has doubts about the existence of climate change)	0.799	0.021	0.800*		38.681			
DM3. Denialist (convinced that there is no change in climate)	0.742	0.026	0.744*		28.346			
Intrinsic Motivation						0.907	0.863	0.709
MI1. Because I think these activities are interesting	0.836	0.016	0.836*		51.268			
MI2. Because I enjoy this kind of activities	0.909	0.007	0.909*		138.103			
MI3. Because these activities are fun	0.764	0.022	0.765*		35.050			
MI4. Because I feel good doing these activities	0.852	0.012	0.852*		71.066			
Environmental Participation						0.901	0.856	0.695
PM1. I have carried out or promoted curricular internships with university teams, related to climate change and its impact on the territory	0.843	0.014	0.844*		59.151			

Table 3 (continued)

Factor/Item	M	SD	loading	weight	t-value	CA	CR	AVE
PM2. I have received or given teaching that has allowed me to learn about climate change and its impacts on the territory	0.835	0.013	0.834*		62.789			
PM3. I have participated in research on climate change and its impacts on the territory	0.833	0.018	0.834*		47.560			
PM4. I have participated in shared actions between the University and actors in the territory aimed at finding solutions for climate change adaptation and mitigation	0.821	0.019	0.822*		43.315			

Source: Authors' proposal

Table 4 Discriminant validity

	F1	F2	F3	F4	F5	F6
F1. Beliefs	N/A	N/A	N/A	N/A	N/A	N/A
F2. Attitudes	0.775	0.601	0.499	0.442	0.495	0.275
F3. Individual Pro-environmental Behaviour	0.373	0.890	0.634	0.324	0.271	0.396
F4. Environmental Disaffection	-0.348	-0.248	0.796	0.709	0.279	0.121
F5. Intrinsic Motivation	0.414	0.222	-0.234	0.842	0.792	0.157
F6. Environmental Participation	0.224	0.323	0.008	0.137	0.834	0.695

Values on the diagonal are the square roots of the AVE.

Below the diagonal: Correlations between factors.

Above the diagonal: HTMT ratio.

N/A = Not applicable.

Source: Made by the authors.

2017) with 5000 subsamples in the PLS program, all this, with the aim of verifying whether or not the hypotheses are fulfilled. As shown in Table 5, the results for all the path coefficients are statistically significant and present the hypothesised indications, supporting all the hypotheses introduced in the model. Finally, with regard to the explanatory capacity (R2) and predictive capacity (Q2), it is verified that both Attitude and Individual pro-environmental behaviour predict their variables adequately and contribute to a great extent to the literature on behavioural research by obtaining explanatory values greater than 0.2, which is considered relevant in the field of social sciences (Hair et al., 2014).

5.3 Multigroup analysis

Once the results of the proposed model had been obtained, in order to contrast the possible differences between groups of different nationalities, a multigroup analysis was carried out to compare the links proposed in the model for the three nationalities included in the sample (544 Colombians, 229 Mexicans, and 277 Brazilians). Before proceeding with the multigroup analysis, a composite measurement invariance analysis was performed (Henseler et al., 2016). This tool is used to confirm that the dissimilarity between the groups is due to the differences between the latent variables and not to other issues, that is, it analyses whether the contrasts are only due to differences in the structural model and not in the measurement model (Carranza et al, 2020). Subsequently, the MICOM analysis was carried out, which is a three-step process that includes: (Step 1) configuration invariance; (Step 2) compositional invariance; (Step 3) equality of composite mean values and variances (Henseler et al., 2016).

After carrying out the MICOM review, in this study it has been verified that the first step is fulfilled and that the model has the same configuration for both the Colombian nationality group and the Mexican and Brazilian nationality groups. Regarding the second step, it is verified that the scores of the composites using the weights for each one of the nationalities do not differ using the weights of the others

Table 5 Structural equation model estimation

Hypothesis	Original sample	t-value (Bootstrapping)	Decision
H1: Beliefs—> Attitudes	0.343	11.510*	Supported
H2: Environmental Disaffection—> Attitudes	-0.184	6.759*	Supported
H3: Intrinsic Motivation—> Attitudes	0.297	10.352*	Supported
H4: Attitudes—> Individual Pro-environmental Behaviour	0.289	9.896*	Supported
H5: Intrinsic Motivation—> Individual Pro-environmental Behaviour	0.069	2.219*	Supported
H6: Environmental Participation—> Individual Pro-environmental Behaviour	0.249	8.780*	Supported

R2 (Attitudes) = 0.344; R2 (Individual Pro-environmental Behaviour) = 0.204.

Source: Authors' proposal.

and the composite invariance is confirmed. To complete the last step, the equality of means and the equality of variances were compared. In this case, equality could not be verified in the variables Beliefs, Environmental disengagement, Individual pro-environmental behaviour, and Environmental participation, but the equality was verified for the Attitude and Intrinsic Motivation variables, which is why it is assumed that the invariance of the measure is partial and the multigroup analysis (MGA) is carried out.

At this point, it is evaluated whether there are significant differences between the Colombian, Mexican, and Brazilian nationality groups using two methods: the MGA test developed by Henseler et al. (2016) and the Welch-Satterthwaite Eq. (Satterthwaite, 1946; Welch, 1947). The first method directly compares the randomly created subsamples by replacing the original data set (Henseler et al., 2009) and the second method performs the analysis in the case of unequal variances. The reason why it was decided to carry out two different tests is because in the MICOM analysis it was possible to detect that the variances are not equal in some of the variables implemented in the model (Table 6).

The measurement criterion of the tests carried out is based on the fact that, if the p value is less than 0.05 or greater than 0.95, there are significant differences between the groups (Henseler et al., 2009). The results of the multigroup analysis of this study indicate that there are no significant differences between the Colombian, Mexican, and Brazilian nationality groups in almost all of the hypotheses proposed. However, it was identified that individual pro-environmental attitudes and behaviours vary between the Colombian and Brazilian nationalities. Consequently, it is verified that the cultural factor influences to a certain extent the individual's behaviour, but in general terms, a pattern of behaviour is established that helps to understand the degree of involvement of Generation Z in pro-environmental initiatives.

6 Discussion

Based on the results of this study, it is certain that this research makes several important theoretical contributions to the literature, which recognises the need to make the population aware of the effects generated by climate change (Bikomeye et al., 2021). This problem is a subject of current concern, and will continue to be so for future generations; therefore, there is a need to change human actions at all levels (Vanegas-Rico et al., 2022).

The literature recognises the need to explore human behaviour in environmental matters, especially in the generational and cross-cultural context where the literature on pro-environmental behaviours is still in an embryonic stage. To answer this call for future research on pro-environmental behaviours, this study provides statistical support to demonstrate how prior beliefs, attitudes, disengagement, motivations, and involvement influence the adoption of pro-environmental behaviour in Generation Z individuals. In this sense, the main contribution of our study is that, although previous empirical research has considered the TPB as a model to predict pro-environmental behaviours, to the best of our knowledge, no work has contemplated this theory together with disengagement, motivation, and participation, which are considered

Table 6 Multi-group analysis results

Hypothesis	P-Value Difference (One-Tailed)											
	Colombians vs Mexicans				Colombians vs Brazilians				Mexicans vs Brazilians			
Relationships	Path Difference	Welch-Satterthwait Test	MGA Test	Supported	Path Difference	Welch-Satterthwait Test	MGA Test	Supported	Path Difference	Welch-Satterthwait Test	MGA Test	Supported
H7a: Beliefs—> Attitudes	0.034	0.648	0.655	No/No	0.146	0.056	0.046	No/Yes	0.112	0.225	0.222	No/No
H7b: Environmental Disaffection—> Attitudes	0.072	0.271	0.272	No/No	0.121	0.065	0.064	No/No	0.049	0.505	0.506	No/No
H7c: Intrinsic Motivation—> Attitudes	0.023	0.740	0.744	No/No	-0.008	0.906	0.900	No/No	-0.031	0.702	0.701	No/No
H7d: Attitudes—> Individual Pro-environmental Behaviour	-0.134	0.062	0.063	No/No	-0.181	0.013	0.013	Yes/Yes	-0.047	0.555	0.557	No/No
H7e: Intrinsic Motivation—> Individual Pro-environmental Behaviour	-0.017	0.812	0.809	No/No	0.129	0.096	0.093	No/No	0.146	0.105	0.104	No/No

Table 6 (continued)

Hypothesis	P-Value Difference (One-Tailed)											
	Colombians vs Mexicans				Colombians vs Brazilians				Mexicans vs Brazilians			
Relationships	Path Difference	Welch-Satterthwait Test	MGA Test	Supported	Path Difference	Welch-Satterthwait Test	MGA Test	Supported	Path Difference	Welch-Satterthwait Test	MGA Test	Supported
H7f: Environmental Participation—> Individual Pro-environmental Behaviour	-0.030	0.663	0.668	No/No	0.021	0.747	0.745	No/No	0.051	0.486	0.487	No/No

Source: Authors' proposal

relevant factors in an environmental context. Our research goes beyond those studies by combining a model validated in the literature with an added value that benefits the behaviour prediction. In other words, our results support the importance of individual beliefs, attitudes, motivations, disengagement, and previous participation for an individual to act in a favourable way with the environment and contribute to the fight against climate change. Another way to contribute to the advancement of research in the environmental context is to consider the generational cohort, since a relatively young age group shows different behaviour patterns in relation to other social groups (Parzonko et al., 2021). In addition, it is appropriate to include nationality as a moderating and driving force in pro-environmental behaviours as cultural differences have been highlighted in various lines of research as a factor to be taken into consideration.

In this sense, the results obtained show that (a) there is a positive and significant relationship between beliefs, attitudes and behaviours, as proposed in the TPB (Fishbein & Ajzen, 1975), (b) environmental disengagement negatively influences the adoption of attitudes (Ahn & Kwon, 2020; Brosch, 2021; D'Arcy & Lowry, 2019) while intrinsic motivations have a positive influence (Pihu et al., 2008; Cho et al., 2020; Qin & Tao, 2021; Al-Jubari et al., 2021), (c) the individual's prior involvement in environmental initiatives and intrinsic motivations influence pro-environmental behaviours (Afsar et al., 2016; Budzanowska-Drzewiecka & Tutko, 2021; Cheng et al., 2022; Faraz et al., 2021), thus confirming the results described in previous studies.

Additionally, the research model was estimated for individuals of Colombian, Mexican, and Brazilian nationality with structural equation modelling (PLS-SEM) using a multigroup analysis. The study findings show that the model is valid and acceptable in groups of different nationalities and that most of the hypotheses are fulfilled. However, attitudes and behaviours between individuals of Colombian and Brazilian nationality may show significant differences, just as the relationship between environmental participation and pro-environmental behaviours is different for Mexican and Brazilian individuals. These results are in line with the reports made in previous studies that concluded that there are significant differences in the behaviours of individuals of different nationalities (Capstick et al., 2019; Higueras-Castillo et al., 2019; Lamiño-Jaramillo et al., 2022; Phuphisith et al., 2020).

In countries that apply rigid measures towards actions that harm the environment, pro-environmental behaviours will be aligned with the cultural values of that country, while, in countries with flexible measures, due to the wide variation in the cultural beliefs of the members of society, pro-environmental behaviours will vary (Mattison & Brouthers, 2021). In Latin American countries such as Colombia, Mexico, and Brazil, culture is unlikely to have a direct influence on behaviour, but specific cultural values may affect beliefs and attitudes, which in turn influence behaviour and may vary among themselves (Chwialkowska et al., 2020).

The results obtained in this study show that there are significant differences between individuals of Colombian and Brazilian nationality, which is not predictable since they all belong to South America and it can be assumed that the cultural difference is not as marked as it is for European or Asian countries. Leon (2019) affirms that individuals who share the same language, history, political and socioeconomic environment develop a considerable amount of common mental

programming. Therefore, as they are countries with different languages and policies, this can condition their attitude and explain the variation in their behaviour.

Another determining factor may be that countries such as Brazil, Mexico, and Colombia are still undergoing rapid industrialisation and environmental standards are not capable of coping with the pressure generated by rapid growth (Vicente-Molina et al., 2013). Therefore, from a cultural perspective, it can be assumed that Brazil is better at environmental transformation than Mexico and Colombia. Additionally, it should be considered that Brazil is the largest country in South America, has the fifth largest population in the world, and has the most solid economy in the region (Haack et al., 2019); therefore, from a pro-environmental point of view, its inhabitants may perceive their efforts to collaborate in the fight against climate change as less productive and influential compared to the inhabitants of smaller countries in the region, who may perceive their contribution as more beneficial for society and this could be one of the reasons for their change in attitude or behaviour.

This study suggests important implications for both theory and application in the field of behavioural research. From a theoretical point of view, although several previous investigations have proposed different models seeking to understand pro-environmental behaviour (Soutter & Boag, 2019; Vanegas-Rico et al, 2018; Berger Silva & Andaur Rodríguez, 2022), empirical research with a generational and cross-cultural focus is still rather limited. This study provides the literature with an innovative and reliable behaviour prediction model, making it possible to analyse Generation Z behaviours from the perspective of individuals of different nationalities.

7 Conclusion

In response to the questions posed in the introduction, i.e. (RQ1) Does TPB explain Generation Z's individual pro-environmental behaviour?, and (RQ2) Does culture influence Generation Z's pro-environmental behaviour?, we conclude that when it comes to environmental issues there are additional relevant predecessors to the TPB that contribute to the understanding of human behaviour. It is corroborated that environmental disengagement, intrinsic motivations, and environmental participation play a fundamental role in the behaviour of individuals and that the cultural and generational factor affects this behaviour trend.

Starting from the growing concern about the alterations produced by climate change, which continues to create economic, social, physical, and health impacts that require mitigation and adaptation (Stewart, 2021), this study, through the presentation and empirical analysis of a theoretical model, analysed the individual pro-environmental behaviours of the generational cohort belonging to Generation Z and confirmed that there are significant positive relationships between the constructs proposed in the model. This supports all the hypotheses and affirms that motivations, disengagement, and previous participation play a fundamental role in the adoption of an attitude and, subsequently, a behaviour. In addition, it was confirmed that there are significant differences in certain variables of the model based on nationality, both for Colombian and Brazilian individuals, as well as for Mexicans

and Brazilians. This difference may be due to the fact that when it comes to environmental issues, societies can be more rigid or flexible in terms of their policies.

From a business point of view, the results obtained in this study help to guide the representatives or leaders of organisations in the mitigation of climate change from a behaviour prediction approach. It is important that leaders or managers focus their efforts first on beliefs, which are prior knowledge that guide people in adopting an attitude (Goh & Baum, 2021). Although belief is described as knowledge, it is important that the way in which information is conveyed to individuals is drastically changed. Currently, there are a number of campaigns that seek to generate environmental awareness or concern. However, instead of disseminating the desired knowledge, what they actually generate is detachment and lack of commitment. This is because society has changed and no longer attracted to commercials or campaigns in traditional media that are perceived as dull. There is a need to focus on new technologies and publicise information, videos, images, etc., in a fun way and across media that are widely used by Generation Z. This will enable individuals to perceive this information appropriately and subsequently adopt a favourable attitude towards the environment.

Second, they must carry out actions that generate feelings of attachment, since this emotion will respond to stimuli that are directed towards specific, differentiated, and short-term pro-environmental objectives (van Kleef & Côté, 2022). In this sense, it has been proven that environmental disengagement can have a negative effect on the adoption of an attitude and this could be the key to changing the unproductive results that have been obtained so far in this field of research. Generation Z individuals are relatively young members of society that are currently studying at university or navigating the job market. Therefore, the actions implemented by the universities or from the companies are currently oriented towards an aspect of the work or studies. However, in the case of universities, the aim is not to include environmental actions within the content of an academic subject, but rather propose it as a recreational activity that generates attachment and a sense of belonging. Likewise, companies should separate environmental actions from work activities and implement mechanisms that allow individuals to interact in initiatives against climate change, but without perceiving them as part of their job.

Third, special attention should be paid to intrinsic motivations; when people have an internal stimulus, the experience of goal achievement is transferred to goal pursuit (Fishbach & Woolley, 2022). Leaders or managers of the various organisations are currently focusing their efforts on motivating Generation Z individuals to participate in the fight against climate change through economic or academic incentives, generating external and momentary motivation that does not last over time. Therefore, it is necessary to implement actions that generate pleasure, for example, promote environmental activities within organisations that allow them to compete with each other and gradually obtain individual and collective recognition for their interactions and specific initiatives, such as the EIT Climate-KIC Climathon (EIT, 2023).

Lastly, previous participation in environmental activities has been found to influence pro-environmental behaviours. Therefore, attention should be paid not so much to the dimension of participation, but rather to repetition. The way in which environmental content is presented must be analysed in detail, seeking a balance so as not to become wearisome but to reinforce it so that the individual always keeps it in mind and can constantly contribute.

In conclusion, our findings help behavioural research not only to meet social requirements related to environmental protection (Bordian et al., 2022), but also to provide management guidance to improve predictions of pro-environmental behaviours in members belonging to Generation Z.

This research is subject to a series of limitations that must be considered to evaluate the results and the conclusions derived from them, which are established as opportunities for future research. Firstly, the research is based on the TPB, which has received criticism and questioning in recent years due to the fact that various studies concluded that its components are insufficient to accurately predict behaviour (Sniehotta et al., 2014). For this reason, the introduction of new factors is proposed, such as intrinsic and extrinsic motivations, in order to improve the explanatory and predictive capacity of the model in future research. Second, with regard to the sample, although the size is large enough for statistical analysis, the existence of differences could be explored with a larger number of participants. Third, it is necessary to consider countries located in other geographical areas in order to analyse whether the cultural aspect can influence the results seen from a broader context. Fourth, differences between generations could be evaluated and contrasted if the proposed model can be validated in another generational cohort, or comparisons could be made between groups, such as Millennials vs. Centennials. Fifth, other constructs that can influence pro-environmental behaviour could be added to the model, such as the attribution of responsibility, self-esteem, or satisfaction. Finally, the model can be applied in other contexts, such as the industrial or business sector, in order to determine if the study variables have a similar impact in other areas.

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Declarations

Conflict of interest The authors declare that they have no conflict of interest.

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Authors and Affiliations

Israel-Javier Juma-Michilena[1] · Maria-Eugenia Ruiz-Molina[2] · Irene Gil-Saura[2] · Sergio Belda-Miquel[3]

✉ Maria-Eugenia Ruiz-Molina
m.eugenia.ruiz@uv.es

Israel-Javier Juma-Michilena
Israel.juma@uv.es

Irene Gil-Saura
irene.gil@uv.es

Sergio Belda-Miquel
Sergio.belda@uv.es

[1] The Research Institute On Social Welfare Policy (POLIBIENESTAR), Edificio Institutos de Investigación, University of Valencia, Campus de Tarongers, Calle Serpis, nº 29, 46022 Valencia, Spain

[2] Department of Marketing and Market Research, Faculty of Economics, University of Valencia, Av. Tarongers S/N. Edif. Dep. Oriental, 46022 Valencia, Spain

[3] Faculty of Social Sciences, Universitat de València, Av. Tarongers 4B., 46021 Valencia, Spain

A3. Artículo 3. Cómo aumentar la motivación de los estudiantes para participar en iniciativas universitarias hacia la sostenibilidad ambiental

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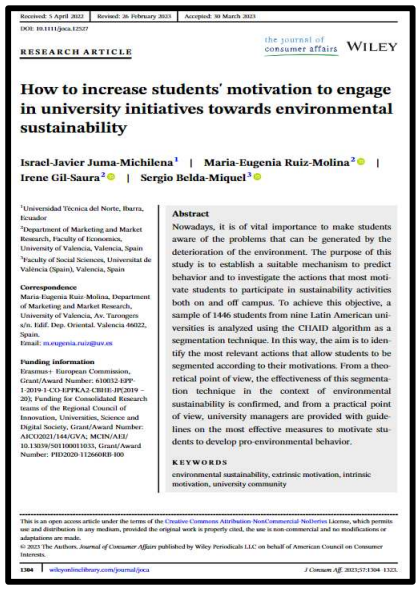

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RESEARCH ARTICLE

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How to increase students' motivation to engage in university initiatives towards environmental sustainability

Israel-Javier Juma-Michilena[1] | **Maria-Eugenia Ruiz-Molina**[2] | **Irene Gil-Saura**[2] | **Sergio Belda-Miquel**[3]

[1]Universidad Técnica del Norte, Ibarra, Ecuador

[2]Department of Marketing and Market Research, Faculty of Economics, University of Valencia, Valencia, Spain

[3]Faculty of Social Sciences, Universitat de València (Spain), Valencia, Spain

Correspondence
Maria-Eugenia Ruiz-Molina, Department of Marketing and Market Research, University of Valencia, Av. Tarongers s/n. Edif. Dep. Oriental. Valencia 46022, Spain.
Email: m.eugenia.ruiz@uv.es

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Abstract

Nowadays, it is of vital importance to make students aware of the problems that can be generated by the deterioration of the environment. The purpose of this study is to establish a suitable mechanism to predict behavior and to investigate the actions that most motivate students to participate in sustainability activities both on and off campus. To achieve this objective, a sample of 1446 students from nine Latin American universities is analyzed using the CHAID algorithm as a segmentation technique. In this way, the aim is to identify the most relevant actions that allow students to be segmented according to their motivations. From a theoretical point of view, the effectiveness of this segmentation technique in the context of environmental sustainability is confirmed, and from a practical point of view, university managers are provided with guidelines on the most effective measures to motivate students to develop pro-environmental behavior.

KEYWORDS

environmental sustainability, extrinsic motivation, intrinsic motivation, university community

1 | INTRODUCTION

Universities today have a specific mission in society, which involves a significant role in working toward sustainability (Yuan & Zuo, 2013). In recent years, sustainable development has become a constant theme, not only in the academic community but also among national and international organizations and governments (Leal Filho et al., 2020). Sustainability actions are considered to play a key role in creating a promising future for societies and can support the ability to respond to today's pressing global challenges (Andrijevic et al., 2020; Pirouz et al., 2020).

In this sense, universities are called upon to contribute to sustainability through actions such as education, research, and dissemination (Beynaghi et al., 2016). Therefore, by compiling and formulating appropriate study plans, the university can shape the personality of students by setting an example for other social agents (Dagiliūtė et al., 2018). In order to do so, it is first necessary to understand the motivations or actions that encourage the student to participate in sustainable actions, and for this reason, our study focuses on the determinants of motivation.

We decided to address this issue because of the economic, social, and environmental significance that sustainability has in today's world. It should not be overlooked that one of the primary objectives of organizations is to help preserve the environment in which we live. However, there have been no significant changes in the approach to this problem and we believe that the most appropriate way to progress in this area is through student motivation. Shapiro (2009) affirms that universities have two roles: one is to serve society, and the other is to challenge society to shape a better future. Universities, as producers of future leaders and policy makers, are tasked with an enabling change toward sustainable development (de Lange, 2013). All this, with the aim that its members reflect and transmit this behavior to their families, social groups, and other members of society. Saracoglu and Ozen (2020) mention that universities are in charge of educating the people who administer and manage institutions, and, as such, they have the responsibility of using resources to create awareness and promote environmental stewardship and literacy. Although higher education institutions build bridges in collaboration between the community and the university in sustainability actions, this link is poorly developed and students are the ones expected to become involved in the construction and strengthening of society in regard to sustainable practices (Budowle et al., 2021).

Similarly, we have detected a research gap in the behavior of university students. Although there are countless studies related to sustainability and the university, to the best of our knowledge, intrinsic and extrinsic motivations have not been analyzed as a differential factor to predict behavior, and in this way, encourage the participation of its members. Growing interest in the preservation of the environment on the part of organizations has been accompanied by several initiatives to develop guidelines, standards, and tools to inform, manage and evaluate sustainability practices and results (Gamage & Sciulli, 2017). However, none of these studies have shown real effectiveness as society continues to behave without due care or thought and no significant changes have been observed. Given that consumer segments may differ in perceptions, preferences and other characteristics (Meng & Olsen, 2022; Sheng et al., 2021), segmentation may allow decision-makers to gain insight into the potential effectiveness in their actions and communication strategies across groups of individuals (Stewart, 2022).

Therefore, the objective of this study is to carry out a segmentation of university students that allows us to define homogeneous groups and helps us to understand the motivating factors behind their participation in actions related to sustainability. For this, we opted for the CHAID decision tree technique due to the ease with which the results can be interpreted (Saracoglu &

Ozen, 2020). The interest behind this research lies in increasing knowledge about the behavior of university students, as well as helping university managers to define their strategies to create a sense of belonging and a balance between economic growth, care for the environment, and wellbeing.

2 | LITERATURE REVIEW

Sustainable development is defined as "meeting the needs and aspirations of the present generation without compromising the ability of future generations to meet their need" (Brundtland, 1987, p. 292). In other words, sustainability can be conceptualized as a process of balance between growth, equity, and preservation (Knox-Hayes et al., 2021). In this sense, Holden et al. (2017) affirm that sustainable development not only consists of balancing social, environmental, and economic objectives but also requires restrictions on human activities. Therefore, it is important that leaders of the various organizations become involved in sustainability activities, since this directly encourages others to engage in the same practices, thereby creating a pattern of sustainable behavior (Tsai & Lu, 2021). Education for sustainable development provides the university community (students, professors, administrative and academic staff) with the necessary skills and abilities to contribute to the achievement of sustainable development (Hernández-Diaz et al., 2021).

Sustainability has become a controversial issue in recent years due to the relevance it holds for both current and future generations. When we speak of sustainability, we cannot ignore climate change, which is a multidimensional global danger that poses the risk of many devastating events for all of humanity (Prasad & Mkumbachi, 2021). We refer to this climate change due to the threat it represents, since it is caused by global warming and driven by human emissions of greenhouse gasses and extreme changes in weather patterns (Demaidi & Al-Sahili, 2021).

It is essential that higher education institutions help improve understanding of the challenges brought about by climate change and exert a positive influence on the way they educate or prepare current and future generations to limit its effects and respond to those challenges (David, 2015). This does not necessarily mean that universities should implement a curriculum focused on climate change, but that they should evaluate the effectiveness of actions and find the appropriate mechanisms to generate pro-environmental behavior. Although universities continue to pay great attention to teaching about climate change, few opinions are known from students; their views, their degree of learning, and how they perceive the university's efforts in response to climate change (Li & Liu, 2021).

In recent years, many national and international surveys on awareness and perception of climate change and sustainability have been carried out, and continue to be carried out, however, research has not provided sufficient information on how university students perceive and respond emotionally to this problem (Santos et al., 2016; Wachholz et al., 2014). Therefore, it is necessary to carry out a more exhaustive analysis of the student as an individual and as an agent of society.

There are several studies that analyze student behavior within the context of sustainability. For example, Zsóka et al. (2013) consider that environmental education has a great impact on individual environmental awareness, and, therefore, they explore the relationship between environmental knowledge, attitudes, and behaviors in universities. In the same way, Wachholz et al. (2014) analyze the relationship between knowledge, attitude, intention, and satisfaction

regarding climate change in university students. These studies coincide with signaling that people with a high degree of knowledge and positive environmental attitudes are predisposed to participating in environmentally friendly behaviors (Di Giusto et al., 2018; Leiserowitz, 2006; Zhai & Lafferty, 2006).

Based on the approaches mentioned in the previous section, this research proposes considering motivations as a differential factor to predict behaviors and help university managers to take effective actions to promote sustainability in various areas. Motivation is defined as the need for achievement, incentive values related to task completion, and incentives to avoid failure (Guo & Zhou, 2021). In an educational context, motivation can be understood as the energy and commitment of students to study, learn, perform effectively, and the drive to exhibit certain behaviors (Cherkasov et al., 2019). Among the theories that analyze motivations, in first place, social cognitive theory suggests that student motivation is context-specific and could be influenced by the social environment (Bandura, 2005). Second, self-regulated learning theory postulates that intrinsic, extrinsic, and self-efficacy motivation are the integrative factors of learning (Guo & Zhou, 2021). Third, self-determination theory maintains that behavior not only depends on the quantity of motivation but also on the quality of motivation (Eide et al., 2020). Finally, cognitive assessment theory describes the effects that intrinsic motivators can have on those who are intrinsically motivated (Deci & Ryan, 1980).

Based on these approaches and in order to achieve the objective proposed in this study, we analyze intrinsic and extrinsic motivations as determining factors when predicting the behaviors of university students in matters related to sustainability. Intrinsic motivation comes from the enjoyment of the activity, it is the internal desire to continue a behavior without external rewards or benefits, while extrinsic motivation is not necessarily based on enjoyment, but on incentives that come from outside (Ryan & Deci, 2000). Intrinsic motivation shows the internal impulses of the individual toward a certain task or activity, indicating their values or personal interests (Patall, 2013). In contrast, extrinsic motivations at the level of the organization or individual include compliance with regulations, social pressure, image, and academic or financial incentives (Dodds et al., 2020). These types of motivations help explain why individuals and organizations are motivated to engage in sustainable behaviors (Dodds et al., 2020).

In the field of education, Pintrich (1991) state that intrinsic motivation refers to the degree to which students engage in sustainability or learning due to curiosity or self-interest, reflecting the potential of human nature and the tendency to want to fulfill goals; while extrinsic motivation refers to the degree to which students engage in sustainability or learning initiatives due to external rewards. When we speak of motivation toward sustainability, it is a type of motivation linked to the individual's own values and is expressed when one fully accepts the importance of caring for the environment in which we live (Graves & Sarkis, 2018). Positive affect may motivate behavior change (Shiota et al., 2021), and in particular, psychological well-being has been pointed out as a predictor of proenvironmental behavior (Nguyen et al., 2022).

Finally, some of the incentives that influence motivation in the link between universities and sustainability for both the individual and the organization include compliance with regulations or policies, since it is currently an essential requirement for all organizations, that is, legal regulations are implemented to ensure that people behave in a sustainable way (Dodds et al., 2013). Another condition of motivation is social pressure, since many people can be persuaded to participate in sustainable behaviors as a result of social influences (Cecere et al., 2014). On the other hand, image or reputation play a fundamental role, since companies or individuals seek to participate in environmental initiatives to defend their public image (Amran et al., 2015). Finally, financial incentives (Axon, 2017) and academic incentives from

the university to the student and from governments or international organizations for the university community to participate in sustainability actions must also be taken into consideration.

Through this study, we seek to understand how the actions carried out by the university can have an impact on the students' motivations to adopt pro-environmental behaviors, which is relevant due to the role that students play in the development of society. From a segmentation approach, several studies have found that higher education students' perceptions of climate change vary according to the type of studies in which they are enrolled (Haq & Ahmed, 2020). However, in a research we assume that motivations could explain the way students act, and given the possible connections between the actions that the university carries out, or should carry out, to mitigate climate change and the motivations of the students, we propose the following research questions:

RQ1: Are the actions that the university takes, or should take, to fight climate change useful to differentiate segments of students based on their intrinsic motivations to participate in these initiatives?

RQ2: Are the actions that the university takes, or should take, to fight climate change useful to differentiate segments of students based on their extrinsic motivations to participate in these initiatives?

3 | METHODOLOGY

To achieve the stated objective, we conducted a quantitative investigation with a structured ad hoc questionnaire. This questionnaire was developed to collect information on the university community's perceptions of the study variables, that is, the actions carried out by the university to fight climate change, and the intrinsic and extrinsic motivations.

All the items used to measure these variables are adapted from scales already validated in the literature (see Table 1) and are measured on a 7-point Likert scale, from 1 (strongly disagree) to 7 (strongly agree). In particular, the intrinsic and extrinsic motivations are adapted from Guay et al. (2000), and the actions carried out by the university to fight climate change are adapted from the scales proposed by UNEP (2014).

The data collected was obtained from students from 9 universities in Latin America. These included 5 Colombian universities (Corporación Universitaria Minuto de Dios; Universidad de Caldas; Universidad de Manizales; Universidad de Quindío; and Universidad Tecnológica de Pereira), 2 Brazilian universities (Pontifícia Universidade Católica do Rio Grande do Sul; and Universidade Católica de Pernambuco), and 2 Mexican universities (Instituto Tecnológico de Monterrey; and Universidad de Guadalajara). To obtain the necessary information, non-probabilistic snowball sampling was used, given that a questionnaire was shared with the lecturers directly involved in an international project focused on developing actions aimed at the fight against climate change, and they were responsible for sharing the structured questionnaire online with the students of their respective institutions, obtaining as a final sample 1446 valid questionnaires. The data collection period was between January and March 2021. Table 2 shows in detail the demographic characteristics of the students who responded to the questionnaire.

To answer the aforementioned research questions, we performed a segmentation analysis centered on the automatic interaction detection based on the CHAID chi-square process (Pintassilgo et al., 2021). The CHAID technique was created by Kass (1980) and is used as a segmentation tool to easily identify the significant relationships between variables, that is, it

TABLE 1 Measurement scales.

Intrinsic Motivation (Guay et al., 2000).
IM_1. I think these activities are interesting.
IM_2. I enjoy these types of activities.
IM_3. These activities are fun.
IM_4. I feel good doing these activities.
Extrinsic Motivation (Guay et al., 2000).
EM_1. I think I must do these kinds of activities.
EM_2. There is recognition of academic credits for my degree or master's degree for my participation (if I am a student).
EM_3. There is academic recognition of some kind that allows me to improve my CV or employability.
EM_4. Allows me to apply the knowledge acquired in my studies or work.
EM_5. It has some type of compensation for the time spent.
EM_6. I have recognition and prestige from my peers.
University actions against climate change UNEP (2014).
UA_1. Curricular internships with university teams, related to climate change and its impact on the territory, paid or not, but with recognition of academic credits.
UA_2. Inclusion of content and didactic material on climate change in existing courses in the curriculum.
UA_3. Inclusion of specific new courses in the curriculum focused on climate change.
UA_4. Inclusion of specific courses outside the official curriculum about climate change and about how the university can contribute to the creation of a more sustainable territorial environment.
UA_5. Conduct existing research actions by university teams that respond to the local challenges of climate change.
UA6. Actions to sensitize and train local actors on adaptation and mitigation of climate change.
UA_7. Co-creation of solutions between the university and actors in the territory to address local challenges of climate change.

Source: Self-made.

identifies the independent variables (predictors) that provide the greatest contribution toward explaining the dependent variable (Díaz-Pérez & Bethencourt-Cejas, 2016). This technique has been applied more often to general consumer research than to other areas (Riquier et al., 1997), and it is considered the most appropriate technique to select the most significant segmentation variables when dealing with large samples (Chung et al., 2004).

The CHAID methodology is useful to detect the most significant factors in the formation of segments, particularly demographic or behavioral (Díaz-Pérez et al., 2005), and facilitates a better understanding of the hierarchy of variables associated with the dependent variable (Pintassilgo et al., 2021). Comparisons are made through the Chi-square statistical test (Magidson, 1993). According to Alkhasawneh et al. (2014), the CHAID method can be divided into three parts: merge, split, and stop. The first stage reduces the number of predictor variables as much as possible when no significant relationship is found between them. In the second stage, the variables with the most significant and least significant *p*-value are used as node separators, and, the last step, consists of stopping the process when the merge and split stage is repeated for all subgroups without finding any more significant differences (Gunduz & Al-

TABLE 2 Sample distribution.

Consumer characteristics	*N*	%	Consumer characteristics	*N*	%
Gender			University		
Male	498	34.4	UNIMINUTO	398	27.5
Female	937	68.4	TEC	100	6.9
Age			PUCRS	49	3.4
18–21	599	41.4	UCALDAS	132	9.1
22–25	445	30.8	UDG	160	11.1
26–35	285	19.7	UMANIZALES	57	3.9
36–45	84	5.8	UNIQUINDIO	48	3.3
46–60	29	2.0	UTP	211	14.6
>60	4	0.3	UNICAP	291	20.1
Study area					
Arts and Humanities	196	13.6			
Applied Social Sciences	356	24.6			
Sciences	264	18.3			
Engineering and architecture	409	28.3			
Health Sciences	221	15.3			

Source: Self-made.

Ajji, 2021). Finally, the resulting segments of the CHAID algorithm are compared by means of an analysis (ANOVA) for numerical variables and by means of contingency tables for nominal variables. In this way, it is possible to determine if the individuals belonging to each group constitute a segment and if they behave differently in relation to the variables considered for the CHAID algorithm (Gil Saura et al., 2017).

The application of the CHAID methodology stands out mainly because it helps to identify the most significant predictors of the dependent variable and provides an easy interpretation of the results, since these are presented in a segmentation tree. In this study, intrinsic and extrinsic motivations are considered as dependent variables and the actions that the university carries out, or should carry out, in the face of climate change are considered as independent variables.

4 | RESULTS

First, the CHAID algorithm was used to classify the members of the university community of 9 Latin American universities in accordance with their intrinsic motivation based on their perceptions about the actions that the university takes or should take against climate change. The results obtained from this segmentation technique are shown in Figure 1.

As a result of the first CHAID analysis, based on intrinsic motivation, four final segments are generated, in which the variable that best explains the student's intrinsic motivation to become involved in environmental initiatives proposed by the university is the inclusion of new specific courses in the curriculum focusing on climate change. In turn, in a second stage, the least motivated group is divided into two segments based on the perceived importance of the

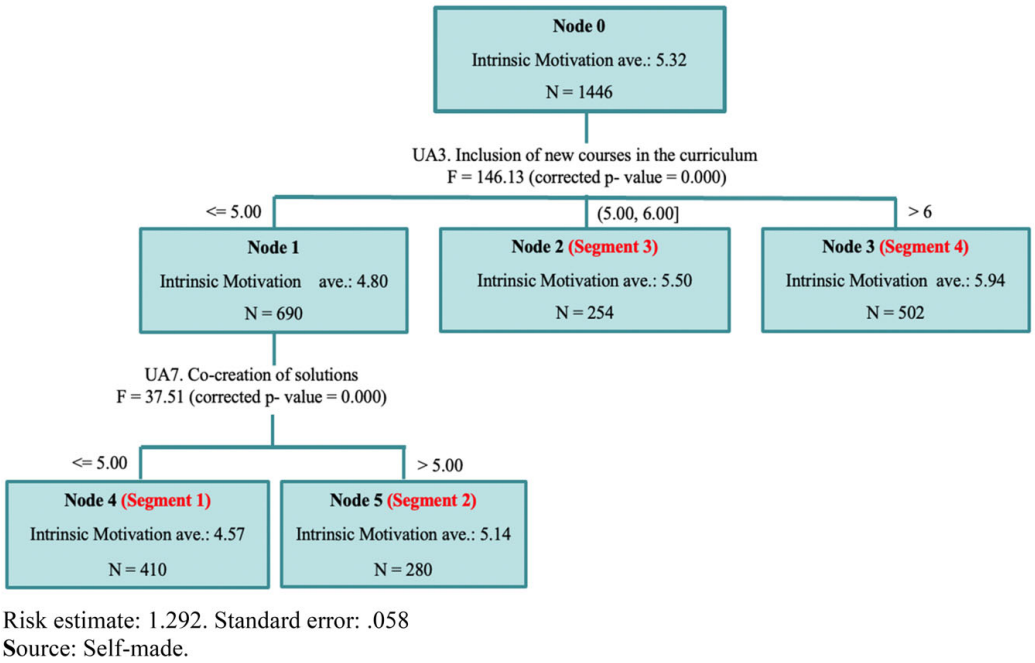


FIGURE 1 Classification tree generated by CHAID algorithm (Intrinsic Motivation). Risk estimate: 1.292. Standard error: 0.058. *Source*: Self-made.

co-creation of solutions, so that the individuals who more positively value actions focused on co-creation of solutions show a higher level of intrinsic motivation than those who value co-creation to a lesser extent.

To characterize each final segment, we analyzed the significance of the differences between the segments in relation to the dependent and independent variables of the CHAID algorithm (i.e., intrinsic motivation and actions that the university takes, or should take, against climate change). Once the normality of the distribution of the variables has been verified, we proceed to calculate the average values for each segment and the ANOVA tests. The results are shown in Table 3.

Regarding the first dependent variable, that is, intrinsic motivation, it is observed that, of the four resulting segments, segments 1 and 2 show the lowest scores, while segment 3 shows intermediate evaluations for all elements and, finally, segment four shows the highest scores from the analysis. This allows us to affirm that there are significant differences between the segments, observing, in general, a correspondence between the levels of intrinsic motivation and the perceived importance of the actions that the university can implement in order to fight against climate change.

To complete the characterization of the segments, we analyzed other constructs that refer to behavior in the literature but were not considered for the CHAID algorithm. Specifically, we analyzed the affective state of university students to assess whether there are significant differences between the 4 segments resulting from the CHAID analysis for intrinsic motivations. Consequently, we evaluate whether there are differences between segments based on the student's attitude toward climate change (i.e., alarmed, concerned, anxious, indifferent, skeptical, or in denial). The results show us significant differences between segments, of which we can highlight that segment 4 is the one that reflects the highest degree of awareness about caring for the environment, since it shows the students who are most alarmed and concerned about climate change with an average of 6.51 and 5.70 respectively. On the other hand, the segment

TABLE 3 Intrinsic motivation: average values and analysis of variance.

Characteristic	Segment 1	Segment 2	Segment 3	Segment 4	F	Differences between segments*
Dependent variable: Intrinsic Motivation	4.57	5.14	5.50	5.94	114.32	1–2, 1–3, 1–4, 2–3, 2–4, 3–4
UA1. Curricular internships with university teams, related to climate change and its impact on the territory, paid or not, but with recognition of academic credits.	4.05	5.04	5.55	6.29	220.08	1–2, 1–3, 1–4, 2–3, 2–4, 3–4
UA2. Inclusion of content and didactic material on climate change in existing courses in the curriculum	4.05	4.84	5.77	6.63	476.21	1–2, 1–3, 1–4, 2–3, 2–4, 3–4
UA3. Inclusion of specific new courses in the curriculum focused on climate change.	3.86	4.35	6.00	7.00	1941.04	1–2, 1–3, 1–4, 2–3, 2–4, 3–4
UA4. Inclusion of specific courses outside the official curriculum about climate change and about how the university can contribute to the creation of a more sustainable territorial environment.	4.08	5.10	5.64	6.56	365.52	1–2, 1–3, 1–4, 2–3, 2–4, 3–4
UA5. Conduct existing research actions by university teams that respond to the local challenges of climate change.	4.30	5.97	6.05	6.74	469.64	1–2, 1–3, 1–4, 2–4, 3–4
UA6. Actions to sensitize and train local actors on adaptation and mitigation of climate change.	4.31	6.18	5.93	6.66	433.66	1–2, 1–3, 1–4, 2–3, 2–4, 3–4
UA7. Co-creation of solutions between the university and actors in the territory to address local challenges of climate change.	4.10	6.54	6.11	6.68	795.55	1–2, 1–3, 1–4, 2–3, 3–4
N	410 28.35%	280 19.36%	254 17.57%	502 34,72%		

Source: Self-made.

*In order to test the significance of the differences between the segments of students, the Tukey post-hoc multiple comparison test is used. Only the statistically significant differences <0.05 are shown.

that is least alarmed and concerned about climate change is segment 1. Table 4 contains a breakdown of each of the analyzed attitudes.

Finally, we show the main sociodemographic characteristics of the members of the university community who participated in this study, taking as a reference the data resulting from the CHAID analysis to explain intrinsic motivation. Statistically significant associations have been found between the four segments generated by the CHAID algorithm and the variables gender, age, and area of studies. Among the results, we can highlight that Segment 4, the most intrinsically motivated to become involved in university initiatives to mitigate climate change, is characterized by the presence of women, a higher age bracket, and the study of social sciences (Table 5).

Once we have analyzed the segments generated by the CHAID algorithm for the intrinsic motivations variable, we proceed to perform the same analysis for the extrinsic motivations dependent variable, obtaining the results that are graphically presented in Figure 2.

As a result of the second CHAID analysis, we obtained three final segments, in which the variable that best explains the extrinsic motivation of the student to become involved in environmental initiatives proposed by the university is inclusion in the curriculum of specific new courses focused on climate change.

To further characterize each final segment, we tested the significance of the differences between the segments with the dependent and independent variables of the CHAID algorithm (i.e., extrinsic motivation and actions that the university takes, or should take, against climate change). Once we verify the normality of the variables, we proceed to verify the average values of each segment and the ANOVA tests (Table 6).

Considering extrinsic motivation as a dependent variable, it is observed that, of the 3 resulting segments, segment 1 shows the lowest scores, while segment 2 shows intermediate evaluations for all elements and, finally, segment 3 shows the highest scores from the analysis, with significant differences between the three segments and a clear correspondence between extrinsic motivation and the importance of each of the actions to mitigate climate change put forward by the university.

On the other hand, the existence of differences between segments is contrasted for different levels of extrinsic motivation based on the affective state. Consequently, we assess the student's attitude toward climate change (i.e., alarmed, concerned, anxious, indifferent, skeptical, or in denial). The results show us that segment 3, which is the one with the highest levels of extrinsic

TABLE 4 Affective state and intrinsic motivation: average values and analysis of variance.

Affective state	Segment 1	Segment 2	Segment 3	Segment 4	F	Differences between segments*
Alarmed	5.14	5.89	5.94	6.51	99.41	1–2, 1–3, 1,4, 2–4, 3,4
Worried	4.96	5.50	5.43	5.70	14.99	1–2, 1–3, 1–4
Restless	3.51	3.01	2.97	2.81	9.95	1–2, 1–3, 1–4
Indifferent	3.03	2.25	2.17	2.00	30.22	1–2, 1–3, 1–4
Skeptical	2.79	1.67	1.80	1.96	33.94	1–2, 1–3, 1–4
Denier	2.12	1.33	1.35	1.35	35.11	1–2, 1–3, 1–4

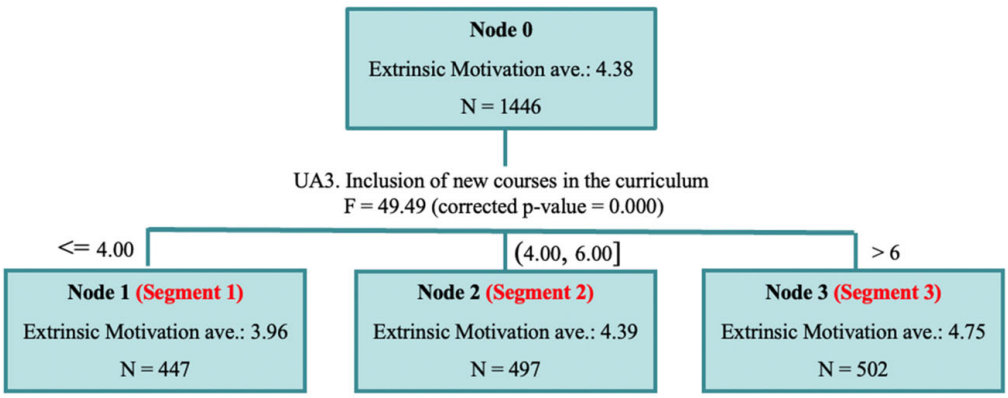
Source: Self-made.

*In order to test the significance of the differences between the segments of students, the Tukey post-hoc multiple comparison test is used. Only the statistically significant differences <0.05 are shown.

TABLE 5 Respondent characteristics and perception (Intrinsic Motivation).

Categorical variables	Segment 1 (%)	Segment 2 (%)	Segment 3 (%)	Segment 4 (%)	Chi-square
Gender					8.45*
Male	37.3	38.0	36.8	29.7	
Female	62.7	62.0	63.2	70.3	
Age					30.28*
18–21 years old	43.7	47.1	45.3	34.5	
22–25 years old	27.8	29.3	34.3	32.3	
26–35 years old	21.5	16.8	14.2	22.7	
36–45 years old	5.1	4.6	5.5	7.2	
46–60 years old	1.5	2.1	0.8	3.0	
More than 60 years old	0.5	0.0	0.0	0.4	
Study area					24.90*
Arts and Humanities	16.1	11.4	11.0	13.9	
Applied Social Sciences	20.0	24.6	26.8	27.3	
Sciences	15.4	19.3	19.3	19.5	
Engineering and architecture	28.3	31.4	30.7	25.3	
Health Sciences	20.2	13.2	12.2	13.9	

Source: Self-made.
*Statistically significant, $p < 0.05$.



Risk estimate: 1.489. Standard error: .055
Source: Self-made.

FIGURE 2 Classification tree generated by CHAID algorithm (Extrinsic Motivation). Risk estimate: 1.489. Standard error: 0.055. *Source*: Self-made.

motivation, presents the highest degree of awareness about caring for the environment, showing the most alarmed and concerned reactions with average scores of 6.51 and 5.70, respectively. On the other hand, the segment that is least alarmed and concerned about climate change is segment 1. In general, terms, the results show us significant differences and coherence with the approach we are taking; the values can be viewed in detail in Table 7.

TABLE 6 Extrinsic Motivation: average values and analysis of variance.

Characteristics	Segment 1	Segment 2	Segment 3	F	Differences between segments*
Dependent variable: Extrinsic Motivation	3.96	4.39	4.75	49.49	1–2, 1–3, 2–3
UA1. Curricular internships with university teams, related to climate change and its impact on the territory, paid or not, but with recognition of academic credits.	4.11	5.32	6.29	311.65	1–2, 1–3, 2–3
UA2. Inclusion of content and didactic material on climate change in existing courses in the curriculum	4.00	5.41	6.63	715.42	1–2, 1–3, 2–3
UA3. Inclusion of specific new courses in the curriculum focused on climate change.	3.55	5.51	7.00	4140.65	1–2, 1–3, 2–3
UA4. Inclusion of specific courses outside the official curriculum about climate change and about how the university can contribute to the creation of a more sustainable territorial environment.	4.12	5.41	6.56	528.27	1–2, 1–3, 2–3
UA5. Conduct existing research actions by university teams that respond to the local challenges of climate change.	4.58	5.88	6.74	472.48	1–2, 1–3, 2–3
UA6. Actions to sensitize and train local actors on adaptation and mitigation of climate change.	4.72	5.81	6.66	335.94	1–2, 1–3, 2–3
UA7. Co-creation of solutions between the university and actors in the territory to address local challenges of climate change.	4.74	5.93	6.68	337.92	1–2, 1–3, 2–3
N	447 30.91%	497 34.37%	502 34.71%		

Source: Self-made.

*In order to test the significance of the differences between the segments of students, the Tukey post-hoc multiple comparison test is used. Only the statistically significant differences <0.05 are shown.

Finally, we show the main sociodemographic characteristics of the members of the university community who participated in this study, taking as a reference the data resulting from the CHAID analysis for extrinsic motivations. As a result, it can be observed that there is a strong relationship between the 3 segments resulting from the analysis of the variables of gender, age, and area of studies. Specifically, similar to what was observed for the segments resulting from the CHAID for intrinsic motivation, segment 3, characterized by higher scores in extrinsic motivation, is the one with the highest proportion of women, of students over 25 years of age, and of those are studying degrees related to the field of social sciences (Table 8).

TABLE 7 Affective state and extrinsic motivation: average values and analysis of variance.

Affective state	Segment 1	Segment 2	Segment 3	F	Differences between segments*
Alarmed	5.28	5.85	6.51	123.78	1–2, 1–3, 2–3
Worried	5.01	5.45	5.70	20.19	1–2, 1–3
Restless	3.33	3.11	2.81	8.38	1–3, 2–3
Indifferent	2.91	2.26	2.00	34.75	1–2, 1–3, 2–3
Skeptical	2.68	1.75	1.96	39.22	1–2, 1–3
Denier	1.99	1.39	1.35	34.47	1–2, 1–3

Source: Self-made.
*In order to test the significance of the differences between the segments of students, the Tukey post-hoc multiple comparison test is used. Only the statistically significant differences <0.05 are shown.

TABLE 8 Respondent characteristics and perception (Extrinsic motivation).

Categorical variables	Segment 1 (%)	Segment 2 (%)	Segment 3 (%)	Chi-square
Gender				12.67*
Male	33.9	40.4	29.7	
Female	66.1	59.6	70.3	
Age				31.66*
18–21 years old	44.3	45.9	34.5	
22–25 years old	26.2	33.4	32.3	
26–35 years old	21.0	15.5	22.7	
36–45 years old	6.0	4.2	7.2	
46–60 years old	2.0	1.0	3.0	
More than 60 years old	0.4	0.0	0.4	
Study area				26.37*
Arts and Humanities	16.3	10.7	13.9	
Applied Social Sciences	21.3	24.9	27.3	
Sciences	14.3	20.5	19.5	
Engineering and architecture	28.4	31.2	25.3	
Health Sciences	19.7	12.7	13.9	

Source: Self-made.
*Statistically significant, $p < 0.05$.

From the results obtained, we can deduce the existence of strong relationships between intrinsic and extrinsic motivation and actions focused on the creation of new specific courses against climate change. In addition, it should not be overlooked that, among students with less intrinsic motivation, actions of co-creation of solutions between the university and local players also stand out when addressing the local challenges of climate change.

In order to further analyze the differences observed across student segment groups and the variability inside each segment, the contingence table relating the resulting segments from the CHAID analyses for intrinsic and extrinsic motivation is shown in Table 9.

TABLE 9 Contingence table: CHAID segments for intrinsic and extrinsic motivation.

		Extrinsic motivation		
		Segment 1	Segment 2	Segment 3
Intrinsic motivation	Segment 1	311 21.5%	99 6.8%	0 0%
	Segment 2	136 9.4%	144 10.0%	0 0%
	Segment 3	0 0.0%	254 17.6%	0 0%
	Segment 4	0 0.0%	0 0.0%	502 34.7%

Note: Pearson Chi2: 2000.835; sig. 0.000.

The most intrinsically motivated segment corresponds exactly to the most extrinsically motivated group of students. In contrast, the least extrinsically motivated segment is included in segments 1 and 2 generated by the CHAID, explaining intrinsic motivation. Moreover, most of individuals showing an intermediate level of extrinsic motivation also show intermediate levels on intrinsic motivation, since they are included in Segments 2 and 3 resulting for the CHAID based on the latter variable. Thus, extrinsic and intrinsic motivation seem significantly associated (Pearson Chi2: 2000.835; sig. 0.000), and some actions such as including new courses in the curriculum focused on the mitigation and adaptation to climate change may enhance both types of motivation. Notwithstanding, Segment 2 in terms of intrinsic motivation shows the highest variability, as far as it includes individuals with different levels of extrinsic motivation, whereas Segment 3 in terms of intrinsic motivation shows the lowest variability, since it is exclusively integrated by highly extrinsically motivated members.

5 | CONCLUSIONS, IMPLICATIONS, LIMITATIONS, AND FUTURE LINES OF RESEARCH

5.1 | Conclusions

The literature emphasizes the need for segmentation to classify consumers under different behavior profiles. In this way, the aim of the study is to contribute to the research into the behavior of university students in matters related to climate change, exploring their intrinsic and extrinsic motivations. The results of this study, obtained from the CHAID algorithm, suggest that both intrinsic and extrinsic motivations and the perceived importance of actions against climate change proposed by the university can contribute to the definition of segments of students with different behaviors and help university managers to make the right decisions about caring for the environment. Therefore, we conclude that university representatives should redesign their policies according to the criteria that generate greater motivation in students to become involved in this type of initiative and to construct a better society. Based on the results obtained, the perceived importance of the inclusion of new courses on sustainability in the curriculum is seen as the relevant factor when segmenting students, both in terms of their intrinsic and extrinsic motivation.

In this case, four final segments of students significantly different in terms of their intrinsic motivation were identified. The perceived importance of the inclusion of new courses in the curriculum is the factor that best determines the differences between segments in terms of their intrinsic motivation in the first stage, while in a second stage, it is the co-creation of solutions that is the variable that allows us to distinguish two groups among the less intrinsically motivated students. Similarly, for the extrinsic motivation to participate in university initiatives to mitigate climate change, the CHAID algorithm produced three segments of students based on their perceptions regarding the inclusion of new courses in the curriculum.

As a consequence, the evidence suggests that the most appropriate way to motivate students to get involved in the fight against climate change from a university perspective is the inclusion in the curriculum of new courses related to climate change. This tool should be considered a priority to motivate students to undertake actions related to sustainability, playing a vital role in educating citizens about climate change and promoting behaviors that benefit the environment, in line with what has been stated by Prasad and Mkumbachi (2021).

The segments identified from the CHAID analysis present significant differences in terms of the student's attitude toward climate change (i.e., alarmed, concerned, anxious, indifferent, skeptical, or in denial); the most motivated (intrinsically and extrinsically) to participate in university initiatives are those who are most alarmed or concerned about climate change. Given that strong attitudes, compared to weak ones, are better predictors of behavior and are more likely to be stable (Conner et al., 2022), we understand that a large part of the university community is aware of environmental degradation and would be willing to participate in actions proposed by the university and aimed at mitigating climate change so that this concern gives rise to pro-environmental behaviors.

Based on the results obtained, in response to our research questions (Are the actions that the university takes, or should take, to fight climate change useful to differentiate segments of students based on their intrinsic or extrinsic motivations to participate in these initiatives?) we can affirm that perceptions about the relevance of various university initiatives make it possible to identify segments of students with significantly different levels of intrinsic and extrinsic motivation, as well as their perceptions of university initiatives, affective state toward climate change, and sociodemographic characteristics.

5.2 | Theoretical and practical implications

From a theoretical perspective, this study provides evidence of the usefulness of the CHAID algorithm to identify the most relevant factors that explain the differences in the motivation of university students. Compared to other types of analysis, the CHAID technique not only generates student segments but also sequentially identifies the leading indicators that help explain differences between students in the key variable (i.e., intrinsic motivation and extrinsic motivation, in this case). On the other hand, despite the different natures of intrinsic motivation and extrinsic motivation, the inclusion of courses related to climate change in the curriculum is seen as the most relevant variable to segment the student body, and clear correlations are observed between the student segments, differentiated in terms of their motivation, and their attitudes toward climate change.

Regarding the implications for management, the evidence obtained in this study could help university managers to distinguish groups of students with different types of motivation to participate in caring for the environment and provide them with a theoretical-practical foundation

in understanding which actions can generate a greater degree of involvement on the part of the university community. Based on the results obtained in this study, actions proposed by the universities to fight against climate change should prioritize the implementation of new courses in the curriculum, as they generate the highest degree of motivation in different groups of students. The content must respond to the genuine interest in environmental sustainability of the intrinsically motivated students, while offering rewards in terms of the number of credits and visibility in the student's curriculum for the extrinsically motivated.

5.3 | Limitations and future research

This study is not free of limitations. First, the geographic scope in which this research was developed was a determined number of universities in three Latin American countries, so it should be replicated in other contexts for external validation. Second, the sample was obtained through the snowball method, therefore, a larger and random sample should be taken into account to guarantee the robustness of the results. Third, for this study only the student body was considered, underlining a clear need to evaluate the perceptions and motivations of the teaching staff and the administration and services staff to better understand how to involve the entire university community in actions instigated by the university that are aimed at mitigating climate change.

Despite its limitations, we understand that our research may inspire further studies in this area. In particular, the use of alternative, causal methods, such as the estimation of structural equation models, would permit analysis of the relationship between student motivation and pro-environmental behavior, including other variables, such as beliefs or word-of-mouth communication as influencing factors in the individual's behavior. Finally, the segmentation carried out can be applied in other contexts; for example, this research could be expanded to other economic activities, in order to determine the variables that allow identification of groups of individuals with different internal and external motivators.

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CONFLICT OF INTEREST STATEMENT

The authors declare no conflicts of interest.

ORCID

Maria-Eugenia Ruiz-Molina https://orcid.org/0000-0002-5307-7111
Irene Gil-Saura https://orcid.org/0000-0002-5758-0806
Sergio Belda-Miquel https://orcid.org/0000-0003-0164-5487

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A4. Artículo 4. Principales motivaciones y barreras para el comportamiento proambiental: Un estudio de la perspectiva del empleado

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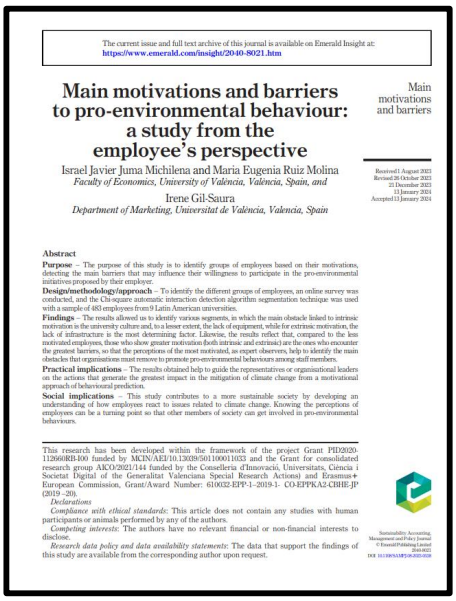

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Main motivations and barriers to pro-environmental behaviour: a study from the employee's perspective

Israel Javier Juma-Michilena

María Eugenia Ruiz-Molina

Irene Gil-Saura

University of Valencia, Spain.

Abstract

Purpose - The purpose of this study is to identify groups of employees based on their motivations, detecting the main barriers that may influence their willingness to participate in the pro-environmental initiatives proposed by their employer.

Design/methodology/approach - To identify the different groups of employees, an online survey was conducted, and the Chi-square automatic interaction detection algorithm segmentation technique was used with a sample of 483 employees from 9 Latin American universities.

Findings - The results allowed us to identify various segments, in which the main obstacle linked to intrinsic motivation is the university culture and, to a lesser extent, the lack of equipment, while for extrinsic motivation, the lack of infrastructure is the most determining factor. Likewise, the results reflect that, compared to the less motivated employees, those who show greater motivation (both intrinsic and extrinsic) are the ones who encounter the greatest barriers, so that the perceptions of the most motivated, as expert observers, help to identify the main obstacles that organisations must remove to promote pro-environmental behaviours among staff members.

Practical implications - The results obtained help to guide the representatives or organisational leaders on the actions that generate the greatest impact in the mitigation of climate change from a motivational approach of behavioural prediction.

Social implications - This study contributes to a more sustainable society by developing an understanding of how employees react to issues related to climate change. Knowing the perceptions of employees can be a turning point so that other members of society can get involved in pro-environmental behaviours.

Originality/value - Many studies have analysed the intrinsic and extrinsic motivations of employees to engage in pro-environmental behaviours; however, as far as the authors are aware, this has not been analysed from the perspective of barriers to motivation.

Keywords – CHAID, Sustainability, Intrinsic motivation, Extrinsic motivation, Barriers, Pro-environmental behaviour.

Paper type – Research paper*

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1. Introduction

Sustainability and, specifically, concern for the environment have become a topic of debate not only in the academic community but also among national and international organisations and even governments (Leal Filho et al., 2021). The misuse of natural resources generates dramatic environmental consequences such as climate change, which hinders the development of society and seriously threatens human health and safety (Wang et al., 2023). The main idea behind sustainability is to maintain a promising future for the planet and for future generations through environmentally friendly practices (Foster et al., 2022). However, much of the environmental deterioration is due to human activities and the incorrect implementation of this type of practice (Kousar et al., 2022), so the role of organisations and their employees is essential to contribute to the fight against this problem (Deng et al., 2022).

Most environmental problems are rooted in human behaviour and, therefore, it is essential to promote behavioural changes (Steg and Vlek, 2009). In the literature, a consensus has not yet been reached to determine what drives the pro-environmental behaviour of employees (Deng et al., 2022). While many organisations design and implement sustainable practices and encourage their employees to "go green", societal changes are yet to be observed (Kim and Lee, 2022), which may call into question the results of previous behavioural prediction research. Therefore, to understand pro-environmental behaviour, motivation must be considered as a driving factor (Dodds et al., 2022). This motivation may be of an intrinsic nature, i.e. linked to the enjoyment of an activity, or extrinsic, i.e. developed from an external stimulus or reward (Deci and Ryan, 2000).

Over the years, business managers have proposed actions to motivate their employees to participate in sustainable initiatives (Dodds et al., 2022). However, no real effectiveness has been observed so far and the behaviours remain unconscious and harmful to nature (Kollmuss and Agyeman, 2002). The lack of consistency in the prediction of pro-environmental behaviours may originate from three main reasons. Firstly, research has not provided sufficient support to help the representatives of the organisations in their decision-making processes. Secondly, previous studies have analysed barriers to pro-environmental behaviours solely from the perspective of barriers (Kollmuss and Agyeman, 2002; Yuriev et al., 2018; Desrochers and Zelenski, 2022), and motivation as a factor influencing behaviour has been notably neglected (Wright, 1943). In this sense, it is important to analyse barriers and motivation not as two isolated issues, but rather, as two closely intertwined factors. Thus, an understanding of the barriers to both intrinsic and extrinsic motivation can provide the literature and practice with a solid basis for promoting pro-environmental behaviours. And, thirdly, due to heterogeneity across different organisations, in which professionals from different fields collaborate, it

may be that the implications suggested in one area do not have the same implications in another. This research analyses the perceptions of university employees, since higher education plays a fundamental role in the generation and dissemination of knowledge and covers various disciplines in the business and social spheres (Fanea-Ivanovici and Baber, 2022).

Along these lines, a research deficit has been detected in pro-environmental behaviour from the employee's perspective. Although there are countless studies related to pro-environmental behaviour (e.g. Yuriev et al., 2020; Al Zaidi et al., 2023), or on the motivations that drive favourable behaviours towards the environment (e.g. Budzanowska-Drzewiecka and Tutko, 2021; Barszcz et al., 2023), no attempt has been made to explain, to the best of our knowledge, the obstacles and barriers that influence the intrinsic and extrinsic motivation of organisation employees. Therefore, an awareness of the factors that impede the participation of employees in sustainable initiatives could be a relevant contribution to the existing literature, to guide managers of organisations to remove the barriers that interfere with the employees' motivation to become involved in pro-environmental initiatives.

Widely validated theoretical frameworks, such as the theory of planned behaviour proposed by Fishbein and Ajzen (1975) or the value–belief–norm theory proposed by Stern et al. (1999), have been fundamental pillars in the literature that explains human behaviour. However, there are serious concerns regarding the integrity and efficiency of these theories in predicting pro-environmental behaviours since they exclusively consider drivers, while obstacles are not an integral part of these theories (Yuriev et al., 2020). In this sense, if only the determinants and drivers of behaviour are taken into account by most research, there is a risk of significantly limiting the explanatory capacity and predictive validity of these models, so considering the barriers could provide long-term strategies to meet the objectives of organisations, which extend beyond the environmental (Graves and Roelich, 2021).

Research that integrates barriers to human behaviour is limited (Gifford, 2011), so this paper contributes with management implications to the literature from a novel and little-explored perspective (Xu et al., 2022), which responds to the following research questions:

> *RQ1. What are the important barriers that influence the intrinsic motivation of university employees to actively participate in the fight against climate change?*
>
> *RQ2. What are the important barriers that influence the extrinsic motivation of university employees to actively participate in the fight against climate change?*

These questions are relevant both for researchers and for managers of organisations, since they allow them to establish a roadmap that will help

clarify the actions that must be carried out so that the obstacles that prevent employee motivation can be managed and facilitate, in this way, the adoption of pro-environmental behaviours within the various organisations.

To achieve the proposed objective, first of all, an analysis of the main bibliographic sources of studies related to the subject matter of the present work is carried out in Section 2. This literature review allows us to propose a segmentation analysis based on Chi-square automatic interaction detection (CHAID). Next, in Section 3 we describe the methodology followed to develop the fieldwork to detect several important barriers that hinder the motivation of employees towards pro-environmental behaviours. In Section 4 the results obtained for a sample of 483 employees are then presented, from which, finally, conclusions, theoretical and practical implications, including social implications, as well as limitations and future lines of research are drawn in Section 5.

2. Literature review

Nowadays, sustainability has become a necessity rather than an option for organisations, due to the consequences of not implementing sustainable practices (Dodds et al., 2022). Callicott and Mumford (1997) define sustainability as "meeting human needs without compromising the health of ecosystems" (p. 32). Sustainability problems arise mainly from greenhouse gases, but, in business practice, environmental deterioration is not only linked to the high level of carbon emissions, but a large part of damage to the environment is caused by human activities (Kousar et al., 2022). The most pressing environmental challenges include increasing levels of salinity, climate change, droughts and floods, land degradation and massive deterioration of water quality (Hossain et al., 2022).

The need to implement sustainable practices is increasingly evident in companies and sustainability must be considered from a Triple Bottom Line approach, in relation to the impact of an activity at an environmental, social and economic level (Elkington, 1998). Sustainability from an environmental perspective is related to activities carried out by the company to take care of the environment, such as the elimination of waste or reduced consumption of energy and natural resources. On the other hand, the social perspective is linked to improving the quality-of-life, reinforcing the relationships that organisations maintain with the different stakeholders in their environment and, finally, the economic perspective is based mainly on long-term financial performance as a key requirement for the survival of any company (Elkington, 2004).

Sustainable development is defined as "development that meets the needs of the present without compromising the ability of future generations to meet their own needs" (Brundtland et al., 1987, p. 41). In this sense, the role that companies and their employees play in the

attainment of sustainable development goals (SDGs) is essential. For this reason, it is important that the leaders and managers of the various organisations encourage their employees to become involved in activities that benefit or, at least, do not harm nature, since this can be a driving force that directly influences other community members to implement the same practices, with the potential to create a pattern of behaviour (Li et al., 2020).

A particularly concerning and urgent challenge from the point of view of sustainability is climate change, which represents one of the greatest global dangers facing humanity (Robertson and Barling, 2013). It causes severe and irreversible damage to nature, affecting all societies and economies across the entire world (Xu et al., 2022). Climate change is mainly caused by global warming and greenhouse gases that have led to temperature rises, sea ice melting, food insecurity, deterioration of the natural environment and various adverse health conditions (Ding and Beh, 2022). In response, several business leaders have developed climate change adaptation plans and programmes, but so far the results are not encouraging due in large part to human behaviour, which plays a major role in this mitigation (Linder et al., 2022).

Employees are considered one of the most important factors in achieving sustainability (Lorincová et al., 2019). Therefore, the effectiveness of companies' environmental management practices depends on the employees' perceptions of these practices and the way in which they act with respect to them (Li et al., 2020). There are discrepancies in the literature when it comes to defining a pattern of pro-environmental employee behaviour due to the diversity of activities carried out in the different areas of economic activity (Kim and Lee, 2022). Specifically, universities are called upon to play a fundamental and more active role in promoting sustainable development, since they are responsible for generating and disseminating knowledge, and training professionals who will integrate into the labour market in different sectors of economic activity (Fanea-Ivanovici and Baber, 2022). In this sense, Universities, as public sector organisations, face increased institutional pressures to disseminate social and environmental information as key actors in sustainable development (Moggi, 2023). Among the 17 SDG of the United Nations (2015) that are established in the 2030 agenda for sustainable development, it is mentioned that higher education must play a key role in a sustainable future by providing current and future decision makers with sufficient knowledge and skills to make informed and effective decisions to this end. This is specifically highlighted in SDG 4 on quality education. Knowledge about sustainable development is crucial for eco-business intentions; therefore, education that incorporates sustainability in its environmental dimension leads to business support and pro-environmental behaviour (Fanea-Ivanovici and Baber, 2022). It is essential to identify the perceptions of

university employees since they will surely have an overview of different business sectors, allowing management guidelines to be established to improve the current situation. If employees adopt pro-environmental behaviours, there will be a significant decrease in negative environmental impacts, mitigating the effects of climate change (Omarova and Jo, 2022).

It is important to note that pro-environmental behaviour may vary across different socio-demographic characteristics and cultural areas (Miller et al., 2022). Globally, the level of development in sustainability issues differs considerably by country or region, with some countries being very well developed while others are still in the early stages of development (Hamad et al., 2023). Also, the pro-environmental attitudes of individuals or employees may be influenced by cultural and socio-economic stimuli (Vicente-Molina et al., 2013). Therefore, in line with the objectives of this study, it is considered relevant to investigate the pro-environmental behaviour of employees in Latin American universities because it is a geographical area where issues related to sustainability have not yet been developed to the level of the most developed countries, which can set guidelines to improve the global problem that humanity faces with climate change. In this sense, knowing the barriers that university employees have can provide an overview of employees (Khan and Terason, 2022), as activities from all areas of the business fabric take place in the university environment and these educational institutions play a key role in promoting and implementing sustainable practices in the workplace (Massaro et al., 2018). Moreover, from the perspective of university employees, a teaching and administrative approach can be analysed at the same time, which is very conducive to broadening the picture of employees' pro-environmental behaviours.

Pro-environmental behaviour is a way of acting aimed at respecting and not harming the environment (Steg and Vlek, 2009). It is defined as the individual's adaptive behaviour to avoid actions that may harm nature (Kollmuss and Agyeman, 2002). It not only refers to actions to reduce negative impacts on the ecological environment, but also entails respecting and protecting nature (Wang et al., 2023).

In organisational terms, pro-environmental behaviours are described as voluntary behaviours of an individual that contribute to the sustainability of the organisation (Omarova and Jo, 2022). This refers to any environmentally responsible practice that helps companies to be respectful of the environment (Farrukh et al., 2022). Employee goals, in turn, tend to be subject to a process of contagion from organisational goals and corresponding management practices (Jaich et al., 2023). However, in the workplace employees autonomously exhibit behaviours that are respectful of the environment. Here, then, this behaviour goes beyond work responsibilities (Li et al., 2020), and the intrinsic and extrinsic motivation of those involved is the most relevant

factor for the implementation of sustainable practices.

Motivation is closely related to emotions because it reflects the extent to which an individual is prepared to act physically and mentally in a focused manner (Borod, 2000). A motivated person is inspired to perform specific actions, while a demotivated person lacks intentions to participate (Suen et al., 2022). For this reason, in the work context of an organisation, employees are usually aware that actions such as turning off unnecessary electrical equipment, using stairs instead of lifts or printing on both sides of the paper can help protect the environment, but on many occasions they decide to not put these actions into practice (Farrukh et al., 2022), which may be due to a lack of intrinsic or extrinsic motivation. There is a wide range of tools to motivate employees; however, the motivation process must be supported by the establishment of realistic business objectives (Lorincová et al., 2019), which generate a sense of belonging in the employee so that pro-environmental actions are consistent and last over time.

Motivation determines what employees do, how they do it, how much time they spend and how hard they work (Meyer et al., 2004). Researchers are increasingly focusing on the role of motivation in employees' pro-environmental behaviour (Graves et al., 2013) due to the low involvement of employees in environmental initiatives. The self-determination theory proposed by Deci and Ryan (2000) has been extensively validated in the literature to examine employees' motivation to engage in pro-environmental behaviours. This theory argues that behaviour depends on the type of motivation, not just the amount of motivation (Graves and Sarkis, 2018). Thus, employees can be intrinsically or extrinsically motivated. The former refers to behaviours performed by the employee's own free will and choice, and the latter to internal pressure (guilt) or external pressure (demand from others) (Tian et al., 2020).

Intrinsic motivation refers to actions that are not associated with rewards and are performed for the individual's pure pleasure or enjoyment (Deci and Ryan, 2000). It is described as the desire to make an effort and is related to individual factors such as personal growth, a sense of achievement, recognition and the work itself (Grant, 2008). This motivation originates from a psychological factor that allows decisions to be made based on one's own will and is not influenced by external factors (Kim and Lee, 2022).

Extrinsic motivation arises from external stimuli (Deci and Ryan, 2000), such as monetary and non-monetary gains that may include money, food, social recognition, rewards, working conditions and status (Kim and Lee, 2022). It is defined as the desire to make an effort to obtain results external to the work itself (Grant, 2008). Extrinsic motivation can assume that individuals act to obtain a reward influenced by a power relationship (Deci et al., 2017), while intrinsic motivation implies that individuals act for the

pleasure of the activity or because they consider that the action to perform is relevant and valuable (Suen et al., 2022). In this sense, both motivations are valid to promote pro-environmental behaviours. However, there are barriers that hinder motivation that require a broader and contextualised analysis.

Regarding the association of barriers with motives, a theoretical review of factors that hinder pro-environmental behaviour found that barriers have three broad phases:

(1) ignorance about the problem;
(2) being aware of the problem, but having obstacles to doing what is needed; and
(3) trying to perform behaviours, but feeling that these behaviours are counterproductive (Gifford, 2011).

Also, employee barriers to pro-environmental behaviours may be due to factors such as:

- the belief that there is no need for behavioural change due to denial of environmental problems;
- conflicts between pro-environmental behaviours and individuals' goals and aspirations;
- the individual may feel judged or criticised for performing pro-environmental behaviours;
- lack of knowledge about how to make behavioural changes; and
- the belief that people are already doing enough for the environment (Desrochers and Zelenski, 2022).

All these macro barriers can be expanded and analysed separately in different contexts, such as from an employee perspective, from a climate change perspective and from a university perspective. There is still no consensus on the most important barriers to employees' pro-environmental behaviour and a more comprehensive review is needed.

For their part, environmental barriers that function as a brake are factors within a behavioural mechanism that prevent a different or new behaviour from occurring (Graves and Roelich, 2021). In the literature, it is highlighted that the obstacles that most prevent employees from implementing certain environmental actions are individuality (e.g. conflicting attitudes), responsibility (e.g. lack of perceived efficacy) and practicality (e.g. social or situational constraints) (Lacroix et al., 2019). In the context of climate change, the most visible barriers for employees are comfort (e.g. not being willing to make sacrifices), blaming the collective, believing in technological solutions and/or doubting the commitment of the business action (Stoll-Kleemann et al., 2001). In a context of education within the framework of a university system, some of the main environmental barriers that the literature highlights are: lack of funds to pay for actions, administrative and management problems inherent to higher education, lack of

appropriate infrastructures to direct environmentally responsible behaviours, lack of equipment and the lack of experts to advise and guide in the development of these practices (Leal Filho et al., 2018). In this sense, there is still no consensus on the barriers that have the greatest impact for employees to choose not to participate in pro-environmental actions, so a broader and more contextualised analysis is proposed below.

3. Methods

3.1 Measures

A quantitative study was developed through a structured questionnaire targeted at employees of 9 Latin American universities participating in an international project focused on developing actions that help mitigate problems derived from climate change to collect information on the main study variables; among them, intrinsic and extrinsic motivation and the main perceived barriers in the fight against climate change. All the items used to measure these variables are adapted from scales previously validated in the literature (see Table 1) and measured on a seven-point Likert scale, with 1 being "strongly disagree" and 7 "strongly agree". A list of barriers in the fight against climate change instead of an open response option is proposed because the present study is aimed at obtaining quantitative data from a wide sample of university employees. The consideration of an encompassing list of barriers is guaranteed, since this variable has been measured with the scale proposed by Leal Filho et al. (2018) to measure perceived barriers to actions for mitigating climate change in an institutional context of universities, being widely recognised and cited.

Table I. Measurement scales

Item	Variable
	Intrinsic Motivation (Guay *et al*., 2000).
IM1	I think these activities are interesting.
IM2	I enjoy these types of activities.
IM3	These activities are fun.
IM4	I feel good doing these activities.
	Extrinsic Motivation (Guay *et al*., 2000).
EM1	I think I must do these kinds of activities.
EM2	There is academic recognition of some kind that allows me to improve my CV or employability.
EM3	Allows me to apply the knowledge acquired in my studies or work.
EM4	It has some type of compensation for the time spent.
EM5	I have recognition and prestige from my peers.

	Important barriers to fight against Climate Change (Leal Filho *et al*., 2018).
BA1	Lack of general public commitment.
BA2	Political agendas at levels beyond the University.
BA3	Lack of knowledge.
BA4	Lack of equipment.
BA5	Lack of an interdisciplinary approach to teaching and research at the university.
BA6	Lack of relationships and connections within the institution.
BA7	Lack of a framework and policy to promote collaboration between programmes and units.
BA8	Lack of infrastructure.
BA9	Administrative and management problems.
BA10	University culture.
BA11	Lack of awareness.
BA12	Lack of interest.
BA13	Lack of expertise.
BA14	Lack of funds.

Source: Authors' proposal.

3.2 Sample and data collection process

Data collection was carried out through a structured online questionnaire that was shared with 566 participants from different universities through their institutional network of contacts. These participants included 467 educators and 79 members of the administrative staff, from whom 483 valid responses were logged. The questionnaire was provided in Spanish and Portuguese depending on the country where the different fieldwork was carried out. The items of the questionnaire have been adapted and translated from English to Spanish and Portuguese, and then back translated to guarantee the equivalence in meaning. Among the participating universities are five Colombian universities – Corporación Universitaria Minuto de Dios (Uniminuto), Universidad de Caldas (Ucaldas), Universidad de Manizales (Umanizales), Universidad del Quindío (Uquindio) and Universidad Tecnológica de Pereira (Utp); two Mexican universities – Instituto Tecnológico de Monterrey (Tec) and Universidad de Guadalajara (Udg); and two Brazilian universities – Pontificia Universidad Católica de Paraná (Unicap) y Pontifícia Universidad Católica de Río Grande del Sur (Pucrs). Table 2 shows the demographic characteristics of the study sample.

Table II. Sample distribution

Characteristics	N	%	Characteristics	N	%
Gender			**University**		
Male	291	53.3	Uniminuto	49	9.0
Female	249	45.6	Tec	43	7.9
Prefer not to answer	6	1.1	Pucrs	11	2.0
Age			Ucaldas	73	13.4
18-21	1	0.2	Udg	128	23.4
22-25	15	2.7	Umanizales	30	5.5
26-35	119	21.8	Uquindio	18	3.3
36-45	150	27.5	Utp	72	13.2
46-60	202	37.0	Unicap	122	22.3
>60	59	10.8			

Source: Authors' proposal.

3.3 Data analyses

To answer the research questions posed, we performed a segmentation analysis based on CHAID using the statistical program SPSS, version 28. In particular, the CHAID procedure subdivides a data set into unique segments for comparison through the Chi-squared test (Magidson, 1993). This technique was proposed by Kass (1980) and is used as a segmentation instrument to identify the independent variables (predictors) that contribute the most to explaining the dependent variable (Díaz-Pérez and Bethencourt-Cejas, 2016).

The CHAID methodology determines the predictor variables that explain to a greater extent the differences between segments for the dependent variable. These segments are generated through a descending iterative method that allows the division of the initial sample into homogeneous and selective subsets, permitting the visual representation of the relationship found between the data in the form of a decision tree (Kumar and Kaur, 2023). This technique is structurally based on regression and classification models for analysis of multiple effects that make it possible to explain, describe or predict a result (Gunduz and Al-Ajji, 2022). This analysis is expected to provide heterogeneous segments that differ significantly in terms of independent and dependent variables, as well as other variables. CHAID methodology has been extensively validated in the literature in different fields of study (Pessach et al., 2020; Surucu-Balci et al.,

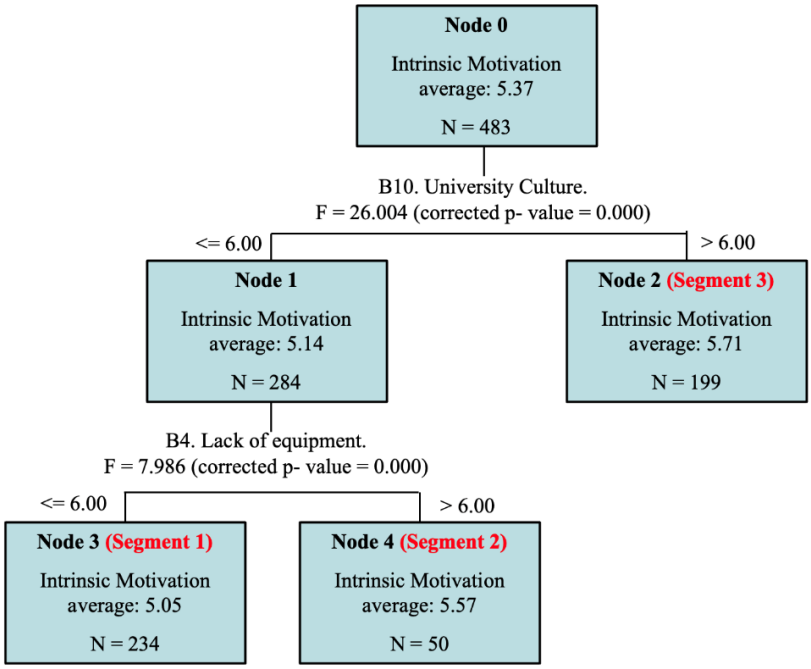
2020; Patalas-Maliszewska et al., 2022; Kumar and Kaur, 2023) and more specifically, in previous studies analysing perceptions, attitudes and behaviour towards sustainability and climate change (Shinkevich et al., 2021; De Luca et al., 2022; Ferreira et al., 2022; Juma-Michilena et al., 2023).

Finally, the segments resulting from the CHAID algorithm are compared through an analysis of variance (ANOVA) for numerical variables and through contingency tables for nominal variables. In this way, it can be determined if the subjects belonging to each group constitute a segment and if they behave significantly differently in relation to the variables considered for the CHAID algorithm (Ruiz-Molina et al., 2021). In this study, the CHAID algorithm has been used to classify employees in terms of their levels of intrinsic and extrinsic motivation based on the perceptions of teaching and administrative staff of the universities regarding the several important barriers to contributing to the fight against climate change.

4. Results

Firstly, the CHAID algorithm was used to classify university employees according to intrinsic motivation based on their perceptions of the barriers that hinder participation in environmental actions. Intrinsic motivation is the dependent variable, while 14 barriers are entered into the algorithm as independent variables. The results are shown graphically in Figure 1.

Figure 1. Classification tree generated by CHAID algorithm (Intrinsic Motivation)



Source: Authors' proposal.

As a result of our first CHAID analysis, we obtained three final segments of university employees in relation to their intrinsic motivation. On an initial level, university culture is the main barrier that differentiates members of the university community in regard to their intrinsic motivation to get involved in environmental initiatives. A second barrier that makes it possible to distinguish between employees with less or greater intrinsic motivation to participate in actions to mitigate climate change is the lack of equipment.

To characterise the final segments of the CHAID analysis, we contrasted the existence of differences between the resulting groups in terms of the values of the variables introduced into the CHAID algorithm (i.e. intrinsic motivation and perceived barriers to participate in the fight against climate change). Once the normality of the distribution of the variables has been verified, we proceed to calculate the average values for each segment and the ANOVA tests. The results can be seen in Table 3.

Table III. Intrinsic motivation and barriers to pro-environmental behaviour: Average values and analysis of variance.

Characteristic	Segment 1	Segment 2	Segment 3	F	Differences between segments*
Dependent variable: Intrinsic Motivation	5.05	5.61	5.71	18.581	1-2, 2-3
Independent variables					
B1. Lack of general public commitment.	5.31	6.22	6.40	43.900	1-2, 2-3
B2. Political agendas at levels beyond the University.	5.11	6.21	6.43	71.464	1-2, 2-3
B3. Lack of knowledge.	4.95	6.26	6.35	62.379	1-2, 2-3
B4. Lack of equipment.	4.59	5.78	7.00	87.99	1-2, 1-3, 2-3
B5. Lack of an interdisciplinary approach to teaching and research at the university.	4.99	5.84	6.31	68.454	1-2, 1-3, 2-3
B6. Lack of relationships and connections within the institution.	4.70	5.31	6.09	57.540	1-2, 1-3, 2-3
B7. Lack of a framework and policy to promote collaboration between programmes and units.	4.89	5.33	6.33	73.163	1-2, 1-3
B8. Lack of infrastructure.	4.56	5.40	5.58	26.633	1-2, 2-3
B9. Administrative and management problems.	4.51	4.60	5.77	45.946	1-2, 1-3

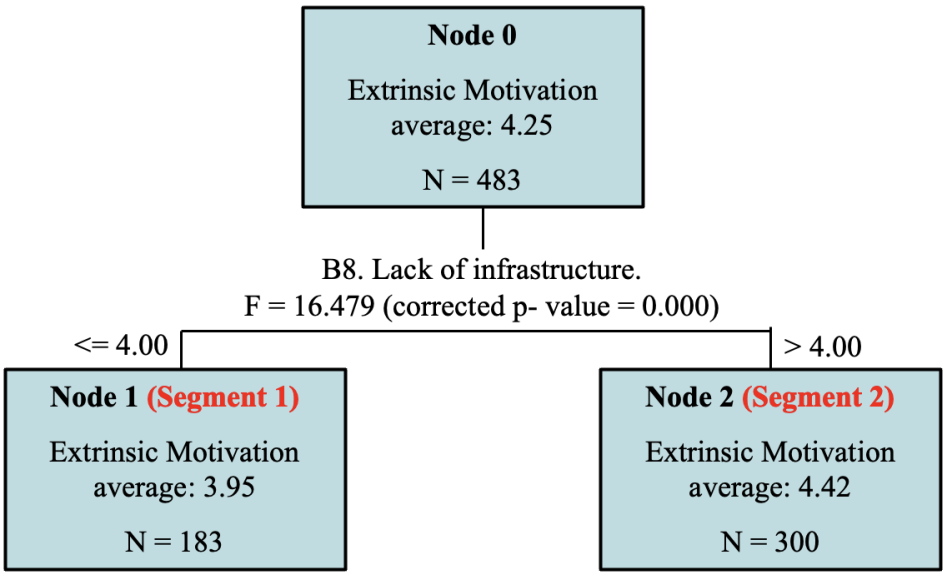
B10. University culture.	4.69	4.78	7.00	474.888	1-2, 1-3
B11. Lack of awareness.	4.98	5.61	6.64	106.432	1-2, 1-3, 2-3
B12. Lack of interest.	4.87	5.37	6.46	83.503	1-2, 1-3, 2-3
B13. Lack of expertise.	4.59	4.61	5.78	38.211	1-2, 1-3
B14. Lack of funds.	5.08	5.60	6.13	29.069	1-2

*In order to test the significance of the differences between the segments of employees, the Tukey post-hoc multiple comparison test is used. Only the statistically significant differences at $p<0.05$ are shown.
Source: Authors' proposal.

Regarding the segments generated to explain intrinsic motivation, it is observed that, of the three resulting segments, Segments 1 and 2 show the lowest scores, while Segment 3 shows the highest scores of the analysis, both for the dependent variable in the CHAID analysis (intrinsic motivation), as well as for the independent variables (barriers to participate in actions to mitigate climate change). This allows us to affirm that the greater the perception of barriers, the greater the intrinsic motivation of the member of the university community.

Similarly, the CHAID algorithm was used considering extrinsic motivation as the dependent variable. The results obtained are presented graphically in Figure 2.

Figure 2. Classification tree generated by CHAID algorithm (Extrinsic Motivation)



Source: Authors' proposal.

As a result of our second CHAID analysis, we obtained two final segments of university employees in relation to their extrinsic motivation. In this case, the lack of infrastructure is the main barrier that discriminates against members of the university community in regard to their extrinsic motivation to get involved in environmental initiatives.

To characterise the final segments of the CHAID analysis, we contrasted the existence of differences between the resulting segments in terms of their levels of extrinsic motivation and perceived barriers to participate in the fight against climate change. Once the normality of the distribution of the variables has been verified, we proceed to calculate the average values for each segment and the ANOVA tests. The results can be seen in detail in Table 4.

Table IV. Extrinsic motivation and barriers to pro-environmental behaviour: Average values and analysis of variance.

Characteristic	Segment 1	Segment 2	F	Differences between segments*
Dependent variable: Extrinsic Motivation	3.92	4.44	18.606	1-2
Independent variables				1-2
B1. Lack of general public commitment.	5.57	6.09	16.531	1-2
B2. Political agendas at levels beyond the University.	5.34	6.08	35.954	1-2
B3. Lack of knowledge.	5.18	5.97	33.351	1-2
B4. Lack of equipment.	4.52	5.81	96.431	1-2
B5. Lack of an interdisciplinary approach to teaching and research at the university.	5.04	6.01	64.975	1-2
B6. Lack of relationships and connections within the institution.	4.64	5.76	68.600	1-2
B7. Lack of a framework and policy to promote collaboration between programmes and units.	4.75	6.05	110.194	1-2
B8. Lack of infrastructure.	3.45	6.05	817.770	1-2
B9. Administrative and management problems.	4.07	5.65	146.468	1-2
B10. University culture.	5.08	6.06	58.102	1-2

B11. Lack of awareness.	5.11	6.14	63.791	1-2
B12. Lack of interest.	4.90	6.04	71.741	1-2
B13. Lack of expertise.	4.33	5.59	81.930	1-2
B14. Lack of funds.	4.71	6.10	111.853	1-2

*In order to test the significance of the differences between the segments of employees, the Tukey post-hoc multiple comparison test is used. Only the statistically significant differences at $p<0.05$ are shown. Source: Authors' proposal.

Regarding the segmentation for extrinsic motivation, it is observed that, of the two resulting segments, Segment 1 shows the lowest scores, while Segment 2 shows the highest scores of the analysis. This allows us to affirm that there are significant differences between segments, in the sense that the greater the perception of barriers, the greater the extrinsic motivation of the member of the university community.

These results may seem paradoxical, since the most motivated individuals (both intrinsically and extrinsically) are those who encounter the greatest barriers, while the least motivated present significantly lower perceptions of the importance of the barriers. One explanation for this finding may be that the most motivated, both intrinsically and extrinsically, are those who have encountered obstacles to their pro-environmental behaviour and have identified more accurately, given their involvement with sustainability, the factors that may prevent other employees of the institution from adopting pro-environmental behaviours. Specifically, if we take highly motivated employee segments as a reference, both intrinsically and extrinsically, in both cases it is identified that the main barriers perceived by university employees to actively participate in climate change adaptation and mitigation actions are environmental awareness and university culture. In addition, for the segment of participants with intrinsic motivation, lack of equipment is indicated, while for the segment of employees who are more extrinsically motivated, lack of funds also receives high scores.

5. Discussion

The literature emphasises the need to carry out a segmentation to classify employees based on their perceptions and their different behaviour profiles (Al Zaidi et al., 2023). To meet this call for research and the need to increase the involvement of employees in pro-environmental behaviours, this study has used the CHAID technique to identify groups of university employees in relation to their motivation to participate in activities aimed at improving sustainability and detecting the main barriers to actively engage in adaptation and mitigation of climate change. As a result, the effectiveness of this segmentation technique is confirmed, since it makes it possible to obtain a graphical representation (in the form of decision trees) of different groups of employees with varying levels

of intrinsic and extrinsic motivation in relation to certain perceived barriers to adopt pro-environmental behaviours. In view of the results obtained, it is understood that the resulting segments are measurable, accessible, substantial and actionable, thus, corroborating the effectiveness of this segmentation technique defended by works carried out in other research areas (Díaz-Pérez and Bethencourt-Cejas, 2016; Ruiz-Molina et al., 2021; Gunduz and Al-Ajji, 2022).

Moreover, based on the results of this study, we contribute to the literature on the main barriers that prevent employee participation in climate change adaptation and mitigation actions, in response to calls for research in this field (Deng et al., 2022). Specifically, concerning the research questions posed, we conclude that the main barrier that discriminates between different groups of employees based on their intrinsic motivation is the university culture, and, to a lesser extent, the lack of facilities. On the other hand, the barrier that most differentiates employees with high extrinsic motivation from employees with low extrinsic motivation is the lack of infrastructure. In addition, it should be noted that the most motivated employees (both intrinsically and extrinsically) are the ones who encounter the greatest barriers, while the least motivated value the obstacles to pro-environmental behaviour as less relevant. This may be because those who are more motivated are the ones who can more realistically assess the obstacles that have been encountered when trying to display pro-environmental behaviours, while the less motivated have not been in the situation of facing these obstacles by not getting involved in mitigation and adaptation against climate change, which is why they value them less intensely.

Specifically, among the most notable barriers to participation in climate change adaptation and mitigation actions for university employees with greater intrinsic motivation are university culture, lack of equipment and environmental awareness. Similarly, the employees with the highest extrinsic motivation to participate in sustainable initiatives coincide with the most intrinsically motivated by highlighting university culture, lack of equipment and environmental awareness as the main barriers, in addition to the lack of funds and lack of general public commitment.

To this end, business leaders and researchers must redesign their policies considering the barriers detected in this study. The identification of these barriers should facilitate the development of actions to encourage the least motivated to become more involved in the mitigation and adaptation of climate change, and ensure that the most motivated do not perceive that the obstacles are so great as to prevent them from taking action. In this way, research and implementation efforts to engage employees in sustainable initiatives are better addressed.

5.1 Theoretical implications

This study suggests important implications for both the theory and the application in the field of research. From a theoretical point of view, although several previous investigations have proposed models to understand the pro-environmental behaviour of employees (Foster et al., 2022; Mohiuddin et al., 2022; Kim and Lee, 2022), empirical research with a focus on barriers and motivation is rather low (Gifford, 2011). Along these lines, this study contributes with findings to the literature on motivational factors, allowing the analysis of barriers or obstacles from the perspective of the employee and providing a new and different theoretical support to previous studies that have focused their attention on analysing the user or consumer perspective (Pham et al., 2022; Meena and Sarabhai, 2023). In addition, previous studies in the literature have found barriers to pro-environmental behaviour; however, many of them focus only on the barrier but not on motivation, as in the case of Grifford (2011), where his findings indicate that individuals try to engage in pro-environmental behaviours, but their behaviour is stopped when they feel these actions are counterproductive. Similarly, Desrochers and Zelenski (2022) state that one of the barriers to the development of pro-environmental behaviours is that individuals think they are already doing enough for the environment. In this sense, this work contributes to the literature by identifying specific barriers from the employee's point of view and connecting how these barriers hinder employee's motivation.

Specifically, in view of the results obtained, the perceptions about the barriers can be considered, not as an antecedent of motivation, but as a result of it, since high motivation entails greater involvement on the part of the employee and consequently greater attention paid to the most serious barriers or obstacles, based on the realistic vision of those individuals who are motivated by the social transformation necessary to combat climate change and face difficulties in taking action, and who are aware of the inaction or scant involvement of their colleagues in this type of initiative.

The present study contributes to the existing literature on pro-environmental behaviour by posing a different scenario to previous findings, in which motivation or barriers influence pro-environmental behaviours separately, but not from an approach in which barrier restrains motivation and a posteriori behaviour. Furthermore, by separating both intrinsic and extrinsic motivations, the causes of whether or not employees engage in pro-environmental behaviours can be analysed in more detail. This is a novel approach and can provide the basis for an answer to the problem of the ineffectiveness of the actions proposed to address the environmental consequences of human behaviour.

5.2 Practical implications

From a practical viewpoint, the results obtained help to guide the representatives or organisational leaders on the actions that generate the greatest impact in the mitigation of climate change from a

motivational approach of behavioural prediction. Specifically, since the most motivated employees to participate in sustainable initiatives perceive greater barriers than the less motivated ones, organisation managers should focus on removing the obstacles perceived by the group with the highest motivation to allow them to take action when it comes to environmental issues.

In this sense, several organisations propose different adaptation and mitigation plans against climate change that focus on promoting various types of behaviour, such as recycling, choosing videoconferencing as a replacement for travel, use of public transport and waste control (Foster et al., 2022). However, based on the current results, it is assumed that these efforts are insufficient and this type of initiative should be complemented with the improvement of equipment and infrastructure, a greater allocation of economic resources for climate change adaptation and mitigation activities, environmental awareness campaigns and with the elaboration of evidence of a culture of the university organisation that assumes sustainability as one of its main values. In this way, it is important that organisation leaders focus their efforts first on being an example and showing their involvement in pro-environmental initiatives, since, as a general rule, individuals learn behaviours by observing others and then try to exhibit similar patterns of behaviour (Farrukh et al., 2022). For example, if the business leader promotes recycling and responsible use of paper, it makes no sense for them to request hard copies of reports from delegates if they can deliver them in an electronic format (Sabbir and Taufique, 2022). These actions, however, small they may seem, mark the path to follow for the other members of the organisation. Regarding university culture, it is also important that organisation leaders consider the university as a transcendental agent in the search for sustainable development, since as society changes, the role of universities becomes more extensive and complex, exceeding its primary vocation to provide education (Fanea-Ivanovici and Baber, 2022). In this way, universities are called upon to be engines of social change by providing the knowledge, skills and attitudes necessary to face the complex challenges both in universities and in companies (De La Torre et al., 2022).

On the other hand, since lack of funds emerges as another significant barrier for employees to adopt sustainable practices, it is suggested that business leaders design a system of rewards or economic incentives for involvement in environmentally sustainable initiatives, given their contribution to extrinsic motivation (Ryan and Deci, 2000). However, it must be handled with care and prudence because it may be that the employee only takes actions to protect nature when there is financial remuneration involved and it is likely that when the incentive is no longer offered, environmental care is put to one side. Therefore, it is important that rewards reflect an organisation's commitment to integrating sustainability into all aspects of work (Kang et al., 2022).

In addition, leaders should focus their efforts on generating intrinsic motivation in their employees to carry out pro-environmental activities. This motivation refers to the passion, enjoyment or satisfaction of performing a certain behaviour for pleasure (Faraz et al., 2021). Therefore, the ideal would be for the representatives of the different organisations to make the employee feel that their contribution has an impact on the lives of both their colleagues and their families, showing them real examples of the benefits that their participation in sustainable initiatives brings about, as this is sure to generate personal pleasure and long-term commitment (Kang et al., 2022). In addition, if employees are intrinsically motivated, they can influence the rest of their colleagues to carry out pro-environmental activities such as turning off their personal computers before leaving their desk or turning off the electric fan or lights before leaving the room (Sabbir and Taufique, 2022), which will greatly benefit the fulfilment of the organisations' SDGs.

In addition, this study has also detected the importance of barriers such as lack of equipment and infrastructure. However, it is not enough to invest in purchasing equipment or the restructuring of buildings, but an environmental management plan must be made based on the needs of the employee (Foster et al., 2022). For example, if you decide to invest in containers for waste classification and its subsequent management, it is not enough to merely buy them and place them in a random location. It is necessary to know where and why and include advice to employees for handling and disposal of all waste materials (Bhattacharya et al., 2022), showing them the usefulness of carrying out this action and the repercussion it will have on the organisation and society.

Finally, it has been detected that the most motivated university employees (both intrinsically and extrinsically) are the ones who find the greatest obstacles to participate in sustainable initiatives, while the least motivated do not perceive the barriers as a determining factor. Therefore, it is suggested that business leaders focus their efforts on allocating more funds to environmental initiatives, or holding environmental awareness talks as, in this way, the most motivated will perceive fewer obstacles and will be able to become more involved in the action and encourage the less motivated to engage in sustainable practices. In this way, the present study contributes to a more sustainable society by developing an understanding of how employees react to issues related to climate change. The knowledge on the perceptions of employees may be used to influence other members of society who can get involved in pro-environmental behaviours.

5.3 Limitations and future research suggestions

This research is subject to a series of limitations that must be considered to evaluate the results and the conclusions derived from them, which are established as opportunities for future research.

First of all, the geographic area in which this study was carried out was Latin America, so a more global analysis could be considered and replicated in European countries, or alternatively a cross-cultural analysis could be carried out. Secondly, with regard to the sample, although the sample size is adequate for statistical analysis, the existence of differences could be explored with a larger number of participants. Thirdly, it could be evaluated if the obstacles perceived by the employees are the same as those perceived from the perspective of the consumer. Fourthly, it could be explored whether the same barriers are detected in other areas. As the business sector is such a broad field and includes experts from various professional areas it may be that implications suggested in one area vary in relation to another. Fifthly, a comparative analysis of gender or age could be carried out to explore whether this condition may be relevant to the results. Sixthly, given the exploratory nature of the CHAID algorithm, the possibility of using alternative methods, such as structural equation modelling, could be considered, to obtain confirmatory results allowing the measurement of other variables associated with the relationship between motivation and pro-environmental behaviour, such as satisfaction or environmental awareness.

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