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Green Gamification in Information Systems for Environmental Sustainability

A Qualitative Study on Employee Behaviour in Organisations

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Authors: Maria Dalgren
Madeleine Tran

Supervisor: Niki Chatzipanagiotou

Grading Teachers: Nam Aghaee
Avijit Chowdhury

Green Gamification in Information Systems for Environmental Sustainability: A Qualitative Study on Employee Behaviour in Organisations

AUTHORS: Maria Dalgren and Madeleine Tran

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ABSTRACT (MAX. 200 WORDS):
The master's thesis focuses on Gamified Green Information Systems (IS). It explores how gamified green IS influence employee behaviour and the motivational factors encouraging environmentally sustainable practices. For this, qualitative research was conducted, and data were collected through semi-structured interviews from seven employees. The data were analysed thematically to conclude to five themes, which represent the research findings, and were discussed through the lens of Self-Determination Theory. Findings show that engagement with gamified green IS are shaped by intrinsic and extrinsic motivations, supported by emotional drivers and clear communication. Design features like feedback and visibility enhance impact, especially in culturally aligned, collaborative settings. Organisational factors, such as leadership, strategy, and communication, enable integration, though challenges such as

remote work persist. When aligned with core values, gamified green IS can reinforce sustainable behaviours and support cultural change. Drawn from the findings, we provide suggestions for effective use of gamified green IS that support environmentally sustainable goals. The master's thesis contributes theoretically in the IS field by linking green gamification with Self-Determination Theory, showing how fulfilling motivational needs encourages employee engagement in sustainability. Practically, it offers organisations actionable guidance on designing gamified IS initiatives that motivate sustainable behaviours and support environmental goals.

Acknowledgements

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Thank you,

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Table of Contents

Figures

Tables

1 Introduction

1.1 Background

The digital world that organisations function in is constantly evolving, which aligns closely to the definition of the Information Systems (IS) field that SISA (Svenska Informationssystemakademin) (n.d.) presents. SISA (n.d.) describes IS as the scientific field that explores digitalisation, including its conditions, meanings, values and consequences for individuals, organisations and society. As sustainability becomes a pressing concern for organisations, the IS field plays a vital role in investigating how digital tools, including gamified systems, can support green transformation. Recognising the urgency of sustainability, the United Nations (UN) developed the 21 Sustainable Development Goals (SDGs) in 2020 as part of their 2030 agenda, acknowledging that prior efforts were insufficient for the change that is needed (UN, 2020). Likewise, organisations also need to integrate sustainability in their agendas (Ixmeier et al., 2024; Kirchner-Krath et al., 2024a). This master's thesis research contributes to this growing and impactful area within IS that focuses on how gamified information systems drive sustainability and support organisations' green transformation efforts.

Sustainability is commonly defined through its three pillars: economic, social, and environmental (Kotlarsky et al., 2023; Veit & Thatcher, 2023). While all three pillars should be considered equally to create long-term business sustainability value, research suggests that the environmental aspect remains underexplored in practice (Ixmeier et al., 2024). In recent years, there has been a growing interest in the relationship between digitalisation and sustainability (Veit & Thatcher, 2023), as digital technologies increasingly intersect with sustainability goals (Kotlarsky et al., 2023). This intersection has given rise to the concept of *digital sustainability* – where technology can serve as a tool to improve sustainable practices (Kotlarsky et al., 2023). Kotlarsky et al. (2023. p. 938) define digital sustainability as "*…the development and deployment of digital resources and artifacts toward improving the environment, society, and economic welfare.*", which this master's thesis also adopts. In the IS field, *Green IT* and *Green IS* are terms used to describe digital sustainability efforts, with Green IT focusing on reducing the environmental impact of IT infrastructure itself, and Green IS focusing on broader initiatives to reduce an organisations environmental footprint (Kotlarsky et al., 2023). Given the growing emphasis on environmental responsibility, it is of great importance to explore and focus on how IS can contribute to sustainable business practices.

One approach gaining attention in IS research is g*amification*, a term first coined by Nick Pelling in 2002, which got widespread attention in the second half of 2010 (Prakash & Manchanda, 2021). Gamification can be defined as "*...improving non-gaming systems and processes using principles and artefacts partially derived from and inspired by gaming.*" (Lowry et al., 2020, p. 609). The difference between gamified applications and games lies in the subjective nature of their context, purpose, and user perceptions (Hsu, 2022). According to Hsu (2022), gamification is widely associated with rewards, leading businesses to implement its strategies to increase user engagement and influence behaviour. Lowry et al. (2020) argue that gamification is a compelling IS research opportunity, especially as the global platform-based economy is growing.

Organisations have already experimented with gamification strategies to encourage employee behavioural change. Studies have shown that integrating gamification into work practices can enhance employee engagement and loyalty (Silic et al., 2020). For example, Deloitte has used gamification in different functional areas. One of these areas is human resource management, where Deloitte introduced the "Maverick program", which aimed to encourage creative and innovative thinking among employees through competitions in teams (Prakash & Manchanda, 2021). The contest presented real-world business scenarios, challenges, and competitive dynamics, rewarding participants with engagement perks, including the chance to collaborate with top leadership. Although environmental sustainability was not the primary objective, the contest indirectly contributed to it by reducing the wastage of time, energy, and resources. This efficiency was driven by gamification elements, such as successive elimination rounds, which enhanced engagement while streamlining the selection process. By fostering competition and rewarding problem-solving skills, the contest effectively identified top contestants who could tackle complex challenges and present real-world business scenarios to an executive panel (Prakash & Manchanda, 2021). The initiative illustrates how gamification can be used and leveraged to drive behavioural shifts. Nonetheless, its potential in encouraging environmental sustainability remains underexplored.

The potential of gamification to encourage environmental sustainability has led to the emergence of *green gamification*, a concept that refers to the application of game design elements, such as points, rewards, challenges, and feedback loops, to non-game contexts with the specific aim of encouraging environmentally sustainable behaviours (Zhou et al., 2024). It is a strategy used to motivate individuals and organisations to adopt greener practices by making such behaviours more engaging, goal-oriented, and rewarding. It combines game design elements with the organisation's environmental and sustainable goals (Zhou et al., 2024). Green gamification is built into and enabled by information systems, resulting in gamified green IS. *Gamified green IS* are information systems that integrate green gamification mechanisms into their design and functionality. These systems are technologically enabled platforms that support, track, and incentivise sustainable behaviours through embedded gamification features. That is, green gamification is often implemented via digital platforms (e.g., apps, dashboards, employee portals among others). Integrating gamified elements into an organisation's information systems can encourage employees to make more environmentally responsible decisions (Zhou et al., 2024). By examining how gamified information systems influence employees' behaviour and are integrated into organisational practices, this master's thesis research contributes to understanding the role of gamified green IS as a tool for organisational transformation.

1.2 Previous Related Studies and Problem Identification

Ixmeier et al. (2024) note that while extensive theoretical research exists, the practical application of environmental sustainability remains underexplored. Environmental sustainability is now a key priority in most organisations' strategic agendas (Ixmeier et al., 2024). Organisational stakeholders are increasingly interested in how organisations take responsibility and accountability for their environmental impact. Ixmeier et al. (2024) highlight the importance of sustainability practices as it assists a company's legitimacy. By prioritising sustainable practices organisations create both sustainability value and long-term business value. For information systems to be able to support environmentally sustainable practices,

businesses must recognise its potential and be both mentally and technically ready to adopt sustainable practices (Ixmeier et al., 2024).

As organisations strive to integrate sustainability into their core strategies, innovative approaches such as gamification are gaining attention for their potential to drive sustainable employee behaviour. Kirchner-Krath et al. (2024a) conducted a systematic literature review, investigating the increased attention that gamified information systems have gained as a way to change employee behaviour, trying to gain a deeper understanding of how gamified IS can be developed but also how these can influence behaviour. The authors further highlight how gamification holds great potential for enhancing positive emotional and social experiences in sustainable employee behaviour. Research on gamification for sustainable employee behaviour has grown, focusing on workplace sustainability, promoting employee health, and energy conservation (Kirchner-Krath et al., 2024a). However, there is an emphasis on the challenges that come with trying to overcome the intention-action gap, meaning that getting employees involved in the first stages is not as complicated as one may think, but going from an idea to a call-to-action still requires further research.

To further connect sustainability with gamification, Zhou et al. (2024) introduce the term *green gamification* within the IS field. Green gamification is a specialised branch of gamification which uses game-like elements in information systems to specifically motivate environmentally sustainable behaviours. Green gamification is a particularly effective strategy to inspire and sustain pro-environmental behaviours, and could be seen as a subfield within Green IS. Zhou et al. (2024) focus on the individual-level behaviours that drive environmental outcomes and highlight that meaningful engagement is crucial for green gamification initiatives. By meaningful engagement, Zhou et al. (2024) refer to the level of interest, interaction and investment a user has with the gamified information system. Within meaningful engagement there are two types: *experiential* and *instrumental outcomes*. Experiential outcomes relate to the emotional and psychological experiences, while instrumental outcomes are the task-oriented achievements, focusing on practical results and actions (Zhou et al., 2024). Zhou et al. (2024) further identify six key motivations that are essential for user engagement and classifies them into three categories building upon the Self-Determination Theory. The three categories are: *intrinsic motivation, autonomous extrinsic motivations,* and *controlled extrinsic motivations*. The main goal of green gamification is to limit negative environmental impact by encouraging users, through the use of information systems, to adopt specific green behaviours, for example, walking rather than driving (Zhou et al., 2024).

When researching green gamification, within leading IS journals and conferences, there is a limited amount of published research on the topic. The only identified article that explicitly uses the term green gamification is by Zhou et al. (2024), suggesting that while the term is relatively new within the IS field, related concepts have appeared in the literature over a decade earlier (e.g., Froehlich, 2015). However, in the last four years, approximately 129 research references related to green gamification have been published in scholarly databases. This suggests that while the concept is gaining traction, it remains in its early stages within the IS field. That is, although gamification has been explored in various fields such as software, education, and computer engineering, there is a gap in the IS research regarding its connection to sustainability practices.

In the growing interest of organisations commitment to sustainability (Ixmeier et al., 2024), there is a notable gap in research on how gamification can drive sustainable practices within organisations. While gamification has been recognised for its ability to influence employee

behaviour towards sustainable practices (Kirchner-Krath et al., 2024a), its application in the IS research field remains underexplored. Zhou et al. (2024) introduce *green gamification* within the IS field, highlighting its capacity to drive pro-environmental behaviours. However, its integration into organisational strategies, particularly in aligning with long-term environmental goals, remains unstudied. A major challenge lies in bridging the *intention-action gap* (Kirchner-Krath et al., 2024a), ensuring that initial engagement in sustainability initiatives translates into long-term, actionable change. As organisations face growing pressure to uphold their legitimacy through sustainable practices (Ixmeier et al., 2024), it is essential to explore how green gamification can be strategically implemented to drive and sustain environmentally responsible behaviours. Since organisations are fundamentally composed of individuals whose actions collectively shape sustainability outcomes, this master's thesis focuses on an individual-level perspective. Therefore, further research is needed in the IS field to understand how gamified IS can be effectively used to foster sustainable employee behaviours and support environmental goals in organisations.

1.3 Research Purpose and Research Question

Drawing from the above problem identification, the purpose of this master's thesis is to explore gamified green information systems (IS) and how these influence individual employee behaviour within organisations, and to explore and understand the motivational factors that encourage environmentally sustainable practices. By focusing on the employee experience, the study aims at providing suggestions into how green gamification can be effectively used to support organisational environmental goals. To achieve the research aim, the following main research question is posed:

- How can gamified green IS influence individual employees' motivation and behaviour toward environmentally sustainable practices within organisations?

This overarching research question can be broken down into the following research sub-questions:

RQ1: What are the key elements of green gamification that influence employees' behaviour toward sustainable environmental practices in organisations?

RQ2: How can green gamification strategies be integrated into organisational practices to motivate and support employees' sustainable environmental behaviour?

1.4 Delimitations

Certain limitations have been outlined to ensure the clarity and feasibility of the master's thesis. The research aims to investigate the interaction between green gamification and employees, and to provide valuable insights into how their organisations can use gamified green IS to support organisational goals related to sustainable environmental practices. There are three pillars within sustainability: economic, social, and environmental. In this master's thesis, we have limited the scope to primarily investigate the environmental aspect of sustainability and how it relates to different organisational goals. Additionally, we do not intend to explore all

organisational factors on understanding the behavioural patterns that impact the perception and use of green gamification. To ensure the study remains focused and manageable, we have excluded the technical specifics of implementing gamification technologies. While understanding that technical challenges are valuable as well, addressing them would require a deep dive into architecture, requirements and infrastructure. There would also be a need for a different approach and standpoint to successfully address the phenomenon. Instead, our aim is to explore how green gamification influences employees' behaviour regarding environmentally sustainable practices within their organisations. Further, we only focus on organisations within Sweden for both practical and strategic considerations. Geographically narrowing the scope allows for a more in-depth exploration of the specific social and regulatory factors that shape the use of information systems in a particular context. Additionally, a geographical limited scope ensures feasibility as there will be limitations regarding resources and time.

1.5 Thesis Disposition

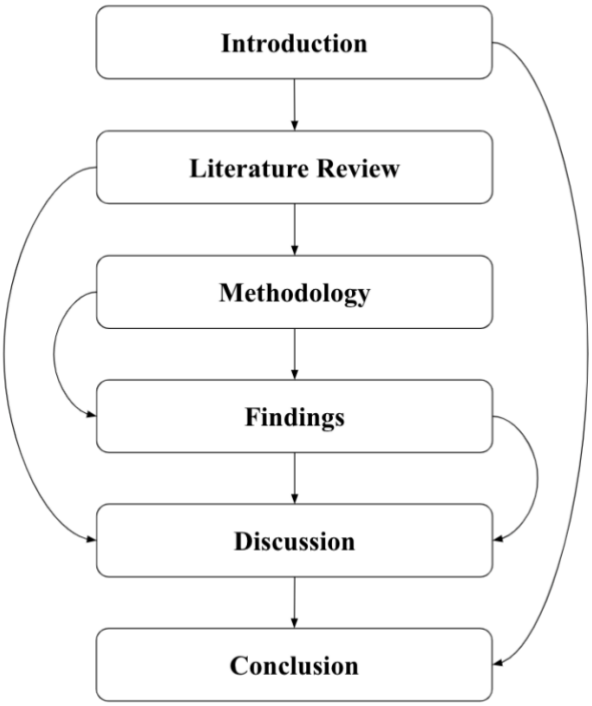

Figure 1: Thesis Disposition (made by the authors, 2025)

Figure 1 illustrates the overall structure of the master's thesis, outlining the logical flow between the main chapters. It starts with the Introduction chapter, which presents the research context and objectives, followed by the Literature Review chapter, which establishes the theoretical foundation of the master's thesis. The Methodology chapter explains how the research was designed and conducted, leading us to the Findings chapter, where the empirical results are presented. These findings are then interpreted and discussed in the Discussion chapter, where they are connected back to the literature to reply to the posed research questions,

and discussed with the help of the theory. Finally, the Conclusion chapter summarises the key insights of the master's thesis research and presents the contributions and implications of the research. Finally, the Conclusion chapter suggests future research directions.

2 Literature Review

2.1 Search Procedure

The search for the material included in this master's thesis literature review was made in the following scientific databases: ACM Digital Library, AISeL, Atlantis Press, Business Source Complete, Emerald Insights, Engineering Village (Elsevier), Scopus and Springer Nature Link. The search was conducted by using the following keywords: green, sustainable, sustainability, environmental, green IT, green IS in combination with gamification, use, organisation, and behaviour, by using the logical operator AND to join the primary terms, and OR to combine the alternate ones. For example, "sustainable" OR "green" AND "gamification". The selection process for the literature review was conducted by a set of following inclusion criteria:

- Articles published between January 2020 and March 2025, with the exception of material related to theoretical concepts, and to articles related to conceptual definitions.
- Articles available as a full-text journal or conference paper, or a book chapter.
- Articles that have been peer-reviewed.
- Articles that have been published and written in the English language.

Thus, the material that did not fall into the inclusion criteria was ultimately excluded. For an overview of the material included in the Literature Review chapter, see the following Table 1. It should be noted that the sources listed in Table 1 do not represent the full list of references used throughout the master's thesis. A complete list of references can be found at the reference list at the end of the master's thesis.

Table 1: Overview of Literature Review Sources

Article	Source + Link from database	Motivation
Andraschko, L., Wunderlilch, P., Sarker, S., & Veit, D. (2023). Sustainable IS Use: What IS Needed to REDUSE, *ICIS 2023 Proceedings*. 10.	AISeL https://aisel.aisnet.org/icis2023/user_behav/user_behav/10/	Explains six drivers at an individual-level for sustainable behaviour.
Bui, A., Veit, D., & Webster, J. (2015). Gamification – A Novel Phenomenon or a New Wrapping for Existing Concepts? *ICIS 2015 Proceedings*. 23.	AISeL https://aisel.aisnet.org/icis2015/proceedings/ITimplementation/23/	Defines gamification and explores if the concept is new or not.
Deci, E. L., & Ryan, R. M. (2000). The "what" and "why" of goal pursuits: Human needs and the self-determination of behavior. *Psychological inquiry*, vol. 11, no. 4, pp. 227–268.	Business Source Complete, BSC (EBSCOhost) https://web-p-ebscohost-com.ludwig.lub.lu.se/ehost/detail/detail?vid=3&sid=12aa3222-104b-4757-99f9-06bdcf716946%40redis&bdata=JkF1dGhUeXBlPWlwLHVpZCZzaXRlPWVob3N0LWxpdmU%3d#AN=3926504&db=bth	Used to explain the three basic psychological needs, autonomy, competence and relatedness, to foster motivation.
Dedrick, J. (2010). Green IS: Concepts and Issues for Information Systems Research. *Communications of the Association for Information Systems*, 27, pp-pp.	AISeL https://aisel.aisnet.org/cais/vol27/iss1/11/	Defines Green IT.

Deterding, S., Dixon, D., Khaled, R., & Nacke, L. (2011). From game design elements to gamefulness: defining" gamification". *In Proceedings of the 15th international academic MindTrek conference: Envisioning future media environments*, pp. 9–15.	ACM Digital Library https://dl.acm.org/doi/10.1145/2181037.2181040	Defines the term gamification
Harnischmacher, C., Herrenkind. B., & Weilbier, L. (2020). Yesterday, Today, and Tomorrow – Perspectives on Green Information Systems Research Streams. *European Conference on Information Systems (ECIS)*	AISeL https://aisel.aisnet.org/ecis2020_rp/193/	Used to see how Green IS research has evolved.
Haque, S., Panda, D., & Ghosh, A. (2024). Gamifying sustainability with self-efficacy: motivating green behaviours in large industrial firms. *International Journal of Organizational Analysis*, vol. 32, no. 11, pp. 74–93.	Emerald Insights https://www.emerald.com/insight/content/doi/10.1108/ijoa-08-2023-3951/full/html	Defines Employee Green Behaviour (EGB) and its connection to gamification.
Hedman, J., & Henningsson, S. (2016). Developing ecological sustainability: a green IS response model. *Information Systems Journal*, vol. 26, no. 3, pp. 259–287.	Engineering Village (Elsevier) https://www.engineeringvillage.com/app/doc/?docid=inspec_M4158f801155e9d6fa6aM644810178163171&pageSize=25&index=1&searchId=5ac07e0b30504c078d35b7f0ac254f81&resultsCount=200&usageZone=resultslist&usageOrigin=searchresults&searchType=Quick	Defines Green IS and provides an example (Nordea).
Hsu, C. L. (2022). Applying cognitive evaluation theory to analyze the impact of gamification mechanics on user engagement in resource recycling. *Information & Management*, vol. 59, no. 2, pp.103602.	Scopus https://www.scopus.com/record/display.uri?eid=2-s2.0-85123608143&origin=resultslist&sort=plf-f&src=s&sot=b&sdt=b&s=TITLE-ABS-KEY%28Applying+cognitive+evaluation+theory+to+analyze+the+impact+of+gamification%29&sessionSearchId=c82632fa8b9688098e51883ebc5828f4	Used in the Introduction chapter to address the subjective nature of gamification.
Ixmeier, A., Wagner, F., & Kranz, J. (2024). Leveraging Information Systems for Environmental Sustainability and Business Value. *MIS Quarterly Executive*, vol. 23, no. 1.	AISeL https://aisel.aisnet.org/misqe/vol23/iss1/5/	Used in the Introduction chapter to address the need for practical application of environmental sustainability.
Kirchner-Krath, J., Dijkstra-Silva, S., Morschheuser, B., & von Korflesch, H. F. (2024a). Gameful systems for corporate sustainability: systematic review, conceptual framework and research agenda on gamification and sustainable employee behavior in companies. *Internet Research*, vol. ahead-of-print, no. ahead-pf-print.	Emerald Insights https://www.emerald.com/insight/content/doi/10.1108/intr-06-2024-1000/full/html	Used in the Introduction chapter as the research investigates how gamification could change behaviour.
Kirchner-Krath, J., Morschheuser, B., Sicevic, N., Xi, N., von Korflesch, H.F.O., & Hamari, J. (2024b). Challenges in the adoption of sustainability information systems: A study on green IS in organizations'. *International Journal of Information Management,* vol. 77.	Scopus https://www.scopus.com/record/display.uri?eid=2-s2.0-85184254199&origin=resultslist&sort=plf-f&src=s&sot=b&sdt=b&s=TITLE-ABS-KEY%28Challenges+in+the+adoption+of+sustainability+information+systems%3A+A+study+on+green+IS+in+organizations%29&sessionSearchId=c82632fa8b9688098e51883ebc5828f4&relpos=1	Describes Green IS potential in organisations.

Kotlarsky, J., Oshri. I., & Sekulic. N. (2023). Digital sustainability in information systems research: conceptual foundations and future directions. *Journal of the Association for Information Systems*, vol. 24, no. 4.	AISeL https://aisel.aisnet.org/jais/vol24/iss4/9/	Defines digital sustainability, and sustainability pillars.
Lowry, P. B., Petter, S., & Leimeister, J. M. (2020). Desperately seeking the artefacts and the foundations of native theory in gamification research: why information systems researchers can play a legitimate role in this discourse and how they can better contribute. *European Journal of Information Systems*, vol. 29, no. 6, pp. 609–620.	Scopus https://www.scopus.com/record/display.uri?eid=2-s2.0-85095745510&origin=resultslist&sort=plf-f&src=s&sot=b&sdt=b&s=TITLE-ABS-KEY%28Desperately+seeking+the+artefacts+and+the+foundations+of+native+theory+in+gamification+research%3A+why+information+systems+researchers+can+play+a+legitimate+role+in+this+discourse+and+how+they+can+better+contribute%29&sessionSearchId=c82632fa8b9688098e51883ebc5828f4	Used in the Introduction chapter to define gamification.
Prakash, D., & Manchanda, P. (2021). Designing a comprehensive gamification model and pertinence in organisational context to achieve sustainability. *Cogent Business & Management*, vol. 8, no. 1.	Scopus https://www.scopus.com/record/display.uri?eid=2-s2.0-85113674742&origin=resultslist&sort=plf-f&src=s&sot=b&sdt=b&s=TITLE-ABS-KEY%28Designing+a+comprehensive+gamification+model+and+pertinence+in+organisational+context+to+achieve+sustainability%29&sessionSearchId=c82632fa8b9688098e51883ebc5828f4	Defines gamification and provides examples of different organisations that have used gamification internally.
Norton, T. A., Parker, S. L., Zacher, H., & Ashkanasy, N. M. (2015). Employee green behavior: A theoretical framework, multilevel review, and future research agenda. *Organization & Environment*, vol. 28, no. 1, pp. 103–125.	Scopus https://www.scopus.com/record/display.uri?eid=2-s2.0-84925387731&origin=resultslist&sort=plf-f&src=s&sot=b&sdt=b&s=TITLE-ABS-KEY%28Employee+Green+Behavior%3A+A+Theoretical+Framework%2C+Multilevel+Review%2C+and+Future+Research+Agenda%29&sessionSearchId=c82632fa8b9688098e51883ebc5828f4	Defines Employee Green Behaviour (EGB)
Ryan, R. M., & Deci, E. L. (2000). Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being. *American psychologist*, vol. *55*, no. 1, pp. 68–78.	Scopus https://www.scopus.com/record/display.uri?eid=2-s2.0-85043751872&origin=resultslist&sort=plf-f&src=s&sot=b&sdt=b&s=TITLE-ABS-KEY%28Self-determination+theory+and+the+facilitation+of+intrinsic+motivation%2C+social+development%2C+and+well-being%29&sessionSearchId=c82632fa8b9688098e51883ebc5828f4&relpos=4	Defines motivation and explains the framework regarding Self-Determination Theory (SDT).
Ryan, R. M., & Deci, E. L. (2001). On happiness and human potentials: A review of research on hedonic and eudaimonic well-being. *Annual review of psychology*, vol. 52, no. 1, pp. 141–166.	Business Source Complete, BSC (EBSCOhost) https://web-p-ebscohost-com.ludwig.lub.lu.se/ehost/detail/detail?vid=6&sid=c4e85a48-b410-42a7-a492-f13573b612a6%40redis&bdata=JkF1dGhUeXBlPWlwLHVpZCZzaXRlPWVob3N0LWxpdmU%3d#AN=4445599&db=bth	Defines the two approaches of well-being, and its connection to Self-Determination Theory (SDT).
Shi, L., & Cristea, A. I. (2016). *Motivational Gamification Strategies Rooted in Self-Determination Theory for Social Adaptive E-Learning*. In A. Micarelli, J. Stamper, & K. Panourgia (Eds.), *Intelligent Tutoring Systems: 13th International Conference, ITS*	Springer Nature Link https://link.springer.com/chapter/10.1007/978-3-319-39583-8_32	Used to provide an example on motivational gamification strategies.

2016, Zagreb, Croatia, June 7–10, 2016, Proceedings pp. 294–300.		
Silic, M., Marzi, G., Caputo, A., & Bal, P. M. (2020). The effects of a gamified human resource management system on job satisfaction and engagement. *Human Resource Management Journal,* vol. 30, no. 2, pp. 260–277.	Business Source Complete, BSC (EBSCOhost) https://web.p.ebscohost.com/ehost/detail/detail?vid=3&sid=7e416339-8821-462a-914d-4a2c71e6b6f0%40redis&bdata=JkF1dGhUeXBlPWlwLHVpZCZzaXRlPWVob3N0LWxpdmU%3d#AN=142601227&db=bth	Used in the Introduction chapter and developed in the Literature Review, as the research highlights that gamification can enhance engagement and loyalty.
Veit, D.J., & Thatcher, J.B. (2023). Digitalization as a problem or solution? Charting the path for research on sustainable information systems, *Journal of Business Economics: Zeitschrift für Betriebswirtschaft*, vol. 93, pp. 1231–1253.	Springer Nature Link https://link.springer.com/article/10.1007/s11573-023-01143-x	Used to describe sustainability's three pillars
Yan, T., & Zhao, Y. (2023). Gamification Teaching Design and Application Based on Self-Determination Theory. In X. Yuan et al. (Eds.), Proceedings of the 2023 4th International Conference on Education, Knowledge and Information Management (ICEKIM 2023) pp. 846–857.	Atlantis Press https://www.atlantis-press.com/proceedings/icekim-23/125988324	Used to provide an example of gamification in relation to SDT.
Zhou, Z., Chen, Z., Jin, X. L., & Yuan, Z. (2024). Unveiling motivational configurations in shaping meaningful engagement in green gamification. *European Journal of Information Systems*, pp. 1–24.	Scopus https://www.scopus.com/record/display.uri?eid=2-s2.0-85204168720&origin=resultslist&sort=plf-f&src=s&sot=b&sdt=b&s=TITLE-ABS-KEY%28Unveiling+motivational+configurations+in+shaping+meaningful+engagement+in+green+gamification%29	Defines green gamification and provides a framework of producing meaningful engagement.

2.2 Sustainability

Veit and Thatcher (2023, p. 1237) define sustainability within IS as: "*IS-enabled organisational and social practices and processes to improve the economic, social, and environmental sustainability of organisations and/or private households*". While several definitions for sustainability exist depending on context and purpose, this is the definition of sustainability adopted for this master's thesis.

Sustainability is usually divided into three pillars – social, economic and environmental (Kotlarsky et al., 2023; Veit & Thatcher, 2023). According to Kotlarsky et al. (2023), the social pillar focuses on how an organisation addresses cultural and social differences, emphasising on overall social well-being. The economic pillar refers to a company's ability to achieve financial growth while balancing the other two sustainability dimensions. This latter aspect is of particular importance, as it can serve as a motivating factor for organisations to adopt sustainable practices when they recognise the potential business value it offers. The third and final pillar, the environmental pillar, is described as an organisation's responsibility to manage natural resources, making organisations accountable for their usage. Veit and Thatcher (2023, p. 1237) further describe environmental sustainability as "*...meets the needs of the present without compromising the ability of future stakeholders to meet their own needs*". Among the

three pillars, the environmental aspect often receives the most attention within the IS field, reflecting a growing focus on how digital technologies can help mitigate environmental challenges.

2.2.1 Digital sustainability – Green IT & IS

As sustainability challenges grow, a clear intersection emerges between these issues and digital technologies, which are increasingly seen as potential solutions (Kotlarsky et al., 2023). As Kotlarsky et al. (2023) highlight, sustainability has long been a topic of interest within the IS field, leading to two distinct areas of focus: *Green IT* and *Green IS*.

To understand Green IS, first there has to be a distinction between Green IT and Green IS. Green IT refers to technological solutions to minimise environmental impact, often with the primary intention to reduce costs (Molla et al., 2009, cited in Dedrick, 2010). In contrast, Green IS encompasses the strategies and information systems that enable sustainability initiatives. Hedman and Henningsson (2016, p. 264) define Green IS as "*The use of IS in organisational activities and processes to reduce the ecological footprint. IS provides support of organisational sense-making and sustainable work practices*". Green IS has the potential to facilitate bottom-up changes in organisations by engaging employees and influencing corporate sustainable practices (Kirchner-Krath et al., 2024b).

Kirchner-Krath et al. (2024b) investigate the individual perception surrounding the adoption and use of Green IS within organisations. Through a qualitative field study, complemented by an expert validation phase, they explored both internal (individual-level) and external (organisational-level) factors that influence successful Green IS adoption. One of the key barriers identified is the "knowledge stage". That is, the initial phase where individuals lack sufficient understanding of sustainability goals and how IS can support them. Furthermore, their findings suggest that fostering motivation among employees is a crucial step. Within the IS field, motivational factors are increasingly recognised, bringing up the use of gamification elements to enhance intrinsic motivation and engagement.

Several factors influence companies to adopt Green IS. Hedman and Henningsson (2016) describe two primary approaches that drive organisations to implement sustainability initiatives: ecological efficiency and ecological effectiveness. The ecological efficiency approach focuses on reducing the environmental footprint, primarily through cost-saving initiatives. The ecological effectiveness approach goes beyond reduction strategies, aiming to deepen the understanding of the underlying reasons behind the environmental outcomes. A case study of Nordea bank, examined by Hedman and Henningsson (2016), illustrates how Green IS initiatives can effectively be integrated into an organisation's sustainability agenda. In 2008, Nordea hired a Corporate Social Responsibility (CSR) manager, alongside launching their Eco-footprint initiative, which organised employees into eight workgroups with specific tasks and goals set for completion by 2016. Green IS solutions included the Click-to-Power system, which automatically put computers on standby mode when not in use, and policies encouraging the reuse and recycle of IT equipment. Notably, Nordea's CSR initiatives played an important role in incorporating sustainability into the company's agenda, ensuring these efforts were more than just a one-time action.

This further leads us to the concept and evolution of Green IS. Harnischmacher et al. (2020) conducted a literature review on the evolution of Green IS research, identifying dominant topics

and future directions. Their study highlights 11 dominant themes, the first most researched topics being about Green IS adoption, organisational practices, outcomes, and Green IS for behaviour changes. While earlier studies focused on the development of the topic, due to the novelty of the term at the time, later studies show a shift towards understanding behavioural change related to Green IS, emphasising the need for user engagement and motivation.

In their literature review, Andraschko et al. (2023) explore how individuals use digital technologies to support environmental sustainability. Based on their findings, the authors propose the REDUSE framework, identifying six antecedents that influence sustainable IS use from an individual-level perspective, which are: relief, empowerment, default, user-centricity, salience and encouragement. Relief refers to the extent in which the digital technology helps individuals in reducing their environmental footprint with minimal effort. Empowerment captures how individuals feel capable and in control of making sustainable decisions through the system. Default relates to situations in which options are pre-selected for the user when no explicit choice has been made, which in a subtle way can guide behaviour. User-centricity highlights the importance of tailoring the system to the preference of the user. Salience refers to the visibility and clarity of the information regarding sustainability making it easier for users to access and use. Lastly, encouragement encompasses how the technology engages and motivates users to act sustainably. This form of motivation can be intrapersonal, interpersonal, or external, highlighting that there are different levels to motivate individuals including social pressures, competitiveness, a sense of belonging, etc. Together, these six factors provide a comprehensive understanding of how IS can be designed to foster pro-environmental behaviour at the individual level.

Nonetheless, while organisational adoption of Green IS is an important first step, it is also essential to understand how Green IS can influence employee behaviour and foster long-term engagement. Simply implementing Green IS does not guarantee sustainable outcomes unless it is accompanied by mechanisms that encourage their actual use and employees' behavioural change. This is where gamification may provide value, by integrating engagement-driven strategies that motivate employees to actively participate in sustainability initiatives.

2.3 Gamification

The term gamification originated in the digital media industry and the first documented use dates to 2008 (Deterding et al., 2011). Gamification got widespread attention in the second half of 2010 and was welcomed by corporates in 2011 (Prakash & Manchanda, 2021). A definition of gamification proposed by Deterding et al. (2011, p. 9), is "*…the use of game design elements in non-game context*". Bui et al. (2015, p.5) extend the definition as "*the application of game design elements in non-game products or services to steer users' behaviours towards preferred outcomes*". This definition is very similar to how Prakash and Manchanda (2021) further define gamification, as putting game-like elements in a non-game environment, aiming to improve engagement and encourage desired behavioural changes. The primary focus of gamification is to bring change in users' behaviour while trying to do a given task or accomplish a goal.

When defining gamification, it is crucial to analytically distinguish it from general playfulness or playful design, as this distinction is key to understanding the unique characteristics of gamified systems. Deterding et al. (2011) offer a detailed conceptualisation of the definition of gamification. The term "game", in game studies, is distinguished by formalised rule systems

and the structured competition or conflict among participants, each pursuing clearly defined objectives or outcomes. In contrast, playful design focuses more on creativity and open-ended exploration, without necessarily having clear goals or competition. Nonetheless, in practice, gamified systems frequently do encourage playful behaviour and mindset (Deterding et al., 2011). To identify "element", in the context of gamification, one suggested approach is to conceptualise game elements as a collection of shared features or building blocks, rather than as a fixed set of necessary conditions. Following this perspective, Deterding et al. (2011) propose that elements refer to features found across a broad spectrum of game-related experiences, which play a significant role in shaping gameplay dynamics. Within "game interface design patterns", typical game design elements included are badges, levels and leaderboards. The term "non-game context" is specifically intended to exclude the application of game design elements in the creation of actual games, as such practices fall under the domain of game design rather than gamification. Deterding et al. (2011) explicitly suggest not delimiting gamification to a specific usage context, purpose or scenario, as there are no clear benefits in doing so.

Expanding on the conceptual understanding of gamification, Bui et al. (2015) investigate whether gamification truly represents a novel phenomenon or if it is just a rebranding of existing game elements. Through an extensive literature review, they demonstrate how many game elements, such as points, levels, and feedback, have been used long before the term gamification gained traction. However, the authors argue that this new label includes a broader range of subcategories. Their findings also raise a set of considerations for future research, particularly regarding the interaction of different game elements. For instance, while competition and challenges can be powerful motivators, they may result in the opposite effect – disengagement or stress – if not carefully applied. As a result, the authors call for more research into the conditions under which elements should be combined or avoided for maximised effect.

To further understand gamification in an organisational context, Prakash and Manchanda (2021) highlight various cases from different industries, and how the gamification initiatives contribute to the different sustainability pillars. One of the companies is Deloitte, where gamification was used in two functional areas. The first area is human resource management, where four different intents are present: creation of goodwill, discovery of talent, cultural and behaviour shift, and purposeful employee engagement. To achieve these goals, Deloitte's US India offices launched the "Maverick Program", a contest designed to foster creative thinking and innovation at work. The competition was team-based, requiring groups of four professionals with at least one female member. Open to all employees regardless of position, status, or performance ratings, participation required prior notification to managers and remained separate from regular work commitments. The contest featured real-world business scenarios, challenges, and competitive elements, with engagement rewards, including opportunities to collaborate with top leadership (Prakash & Manchanda, 2021). The contest enhanced employees' ability to think creatively and collaborate effectively while fostering a positive mindset towards finding meaning in their work and contributing to the organisation's success. As for how it contributed to the environmental sustainability dimension, the contest enabled less wastage of time, energy and resources. It was due to that the contest featured successive elimination rounds to select top contestants who could solve complex problems and present real-world business scenarios to an executive panel. Instead of relying on monetary incentives, it used challenges and opportunities to enhance employee motivation while encouraging a positive organisational culture.

The second functional area Deloitte focused on was executive training engagement, to help employees get engaged in the training content designed for them (Prakash & Manchanda, 2021). The goal of the training was to equip executives with essential management and leadership skills while fostering connections with top business leaders worldwide. Deloitte used a behaviour platform and made use of game elements in the training program "Deloitte Leadership Academy". The game mechanics included rewards like rankings and badge-like earnings, which were displayed on leaderboards and online profiles. It also featured challenges, missions, and competitive elements to enhance engagement and motivation (Prakash & Manchanda, 2021). The overall outcome was time reduction for finishing the training program and enhanced trainee engagement. As for the environmental sustainability dimension, the outcome was effective usage of the online platform and brought overall reduction in the resources consumed when comparing it to traditional training.

2.3.1 Green Gamification

Gamification offers various benefits to organisations, including increased employee participation, engagement and loyalty (Silic et al., 2020). Green gamification can be seen as a specialised form of gamification that applies game mechanics, such as points, badges, leaderboards, challenges and feedback, specifically to encourage environmentally friendly behaviours (Zhou et al., 2024). Green gamification aims to make environmentally friendly actions more engaging and rewarding by appealing to individuals intrinsic and extrinsic motivators. This approach is rooted in the understanding that organisations environmental goals often involve long-term effort and behavioural change, which can be challenging to sustain through information and regulation alone (Zhou et al., 2024). By making environmental sustainability initiatives more interactive and rewarding, green gamification helps bridge the gap between awareness and action.

Green gamification is implemented and used through the organisation's information systems. That is, digital platforms such as applications, intranets, dashboards, learning management systems, among others. Green gamification is integrated and supported by information systems, which results in the term *gamified green IS*. Gamified green IS represents the practical implementation of green gamification within information systems to encourage sustainable behaviour. Gamified green IS are designed to motivate user engagement in eco-friendly behaviours by integrating game elements into non-gaming context (Zhou et al., 2024). These applications aim to create an engaging and enjoyable experience that motivates users to participate in pro-environmental activities. Green gamification has the potential to enhance sustainable behaviours and decision-making among individuals (Zhou et al., 2024). Gamification can contribute to environmentally sustainable outcomes, as seen in the different examples, even though it is not explicitly named as green gamification. The proposed framework by Zhou et al. (2024), describes motivations and how it produces meaningful engagement, which is closely connected to Self-Determination Theory (SDT), as it provides a valuable lens for understanding user motivations within gamified IS. SDT is highly comprehensive and validated for examining how different types of motivations can influence positive individual behaviours and, in this case, meaningful engagement.

Meaningful engagement is an important part for green gamification to be successful (Zhou et al., 2024). Meaningful engagement, characterised by a user's interest, active participation, and investment in a gamified system, enhances the probability of internalising the systems intended

values and behaviours, ultimately supporting long-term habit formation. Meaningful engagement can be divided into two types of outcomes: *experiential* and *instrumental outcomes*. According to Zhou et al. (2024) experiential outcomes involve emotional and psychological experiences, which could include feelings such as enjoyment, satisfaction or a sense of purpose. In contrast, instrumental outcomes focus on task-oriented achievements, emphasising practical results and actions. These may include meeting sustainability goals, completing a task efficiently, or receiving rewards or recognition. The six outlined motivations are in the context of green gamification and are categorised according to SDT principles (Zhou et al., 2024).

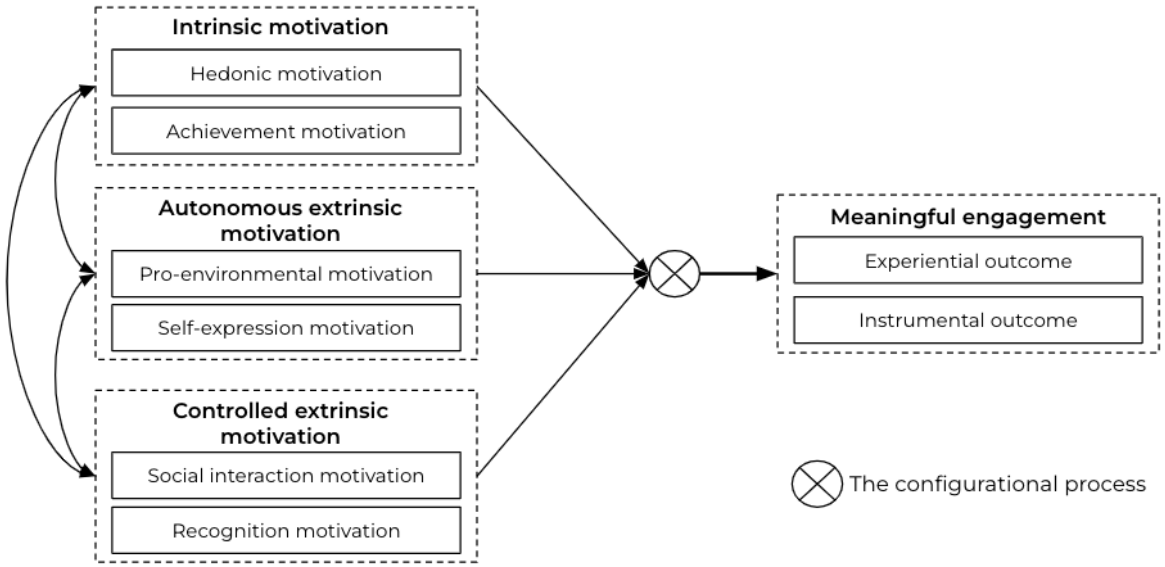

Figure 2: Motivational Configurations Producing Meaningful Engagement (adapted from Zhou et al., 2024, p.7)

As seen in the above Figure 2, there are three motivations with two sub-motivations each that together produce meaningful engagement. The three motivations are: *intrinsic*, *autonomous extrinsic* and *controlled extrinsic* (Zhou et al., 2024). Intrinsic motivation refers to the genuine enjoyment and satisfaction gained from the activity itself. Within intrinsic motivation, the two sub-motivations are hedonic and achievement motivation. Hedonic motivation is about the experience and enjoyment, while achievement motivation is about internal desire of self-fulfilment and success. Both motivations stem from users' internal propensities and drives users to pursue environmentally friendly goals and adopt pro-environmental behaviours (Zhou et al., 2024). According to Zhou et al. (2024) a lack of enjoyment could lead users to disengage from the green gamification application.

The second motivation, autonomous extrinsic motivation, refers to an individual's drive to engage in a behaviour due to personal values and self-recognition, rather than external pressures or control (Zhou et al., 2024). In the context of green gamification, this includes pro-environmental motivations and the desire for self-expression through sustainable actions. Pro-environmental motivation in green gamification reflects an individual's active engagement driven by alignment with their own environmental values. Self-expression motivation is similar as it reflects a psychological drive to reinforce and affirm one's self-identity to the external world in an initiative and autonomous manner (Zhou et al., 2024).

Lastly, controlled extrinsic motivation, stems from behavioural motivation coming from external pressure or coercion (Zhou et al., 2024). In the context of interactive digital technologies, individuals often seek social approval and recognition, leading them to engage in activities to meet external expectations. This form of motivation drives participation not purely for personal satisfaction but for the validation and acknowledgment received from others, to meet external standards and avoid negative judgement. For instance, individuals might partake in competitive games, under the influence of wanting to be seen and appreciated by their peers. Social interaction motivation is driven by the desire to connect, engage and interact with others, while recognition motivation is centred around gaining approval, social status and reputation (Zhou et al., 2024).

In green gamification, the relationship between motivations and meaningful engagement is shaped by three key factors: *conjunction*, *asymmetry* and *equifinality* (Zhou et al., 2024). The first key factor, conjunction, suggests that motivations are not separate but interconnected, working together to influence behaviours like meaningful engagement. This means that meaningful engagement typically results from a complex mix of motivations rather than form a single factor. Zhou et al. (2024) specifically noted that no single motivation is sufficient on its own to produce meaningful engagement, instead it emergers from the configurational effects of multiple motivations working together. Secondly, Zhou et al. (2024) emphasise that the relationship between motivations and meaningful engagement is asymmetry. For example, high levels of engagement can be driven by strong intrinsic motivation in some cases, or by low intrinsic motivation when supplemented by external rewards. This shows that the effect of motivation on engagement can vary, depending on how different motivational factors interact. Lastly, equifinality, suggests that multiple combinations of motivations can lead to meaningful engagement. In practice, some individuals might be motivated by gamification elements like achievement and competition, which appears to be hedonic or achievement-oriented experiences during green activities. While others might be motivated by extrinsic factors, such as rewards or social recognition. This highlights that there is no single path for achieving meaningful engagement, as different motivational configurations can produce meaningful engagement.

2.3.2 Employee Green Behaviour

Green gamification initiatives could therefore be considered related to the term Employee Green Behaviour (EGB), which can be described as the actions and behaviours displayed by employees that contribute to environmental sustainability (Haque et al., 2024; Norton et al., 2015). EGB plays a crucial role in supporting green initiatives and servers as a proactive driver for achieving sustainability goals within the organisation (Haque et al., 2024). Haque et al. (2024) highlight that EGB is an important practice for organisations to achieve long-term environmental sustainability through the active involvement and participation of employees. Within the concept of EGB, the term self-efficacy is highly relevant as it is the belief in one's ability to succeed in specific situations or accomplice a task. Self-efficacy is therefore crucial as it affects the employee's choice of activities, level of effect and persistence in completing a particular task (Haque et al., 2024).

There are two types of EGB: *required* and *voluntary* (Norton et al., 2015). Required EGB is defined as mandatory actions that an employee must perform as a part of their official job role. This includes, for example, adhering to organisational policies, changing and adopting to alternative work methods as well as creating sustainable products and processes. By these

behaviours, the organisation meets its main goals, either directly or indirectly (Norton et al., 2015). Voluntary EGB, involves employee's personal initiative that exceeds organisational expectations. These behaviours could influence the organisational culture and social interactions. While these actions might not directly be linked to the organisations core business goals, it could contribute to overall well-being and functioning of the workplace (Norton et al., 2015).

Norton et al. (2015) present a literature review of EGB and within that, the authors highlight factors that lead to EGB on different levels within the organisation and factors that are outcomes of EGB. When an organisation holds positive values toward the environment, such as prioritising sustainability and environmental responsibility, this plays a key role in encouraging EGB. When these values are translated into clear practical actions and embedded in the organisations culture, it helps employees understand the importance of contributing to environmental goals and therefore encourages them to engage in green behaviours themselves. By leveraging gamification in organisational contexts, it could motivate green behaviour among employees (Haque et al., 2024).

2.4 Self-Determination Theory

Self-Determination Theory (SDT) is a theory related to human motivation and personality, developed by psychologists Edward Deci and Richard Ryan in 1985 (Deci and Ryan, 2000). SDT focuses on human motivation, examining the factors that support or hinder individuals' engagement in different activities (Ryan & Deci, 2000). It emphasises people's natural drive for growth and their basic psychological needs, which influence self-motivation and overall development. It explores how these needs support self-motivation and personality development, as well as the external conditions that encourage these positive processes. That is, SDT practically focuses on the degree to which human behaviour is self-motivated and self-determined.

SDT supports that people are most motivated and function best when three basic psychological needs are satisfied:

- Autonomy: the need to feel in control of one's actions and choices.
- Competence: the need to feel effective and capable in one's actions.
- Relatedness: the need to feel connected to others who are part of the activity.

The aforementioned three core psychological needs: *autonomy*, *competence*, and *relatedness*, are essential for fostering *motivation*, *well-being* and *personal growth*. When these needs are fulfilled, individuals experience greater engagement (Ryan & Deci, 2000). These three psychological needs are considered essential for understanding both the content of goals and the processes through which individuals pursue them (Deci & Ryan, 2000).

Continuing, *motivation* in SDT is highly valued due to its significant impact on behaviour and outcomes. SDT distinguishes between intrinsic motivation (doing something for its inherent satisfaction) and extrinsic motivation (doing something for external rewards or pressures), and it emphasises the role of social and environmental factors in supporting or undermining these motivations. More analytically, individuals' actions are shaped by various influencing factors, leading to different results based on the nature and strength of their motivation (Ryan & Deci,

2000). Ryan and Deci (2000) explain that SDT emphasises a more detailed understanding of motivation, as it seeks to identify and analyse the specific type of motivation influencing a person's actions at any given moment. There are three different types of motivation as seen in the following Figure 4: *amotivation*, *intrinsic motivation* and *extrinsic motivation*.

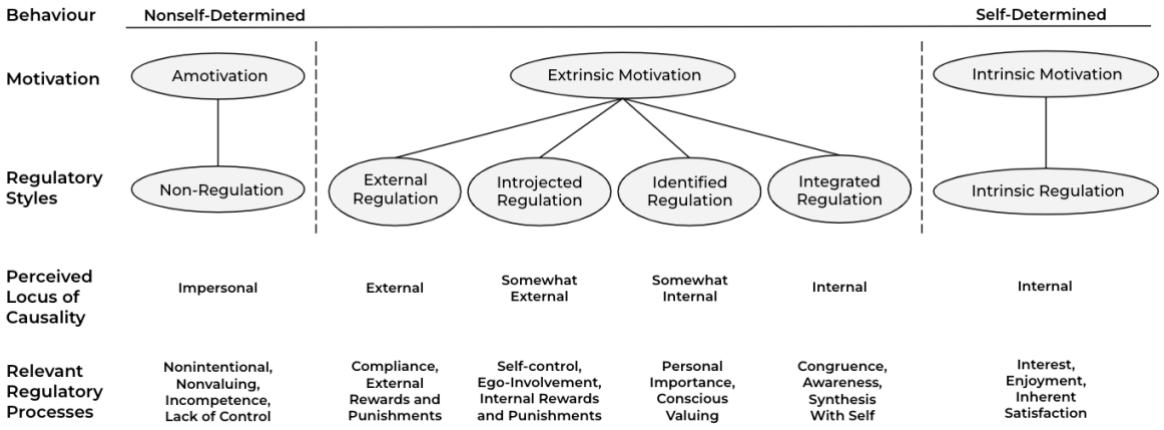

Figure 3: The Self-Determination Continuum Showing Types of Motivation with Their Regulatory Styles, Loci of Causality, and Corresponding Processes (adapted from Ryan & Deci, 2000, p. 5)

Amotivation refers to the lack of intention to act, people either do not act at all or act without motivation, leading to no intention behind it (Ryan & Deci, 2000). While *intrinsic motivation* refers to the natural drive to engage in activities for internal inherent enjoyment, curiosity, and challenge rather than external reward or pressure. Cognitive Evaluation Theory (CET), a sub theory of SDT, explains how different social and environmental factors influence intrinsic motivation (Ryan & Deci, 2000). It suggests that when individuals feel competent in what they are doing and have a sense of autonomy, meaning they perceive their actions as self-driven rather than controlled by external forces, their intrinsic motivation is enhanced. Studies indicate that intrinsic motivation is strengthened by positive feedback and a sense of autonomy. However, external rewards, pressure, or overly controlling environments can undermine it by shifting a person's perceived focus of causality from internal to external (Ryan & Deci, 2000).

In contrast, *extrinsic motivation* refers to engaging in an activity to achieve a distinct outcome, such as a reward or recognition, rather than for the inherent enjoyment of the activity itself (Ryan & Deci, 2000). Unlike perspectives that view extrinsically motivated behaviour as entirely controlled by external forces, SDT suggests that extrinsic motivation exists on a continuum of autonomy. This means that some forms of extrinsic motivation can be experienced as self-directed, depending on the degree of personal endorsement and integration of the activity's value. Therefore, within extrinsic motivation, there are four types of regulations: *external*, *introjected*, *identified* and *integrated* (Ryan & Deci, 2000).

Firstly, *external regulation* is the least autonomous form of extrinsic motivation, in which behaviour is driven by external contingencies such as rewards, punishments, or social expectations. Individuals engaging in externally regulated activities typically perceive their actions as being influenced by external forces rather than personal choice, leading to feelings of control or detachment (Ryan & Deci, 2000). Secondly, *introjected regulation* is when individuals internalise external rules or expectations but do not fully accept them as their own. This regulation is relatively controlled, as behaviour is driven by the desire to avoid guilt, anxiety, or self-criticism, or to attain self-worth and pride. A common manifestation is ego

involvement, in which individuals seek to demonstrate ability or avoid failure to maintain their perceived self-worth. Despite originating from internal pressures, introjected behaviours retain an external perceived locus of causality, as they are not fully self-endorsed (Ryan & Deci, 2000). Thirdly, *identified regulation* is a form of extrinsic motivation where individuals consciously value and accept a behavioural goal as personally important, even though the action is performed to achieve an external outcome. Lastly, *integrated regulation* occurs when identified regulations are fully assimilated into an individual's sense of self. This means the behaviour is evaluated, aligned with personal values and needs, and experienced as congruent with one's identity. Although actions driven by integrated regulation share characteristics with intrinsic motivation, such as a sense of personal commitment, they remain extrinsic because they are undertaken to achieve specific outcomes rather than for the inherent enjoyment of the activity.

Well-being is a complex construction that defines how individuals get influenced by practices that aim to change humans for the better and therefore require some vision of what "the better" is (Ryan & Deci, 2001). Research within well-being have derived from two general perspectives, the *hedonic approach* and *eudaimonic approach*. The *hedonic approach* understands well-being as subjective happiness and consists of pleasure. By subjective happiness, Ryan and Deci (2001), describe it as it depends on how the individual feels rather than objective facts. Furthermore, it is tied to the experience of pleasure versus displeasure, which means it is about good or bad elements of life. Within the hedonic approach, subjective well-being serves as one way to evaluate the pleasure continuum in individuals' experiences. Three components that together form subjective well-being are: life satisfaction, the presence of positive mood and the absence of negative mood, which often are summarised as happiness.

The second perspective of well-being, the *eudaimonic approach*, focuses on meaning and self-realisation. Within this approach, well-being is defined as the degree to which a person is fully functioning and refers to well-being as distinct from happiness (Ryan & Deci, 2001). SDT integrates both subjective well-being and eudaimonic approach of well-being. It holds that satisfying basic psychological needs – autonomy, competence and relatedness – typically enhances both perspectives of well-being. SDT recognises that feeling satisfied with life and experiencing more positive than negative emotions, which are aspects of subjective well-being, are often signs of psychological health (Ryan & Deci, 2001). This also aligns with the eudaimonic approach, that our emotions reflect internal evaluations of life events and conditions. However, SDT shows that some conditions that foster subjective well-being, do not motivate eudaimonic well-being, which illustrates that there are different types of positive experiences (Ryan & Deci, 2001).

Personal growth is a central component of well-being, particularly within eudaimonic frameworks that emphasise self-realisation and meaning. Ryan and Deci (2000) emphasise that humans have a natural tendency toward personal growth, and that this tendency is significantly influenced by their surrounding social context. Core findings from SDT indicate that environments which support individuals' autonomy and competence, encourage their natural tendency to grow. In contrast, when individuals are put in controlling environments that undermine their sense of efficacy, the natural tendency towards growth is inhibited (Ryan & Deci, 2000).

Earlier research on gamification, particularly green gamification by Zhou et al. (2024), presents a framework for fostering meaningful engagement, were both intrinsic and extrinsic motivation are included. Self-Determination Theory serves as a foundational framework for explaining and

understanding the impact of green gamification, making it essential for examining its influence on employee behaviour, as it further helps explain why employees engage in sustainability practices through gamification.

Self-Determination Theory aligns well with qualitative research. Since it focuses on individuals' internal experiences, motivations, and perceptions, it complements qualitative methods that explore meaning, context, and subjective understanding. Qualitative research methods such as interviews and thematic analysis can capture how autonomy, competence, and relatedness are experienced in specific settings. Further, SDT has been used in qualitative studies in the Information Systems (IS) field, particularly in areas related to user engagement, technology adoption, gamification, learning systems and digital motivation. For example, the study of Yan & Zhao (2023) focusing on gamified teaching design, applied SDT to understand how gamification strategies could enhance students' intrinsic motivation. Another study by Shi and Cristea (2016) in the context of social adaptive e-learning, proposed motivational gamification strategies rooted in SDT. Through a combination of design and evaluation methods, including qualitative assessments, the research highlighted how gamification elements could satisfy learners' psychological needs.

2.5 Theoretical Framework

The literature review, which includes key concepts, such as sustainability, digital sustainability, Green IT and IS, gamification, green gamification, gamified green IS, and employee green behaviour create the theoretical basis for the master's thesis research study. The aforementioned literature along with the theory of Self-Determination form the theoretical framework of the master's thesis, which is used to interpret and discuss our research findings. SDT offers valuable insights into intrinsic and extrinsic motivation, which are essential for understanding how and why employees may respond to gamified interventions aimed at encouraging environmentally sustainable behaviours. That is, the research findings are discussed in the coming discussion chapter in relation to the research aim, and research questions, and are interpreted and discussed with the help of the theoretical framework.

3 Research Design

3.1 Research Philosophy

The research philosophy is a crucial part of conducting research, as it influences how researchers understand and explain their research (Lee, 2004). It provides a framework for determining the methods used, the types of questions posed and how findings are interpreted. Additionally, the research philosophy lays the foundation for achieving higher quality research and how knowledge is acquired (Hassan & Mingers, 2018). Since, research philosophy forms the foundation of how research is conducted, interpreted and understood, it is essential to establish it to provide a clear context for this master's thesis. The two fundamental elements of research philosophy are *ontology*, which pertains to the nature of reality, and *epistemology*, which concerns the nature of knowledge, the methods by which it is acquired and validated, and the theoretical perspectives that shape research choices (Hassan et al., 2018).

Within the IS discipline there are three research philosophies or paradigms: positivism, interpretivism and the critical paradigm (Klein & Myers, 1999). Interpretivism seeks to understand how social group members construct and assign meaning to their realities through participation in social processes, and how these meanings shape their beliefs, intentions, and actions (Goldkuhl, 2012). This research philosophy is commonly associated with the qualitative research approach and therefore qualitative methodologies such as ethnography, hermeneutics and case studies (Lee, 1991). In contrast, positivism, rooted in natural sciences, emphasises objective reality, aligns with the quantitative research approach and employs methods such as mathematical analysis, hypotheses testing and experimental design (Lee, 1991). Meanwhile, the critical paradigm goes beyond describing or interpreting the world; it aims to critique social issues, expose inequalities and promoting change (Myers & Klein, 2011).

This master's thesis is grounded in an interpretive research philosophy, which assumes that reality is subjective and socially constructed through human interactions (Lee, 1991; Patton, 2015; Recker, 2013; Walsham, 2006). Related to this master's thesis, this means to understand the relationship between gamification and employees, and how this interaction influences employees' behaviour and supports organisational sustainable environmental practices. In this context, interpretivism serves to align the research approach with the study's objectives, facilitating a comprehensive understanding of the phenomenon under investigation. Thus, the master's thesis adopts the interpretive research philosophy because its purpose is to explore employees' behaviours and their connection with green gamification, aiming to provide insights into how gamified green IS can be effectively used to support environmentally sustainable practices in organisations. Rather than seeking objective truths, it focuses on understanding subjective behaviours, experiences and interpretations of employees, aiming to uncover how these meanings shape sustainable behaviours within an organisational context.

3.2 Research Approach

Academic research is conducted using one of the three research approaches: quantitative, qualitative, or mixed methods approach. According to Patton (2015), the quantitative approach involves the collection of measurable, numerical data and aims to produce objective and

generalisable results. In contrast, the qualitative approach seeks to explore and interpret the meaning behind the data, focusing on context, experiences and perspectives. The mixed methods approach combines these two approaches, integrating elements from both quantitative and qualitative research (Patton, 2015).

Our research aims to answer the question "*How can gamified green IS influence individual employees' motivation and behaviour toward environmentally sustainable practices within organisations?*", which focuses on exploring the interaction of green gamification and individual behaviour in organisations, aiming to provide insights into how gamified green IS can be effectively used to support sustainable environmental practices in organisations. To gain an in-depth understanding of employees' behaviours, perspectives, experiences and interactions with gamification connected to sustainability, the qualitative research approach is adopted as this approach is suitable for the purpose of this master's thesis. Patton (2015) describes the nature of qualitative research as an approach to study how individuals construct meanings. By doing this, careful consideration must be taken into what data is meaningful depending on the context. Therefore, qualitative research includes interpretation of meanings, finding themes and/or patterns related to the gathered data, which then the researcher aims to understand and associate with the given context.

The questions that the qualitative research approach aims to address are "how" and "why" within a certain context (Recker, 2013). Given that this master's thesis research explores how employees' behaviour is influenced by gamification to support sustainable practices and seek to establish why certain gamification techniques are used, the qualitative approach aligns well with the study's objectives. Recker (2013) also states that qualitative methods are particularly useful when there is a need to explore a specific phenomenon in detail. As stated in the research problem, there is a knowledge gap regarding green gamification within organisations related to the IS field, which makes the qualitative research approach well-suited for this master's thesis study.

3.3 Data Collection Method

There are several methods of data collection in qualitative research, with the main one being interviews, observations and workshops, among others (Patton, 2015). For this master's thesis, interviews have been chosen as the primary method of our data collection. According to Patton (2015), there are three main types of interviews: structured, semi-structured, and unstructured. Unstructured interviews are highly open-ended and flexible. The interviewer does not follow a strict set of questions but rather allows the conversation to evolve naturally based on the participants' responses. In contrast, structured interviews follow a fixed set of questions with little to no deviation. This ensures that all participants are asked the same questions, enhancing comparability and consistency. However, it limits the opportunity to explore unexpected emerging topics that may arise during the conversation. Semi-structured interviews offer a balanced approach, combining these two approaches. They are guided by an interview guide, but not so rigidly that it does not allow to further explore emerging topics that may arise during the interview.

The chosen data collection method for this master's thesis is conducting semi-structured interviews, which according to Recker (2013) is fitting for a study that follows the qualitative research approach and adopts the interpretive paradigm. Recker (2013) emphasises that semi-

structured interviews help researchers gather valuable knowledge from key participants, who have unique expertise and can offer insights about specific people, processes or topics relevant to the research. Therefore, semi-structured interviews are a suitable data collection method for our master's thesis research since they allow us to gather knowledge about the employees' behaviour. A semi-structured interview allows for a conversation between the researcher and participant, enabling the researcher to ask follow-up questions, which help gain deeper exploration of the respondent's answers and uncovering insights that might not be brought up otherwise (Bryman & Bell, 2017; Patton, 2015; Recker, 2013). While conducting semi-structured interviews, an interview guide should be created to ensure that the interview will cover the correct, necessary and consistent information (Patton, 2015). Patton (2015) emphasises that an interview guide should include themes and key questions to ensure that all the interviews conducted have the same basic lines of inquiry. The interview guide typically includes an opening, an introduction of the subject, key questions and a preparation for a closing. Thus, semi-structured interviews enabled us to get knowledge about the phenomenon that might have been missed if we did structured or unstructured interviews instead.

3.3.1 Participants, Sampling techniques, Criteria and Size

The way of selecting participants was made by chain sampling, also referred to as snowball sampling (Patton, 2015). Snowball sampling is described as locating key informants and by talking to them gathering new participants, something which is particularly effective when researchers are unsure of how to access the target group (Oates et al., 2022; Patton, 2015). By contacting organisations within Sweden, we aimed to find employees that were using gamification in their work processes. Therefore, we set the following criteria for the selection of key participants:

- The participants should work in an organisation within Sweden. Working in the same organisation was not set as a requirement for the participation in the research.
- The participants should be aware of and familiar with the term gamification, to be suitable for our research.
- Having practical experience of working with gamified IS was not considered necessary for our research.
- The participants need to have been working at least six months in order to have knowledge and have acquired experiences about their organisation and its environmental practices and goals.

By following the snowball sampling technique and then by using the aforementioned selection criteria to screen the participants, we concluded to ten participants, whom we approached and requested to participate in our master's thesis research. From those, nine accepted our invitation to participate. By the end of the data collection period, a total of seven participants had been interviewed.

Table 2: Overview of the Participants

Participant	Role	Type of Company	Size of Company
P-1	IT Application Consultant	Consultancy	200

P-2	IT Engineer	Manufacturing	300
P-3	Environmental Engineer	Manufacturing	700
P-4	IT Application Consultant	Consultancy	600
P-5	Digital Workplace Specialist	Manufacturing	300
P-6	Data and Analytics Consultant	Consultancy	600
P-7	Full-stack Developer	Cooperative	12 000

The number of participants was not predetermined; instead, data collection continued until saturation was reached, meaning when the responses began to repeat themselves and no new significant insights were emerging, thus avoiding oversaturation. See the above Table 2 for an overview of the participants and additional contextual information to enhance understanding of the data.

3.3.2 Data Collection Procedure

The data collection procedure began in March 2025. Most participants were contacted through professional e-mails and LinkedIn messages, using a snowball sampling approach. That is, existing participants referred potential ones. Upon receiving responses, we screened the potential candidates to double check that they met the predefined selection criteria. After confirming their eligibility, we sent formal invitations to participate in our master's thesis research. For those who responded positively, we scheduled interviews at dates and times convenient for them. The interviews were conducted online throughout the month of April. Prior to each interview, a consent form was sent to the participants and returned signed before the official session began, ensuring they were fully informed about how their data was going to be handled (see Appendix A for the consent form). Each interview began with informal introductory conversation, during which we expressed our appreciation for the participant's involvement and provided an opportunity for any questions before initiating the recording. Following this, foundational questions related to the research topic were posed, in line with the approach recommended by Recker (2013). The semi-structured interviews, as said, were conducted online, allowing for flexibility and accessibility of the participants. Additionally, since some participants were located outside southern Sweden, online interviews enabled their participation, without us having to spend extra time and resources on traveling. The interviews were conducted through Google Meet or Teams to accommodate participants' schedules and minimise disruptions. This virtual approach also facilitated a comfortable environment where participants could engage from familiar settings, potentially leading to more open and reflective responses. This research setting was chosen to enhance participation, ensure convenience, and maintain consistency in data collection.

Each interview was guided by an interview guide, which helped the researchers to stay focused on the topic while giving room for additional questions that emerged during the interview. The guide included several questions related to the research's two main subjects: sustainability and gamification. For the gamification section, questions were tailored based on whether the

participant's organisation actively used gamification or not. These concepts were identified during the literature review, and the interview guide evolved based on those insights (see Appendix B for the interview guide). All interviews were recorded and later transcribed verbatim by using Whisper[1] AI tool to allow analysis of the collected data set.

3.4 Method for Data Analysis

Data analysis is an essential process to identify and understand the collected data and make sense of them (Patton, 2015). In qualitative research, this step often involves handling large volumes of data, usually without an initial clear understanding of what is relevant and important (Recker, 2013). It is important to thoroughly analyse the collected data from the interviews as they are the foundation for answering the main research question. For this master's thesis, we followed the method of thematic data analysis as suggested by Braun and Clarke (2006). According to Braun and Clarke (2006, p. 6), thematic analysis is, *"...a method for identifying, analysing, and reporting patterns (themes) within data. It minimally organises and describes your data set in (rich) detail."*. Thematic analysis, according to Braun and Clarke (2006), entails the following six steps: 1) get familiar with the data, organise them, and edit them, if needed; 2) generate initial codes from the data; 3) group into categories the initial codes that are extracted from the data; 4) look for themes, review and refine the themes within those categorise; 5) define and name the finalised themes, which are presented in the findings chapter; and finally 6) write the report based on the findings and demonstrate evidence of themes by using examples and quotes from collected data (participants' transcriptions).

As said above, the first step in the thematic analysis is to get familiar with the data set (Braun & Clarke, 2006), which in our master's thesis was done by revisiting and reading carefully the interview transcriptions. As mentioned in the previous section, the conducted interviews were recorded to allow us to fully concentrate on the interviews and conversations with the participants. By recording the interviews, we were able to revisit the data (Recker, 2013). The recorded interviews were transcribed verbatim by using Whisper AI to speed up the transcription process as one hour of interview typically requires 4-5 hours of transcriptions when doing it manually (Oates et al., 2022). Then we reviewed all the transcriptions while simultaneously listening to the recordings to ensure their accuracy and deepen our familiarity with the data. As a result of this, we corrected some words and sentences to make the transcriptions correspond with the audio files. These transcribed interviews constituted our data set. Additionally, to ensure confidentiality, we changed the organisations name to "[company]" in each interview transcription as well as if any name of a colleague was mentioned was changed to "[colleague]".

Transcriptions reflect reality's complexity, and through coding and classification in data analysis, we bring structure to the raw data (Patton, 2015), which is the second step in thematic analysis according to Braun & Clarke (2006). Coding is a crucial step in preparing the data for analysis and requires careful consideration for how the data is converted (Recker, 2013). The process includes collecting specific and relevant data from the interviews to each code (Braun & Clarke, 2006). This second step, in which we generated the codes, was performed in rounds.

[1] Whisper AI is a speech recognition system developed by OpenAI. It can transcribe and translate audio recordings in various languages.

Firstly, we codified the whole transcribed material. Codes can be words, sentences, or chunks of text related to the research questions and research purpose. For example, “Competition” and “Mindset”. This approach is known as inductive and is usually applied when no direct theory supports the explored phenomenon (Skjott Linneberg & Korsgaard, 2019). So, we tried to get as many codes as possible in order to not overlook interesting details, that could complement our findings and ensure validity of them. Continuing, the outlined codes were refined. Coding can be influenced by biases, which could affect validity and reliability (Recker, 2013). To address this, both researchers coded the data separately and then compared the results with each other to ensure reliability. Following this individual coding phase, we engaged in a collaborative comparison of our codes to determine the extent of overlap and divergence. This involved systematically examining whether we had highlighted the same segments of text, such as specific sentences or words, and discussing the rationale behind each code.

Through this dialogue, we were able to refine our understanding of the data and reach a consensus on the categorisation of each code. As the categorisation process progressed across all interviews, this method produced a total of 31 distinct initial categories, which constituted the third step of analysis. After organising the codes into categories, we reviewed and refined them to ensure alignment between each code and its corresponding category. Revisions were made where necessary, particularly in relation to how well the codes supported potential answers to our research questions. From the 31 categories we used colours to group similar and overlapping categories together. During this step, some categories were merged with others, some were considered redundant and were removed, some were renamed, and some remained the same. The fourth step was to search for themes within the aforementioned categories, which we reviewed several times and refined them (Braun & Clarke, 2006). After this step we identified seven new themes. After these seven themes were identified, we revisited them to see if they were aligned with the research questions. We realised that some of them were still overlapping, when comparing them in a table. Braun and Clarke (2006) highlights how using a visual representation, such as mind-maps or tables, might be helpful to create main themes and subthemes.

Continuing, from the final list of categories, five themes emerged. This fifth step includes defining and naming the identified themes, which includes determining what aspect of the data each theme captures. Here it is important that each theme does not include too much and becomes too complex. The names for each theme need to be concise and immediately give the reader a sense of what the theme includes (Braun & Clarke, 2006). So, we came up with the working names for the themes showing the general idea of each theme but also trying to keep it neat and short. Finally, we started to write the report, where each theme was explained in a narrative way with the help of participants’ quotations as evidence of the research findings. As Braun and Clarke (2006) suggests, in this step it is crucial that the analytic report is more than providing and describing the data, it needs to make an argument in relation to the research question, which we also followed.

3.5 Validity and Reliability

As researchers, we recognise that biases are inevitable in the research process. However, we aim to address this by openly acknowledging their presence and reflecting on their potential influence throughout the study. Reliability in qualitative research refers to the consistency of the research, that is, the extent of which a study is able to be replicated (Recker, 2013). Although

qualitative studies are not always intended to be replicated the same way as quantitative studies, to enhance reliability and to minimise biases in this research, as mentioned in the methods section, the codes that derived from the interview transcriptions were initially produced separately by the researchers. These codes were then discussed collaboratively to enhance accuracy and objectivity of the identified themes.

Validity refers to the accuracy and meaningfulness of the findings (Recker, 2013). In quantitative research, it refers to the ability of the measurement instrument to accurately capture the chosen topic or problem. In qualitative research, the researchers themselves act as the instrument, with their skill and expertise in executing the study, which plays a crucial role to ensure validity (Patton, 2015). Furthermore, while there is a noticeable growing use of the interpretive approach in the IS field (Walsham, 2006), there is still a need for more standardised frameworks and approaches to ensure the quality of the research (Klein & Myers, 1999). Klein and Myers (1999) propose a set of principles to guide interpretive research, and this master's thesis adopts several of these principles to ensure validity. First, the *hermeneutic circle* was applied, a step that emphasises the need for comprehensive understanding of the subject, which was done when researching about the topic and learning about concepts that contributed and constructed the bigger picture, which became evident when developing the literature review chapter. Second, *contextualisation*, which ensures a clear understanding of the background and history of the problem so that the findings are grounded in the context. *Dialogical reasoning* was another used principle, which reflects on potential contradictions between theoretical preconceptions and the empirical data. This approach ensured that the findings were coherent and aligned with the evidence, rather than forced to fit existing theories. Finally, *multiple interpretations* was applied to recognise and address the possibilities of different experiences from participants, and that as researchers the same data can be interpreted differently. To manage this, we initially coded separately and then discussed differences in interpretations of the findings to arrive at a shared understanding.

3.6 Ethical Considerations

As previously stated, this master's thesis follows the qualitative research approach and employs qualitative methods, such as interviews, for the data collection. As interviews gather personal insights from participants, there are multiple ethical considerations that must be considered. By conducting interviews this evokes feelings, thoughts or experiences both for the interviewer and participant, which might be difficult to foresee (Patton, 2015). As the purpose of the interview is to gather data, not affect the participant, it was important to keep certain considerations in mind when doing the research (Patton, 2015). First, we informed the participants about the purpose of the study, ensuring that they understood what they were participating in. Second, a consent form was signed and agreed upon prior to the interview, ensuring that they understood the implications of being part of the research, giving the participant the right to withdraw at any time as the interview is a voluntary participation. Third, confidentiality was ensured throughout the entire process to protect the participants' identities and ensure their personal information remained confidential, aligning with ethical research standards. Recker (2013) highlights that interviews that take place in-person, have difficulties guaranteeing anonymity, therefore we instead ensure them of confidentiality.

Ethical considerations also involve the storage and analysis of the gathered research data (Recker, 2013). Regarding the data collection, to facilitate the analysis process, we used the

tool Whisper AI for the transcriptions. The interviews were only recorded with the participants prior consent, as outlined in the informed consent form. Additionally, this ensured transparency and fostered a sense of control for participants over their personal data. Nevertheless, for security and privacy reasons, we followed the LUSEM standard, ensuring that the process did not happen in the cloud, but was locally based. This minimised the risk of data breaches or unauthorised access. Citations could then be used to enrich the findings section. Although the transcriptions had to be shared in the final master's thesis submission, they were deleted from the thesis before publication, to ensure confidentiality of the participants. By adhering to these procedures, we ensured compliance with ethical guidelines and reinforced the integrity of the research process. These practices served to protect both the participants and researchers, promoting ethical responsibility and ensuring a careful, transparent approach to data collection and analysis.

4 Findings

4.1 Overview of Themes

The findings that emerged from the thematic analysis of the collected data are outlined in the following Table 3. In the following section, participants are referenced as P-X, where X represents the participant number (as listed in Table 2). To enhance readability and ensure clarity, minor corrections have been made to the quotations – preserving their meaning while making them more cohesive and understandable when presented outside of their full conversational context.

Table 3: Overview of Themes

Themes	Description of Theme
Theme 1: Motivational Drivers and Individual Engagement	This theme explores how individual employees respond to green gamification elements. It captures how green gamification taps into human psychology to trigger sustainable behaviours.
Theme 2: Key Game Design Elements that Influence Behaviour	This theme identifies the practical components of green gamification that are perceived as effective by employees.
Theme 3: Organisational Integration and Strategic Alignment	This theme covers the institutional and strategic mechanisms that support or hinder green gamification.
Theme 4: Organisational Impacts and Culture Change	This theme captures how green gamification affects the organisational ecosystem.
Theme 5: Conditions for Effective Use	This final theme ties everything together into practical insights and strategic recommendations.

4.2 Theme 1: Motivational Drivers and Individual Engagement

This theme explores how individuals engage with green gamification elements, focusing on the psychological motivators that drive environmentally sustainable behaviours. It explores the ways in which green gamification strategies resonate with personal values and motivations to encourage environmental action.

4.2.1 Intrinsic and Extrinsic Motivations

All participants mentioned motivations that could trigger individual sustainable behaviour. Although participants differed in personal interest and individual engagement, there was a shared acknowledgement of the importance and need of environmental sustainability initiatives. What was noted was the different extents of perceived responsibilities, or own opinion. Some participants described themselves as naturally inclined towards sustainable behaviour, often choosing greener options even when less convenient. As P-6 explained:

> *"But for me, I think that you should probably ask that to someone that care less, because I usually like out of my own motivation wants to do the sustainable option. So that's the impression that I get throughout the company as well, that people that really care about the environment always takes the trains, even if it's inconvenient." (P-6).*

This reflects a personal commitment to sustainability, suggesting that for some, environmental responsibility is embedded in their own values, a perspective also supported by P-5. In contrast, P-3 mentioned a lack of personal interest as a possible inhibitor towards environmental initiatives:

> *"I've heard people are always talking about in terms of environmental things. 'It's, oh it's so hard, ah no one cares'" (P-3).*

This attitude or lack of interest around the topic is similarly confirmed with P-1, while still recognising the importance of environmental sustainability:

> *"... for me I'm not interested at all. I know it's the future and we need to be more aware." (P-1).*

This two-sided coin, where sustainability is valued in principle but not fully embraced personally, reflects an aspect of tension within employees' attitude, as it implies differing levels of motivation. This internal tension is further demonstrated by P-5, who emphasises the psychological impact of action on belief, arguing that that behaviour often shapes attitudes, rather than the other way around:

> *"If I do something, I will change my opinion to reflect my behaviour because that's kind of how it works. You don't want to do something and not believe yourself. So I think that's what would happen. I think it would change the team's behaviour." (P-5).*

P-5 further emphasises that other participants highlighted the motivational potential of small rewards, particularly in overcoming personal reluctance, which P-7 explained:

> *"I actually lose taking the stairs ... sometimes my knees hurt and it's like 'oh I'm already maybe a little bit late, it's faster taking the elevator' or something like that but if I actually have something to gain from taking the stairs like some kind of, it like it doesn't have to mean anything it's just like internally I feel like that it's worth it because like some kind of arbitrary point system." (P-7).*

The statement from P-7 emphasised emotional benefits and understanding of purpose. Similarly, P-2 linked gamification to awareness, purpose and pride:

> *"... the benefits will be awareness ... and then also a feeling of being useful. And also, like, so do you feel proud that, 'oh my God, like, if I do this, this will happen'. And then you feel so proud. And then, of course, it creates this happy environment of not a toxic competition." (P-2).*

Similarly, P-3 and P-4 both underscored the significance of clearly communicating the purpose and anticipated outcomes of tasks. They observed that when employees understand the purpose behind their work, it not only enhances their sense of purpose but also increases their motivation and overall engagement. As P-3 put it:

> *"... everything's funnier if you know why you're doing it and that what you are doing is making something better." (P-3).*

This perspective highlights the importance of transparent communication and clearly defined outcomes within sustainability initiatives. When employees see the impact of their actions, tasks become not only more meaningful but also more enjoyable, a benefit mentioned by participants (P-3; P-4; P-7). For example, P-2 and P-5, who both work at the same company, are responsible for the onboarding process of new recruiters in their organisation. In an effort to make the process more engaging, they have introduced gamification elements to foster greater interaction. P-2 expressed the onboarding process as:

> *"... onboardings are usually very, like there's one day per week that we do the onboardings for the new joiners of the company. And it's like, it's usually very boring because you are, as I said, like standing by the slide deck ... So we want them to interact and then at some point there are like a quest to do as well." (P-2).*

This showcases the importance of making initiatives more engaging and interactive, so that employees gain responsibility of their actions, and consequently raises awareness. This strongly aligns with P-3 suggestion that, when employees can see tangible outcomes of their actions, they may be more motivated to adopt sustainable practices:

> *"I guess that if we educate them more, they would have their own interest in be a part of the results. We're trying to give them the results back to them as soon as possible. So they feel like their work has been listened to" (P-3).*

Both the statements from P-2 and P-3 aligns with the broader theme that when sustainability actions are communicated effectively and presented as meaningful, they are more likely to resonate with employees, enhancing both their motivation and engagement. Furthermore, a recurring motivator for environmental sustainability initiatives among participants was competition, expressing that it would be one of the key drivers for successful gamification (P-1; P-3; P-4; P-5; P-6). For some participants, competition was a stronger driver than for others, which P-1 described as a factor aligned with the organisation's professional culture:

> *"I'm a very competitive person. So I think that is a very fun way. And I think most in our company, the people are very competitive. I think you need that to be a good consultant as well" (P-1).*

This aligns with P-3 attitude towards competition, who linked personal satisfaction of competition to broader employee engagement:

> *"And since I love to compete, I assume that everyone else loves to compete, so you don't want to be worse than your neighbour, right? So I think that's an easy way to get people on the right track" (P-3).*

Additionally, supporting this statement, P-6 emphasises that people are competitive and ambitious. P-6 states that when employees understand that their actions will have an impact on the team, they are more likely to make an effort. This indicates the importance of fostering a sense of individual impact within a team-based setting. P-6 noted that performance comparisons between departments can motivate individuals to increase their contributions:

> *"... people are competitive and ambitious. And when they say that,'oh, this department only has 80%, let's get it to 100 so that we can shine compared to', like people buy that, I would say. And yeah, well, you try to contribute to your community" (P-6).*

This suggests that competition, when aligned with team-based goals, can strengthen a sense of purpose and personal investment in sustainability efforts. Overall, the participants highlights both intrinsic and extrinsic motivators for environmentally sustainable practices, such as personal values, organisational commitment and perceived purpose.

4.2.2 Awareness and perceived value of environmental actions

A recurring theme among participants was the disparity in awareness of the external and internal sustainability goals. Most participants were aware of the external sustainability goals, in particular those mandated by legislation, such as the EU climate law. As noted by P-7:

> *"... like to reach the common goal that we have which is like climate neutral by 2050 you have all of this EU but you also have some other initiatives that we all follow." (P-7).*

While all participants were familiar with overarching goals, awareness of internal and organisation-specific goals were often lacking. P-5 expressed uncertainty about specific internal goals, explaining that sustainability is embedded in the company's core value and business, and thus integrated across all processes:

> *"I can't think of any super specific company goal related to this more than that sustainability is one of the core things, so it's just everywhere" (P-5).*

P-5 shows limited awareness regarding organisational goals, despite being directly influenced by a sustainable core value in their daily work. In contrast, P-1 shows awareness of company related goals, while acknowledging that such initiatives have little to no direct influence on their daily tasks, indicating a lack of perceived value in their specific context:

> *"Our sustainability and environment goal doesn't impact on me at all I would say." (P-1)*

While there is a difference in awareness and influence, there is a consensus regarding the need for sustainable focus within organisations. P-3 emphasises the perceived value of environmental sustainability initiatives, as it is a key driver for success, viewing it as an integral to their organisation's responsibility:

"I'd say you have to have it in order to be a successful company who, yeah, take their social responsibility." (P-3)

In line with this statement, participants (P-1; P-2; P-3; P-5; P-6; P-7) show an understanding of the extent to which sustainability affects and the role it plays throughout the organisation. P-7 presented a more holistic understanding of environmental sustainability, shaped by the organisation:

"For me I've kind of been ingrained in this [company] and the way of thinking that every part of a product should be sustainable from where you source the resources to how you produce it to how you transport it somewhere and such. So like for me sustainability is not like really one specific thing it's like the whole way of working." (P-7).

Showcasing that working with sustainability is not optional anymore for organisations to be seen as successful and appealing for consumers and external stakeholders. More specifically, in industries that have direct environmental impact, which both P-2 and P-7 note, as their organisations have initiatives for preserving the environment. P-2 describes this as following:

"A lot of nature and a lot of things that needs to be preserved still and then don't really kill the environment to make it more environmental friendly" (P-2)

The perceived lack of internal goal clarity was linked to limited internal communication, showing a need for clear information sharing and understanding. For some participants (P-2; P-3; P-7), awareness of sustainability is closely tied to their organisation's operational activities, creating a stronger link between personal engagement and perceived impacts.

4.3 Theme 2: Key Game Design Elements that Influence Behaviour

This theme focuses on the design aspects of gamification that participants found impactful. None of the participants had any current or past experiences with green gamification. However, in relation to gamification, most participants had experience with some type of element such as rewards, leaderboards or competitions in work-settings. Visualisations tools like dashboards, leaderboards, and team comparisons were mentioned by several participants (P-2; P-5; P-6; P-7) as ways to make progress more tangible and encourage engagement. P-2 and P-6 suggested that it would be more engaging if the organisation measured and showed employees statistics of sustainability initiatives. By displaying this information, it would enhance awareness and make people more mindful of sustainability practices and policies. As P-6 expresses:

"I think it would be more engaging if we got to see some numbers. I don't know if we have the numbers, but I think people are prone to like, to appreciate statistics in that, like when it's easy to grasp and easy to relate to, a lot of people use like watches to track their exercise. And yeah, well, if it's easy to see how the statistic is relevant to you, I think it would, I don't know, spread awareness and make people more mindful." (P-6).

Which P-2 further elaborates when mentioning their gamified onboarding initiative, extending on what mechanisms could encourage employees to engage more, such as leaderboards tracking their water consumption. As their organisation provides them with "ocean bottles", which have

the function to scan every time you refill your water bottle, providing employees with numbers on how much plastic they are saving, etc, a function most employees are unaware of. Therefore, an idea proposed by P-2 was to incorporate it into their onboarding, making employees more engaged and mindful:

> *"We should include it in the game, like onboarding game and … ask them to upload their screen shot of the app like every week, like see how many people like who was the leader in saving the ocean" (P-2).*

In addition to the gamified onboarding process, P-5 explained that the organisation also had a gamified initiative to raise awareness about phishing. Employees received simulated phishing emails and were given immediate feedback based on their response, whether they mistakenly interacted with the phishing content, for example clicking on a link, or correctly identified and reported the email as a phishing attempt. As P-5 described:

> *"It progresses as you progress as well so they become more and more difficult and then there's a leaderboard" (P-5).*

Depending on how well you detected the phishing, there is a leaderboard showing how well your colleagues performed, and progress was measured by making the levels harder as progressed. Moreover, while some social aspects of gamification were perceived as positive across the interviews, as incentive to engage in more interactive solutions, such as team-competitions (P-1; P-2; P-3; P-4; P-5; P-6), both P-5 and P-7 expressed caution about over-emphasising competition. Instead, they proposed designing gamified elements that motivate collaboration and shared goals, potentially on a company-wide level, as P-5 explained:

> *"I do think that the risk there is that to of course like a little bit of competition is good but one of the most important things is that you also work between the teams really well so I don't know if there could be instead of between teams maybe like on a company-level and then maybe like how it progresses each week or how it changes I don't know like something like that" (P-5).*

This suggests that while individual motivation might be lacking, incorporating practical components such as rewards, leaderboards and educating employees more about their actions, could influence behavioural change.

4.4 Theme 3: Organisational Integration and Strategic Alignment

This theme explores how green gamification can be integrated into broader organisational strategies. By zooming out from individual-level motivations, this theme examines how green gamification is embedded into the wider organisational context, examining potential barriers and mechanisms that support this integration.

4.4.1 Barriers to integration

Participants identified several internal and external challenges that can hinder the effective use of green gamification. A major concern frequently mentioned was remote work. As more organisations adopt flexible work (P-1; P-7), maintaining collective engagement and

participation becomes increasingly difficult. For instance, P-1 shared how sustainability actions like recycling were harder to manage outside office settings:

> *"Some stuffs are hard to achieve like the easier stuff like recycling, because that's a hard thing to do when you're from home" (P-1).*

This barrier shows that being in the right setting affects the ability to change employee's behaviour. Beyond logistical challenges, many participants (P-1; P-3; P-5; P-6; P-7) also pointed out prioritisation and time constraints as key barriers. Employees are often preoccupied with client satisfaction, leaving little room for internal initiatives, let alone regarding sustainability, as P-6 explained:

> *"That is in general a problem that people's like the highest priority is still to make your customer happy. So all of those like internal initiatives and information sharing and everything like that it is depending on people being like engaged or ambitious in doing it because you probably have to manage your time better and it takes more effort" (P-6).*

Additionally, P-6 emphasises that when employees experience high workloads, they are less likely to prioritise initiatives that are not directly tied to their core responsibilities. This highlights the importance of designing gamified initiatives that are perceived as manageable and not burdensome, to avoid overwhelming employees. As P-2 suggested:

> *"If it gets too much or like too many things, maybe it's going to be like you will ignore it. But like if for example, weekly thing, like a Friday thing or Wednesdays of this, like kind of like this, it will be cool to have things like this. Then you look forward to Wednesdays" (P-2).*

This suggests that while individual mindset influences employee engagement, time management limits most initiatives. Similarly, P-3 describes how time pressures within daily work also reduce attention to sustainability:

> *"If the employees don't have that much work … they have the time to actually prioritise to take the stairs in this case, so they're not in such a hurry all the time and could focus on 'hey, we can do this for the environments instead'." (P-3).*

This highlights additional barriers, which are the importance of timing and organisational readiness. Even well-designed initiatives could fail if implemented during periods of stress with heavy workloads. As P-5 noted:

> *"Maybe the timing is more important right than anything else because I think it's very likely that not everyone will be in the right mindset to do the games at any stage. It might actually backfire and be annoying" (P-5).*

As P-5 states, the timing for these initiatives are crucial for success. Other barriers include work-life balance and individual convenience, which directly affects employee willingness (P-6). For instance, employees may opt for quicker but less sustainable options when travelling just to maintain a balanced work-life lifestyle. While most participants acknowledged the importance of sustainability, they recognised that financial constraints play a decisive role in determining what initiatives are possible, affecting an organisations capacity for sustainable changes. As P-4 explained:

"It's also budget thing so I don't think they have so free hands" (P-4).

Similarly, P-3 mentioned that while the intent to act sustainably exists, practical constraints, especially financial and resource-related, can limit such use:

"There's so many more ways that we could, but it's a question of resources as well" (P-3).

This shows that while most companies try to incorporate sustainability within their organisation, the extent of this varies abundantly depending on resources, capacity and company culture. The participants highlighted various barriers for green gamification initiatives, such as remote work, time management and organisational readiness. This shows broader factors that need to be considered outside of individual motivations.

4.4.2 Strategic Alignment

All participants stated that their organisation had someone or a team responsible for environmental goals. However, the extent to which organisations shared information or had present support within sustainable initiatives, varied a lot. When asked about sustainable initiatives within companies, most participants interpreted these as organisational efforts aimed to encourage sustainability, as P-5 clarified:

"I'm not sure like what exactly you mean by initiatives, but to me, it's like anything that the company tries to do to promote sustainable behaviour" (P-5).

While some organisations have sustainability as part of their core, others use it primarily as a marketing strategy. As P-1 pointed out:

"I think we are using it [environmental goals] to marketing ourselves as a company. To mark these goals outside to other companies and customers" (P-1).

This further aligns with past initiatives often connected to social sustainability, which both P-1 and P-4 mentioned. For instance, P-4 described their organisation's initiatives such as running, hiking and walking parades together with colleagues, strongly encouraging participation:

"You can pant and you can like there is signs for environmental mini movements and they are also like hiking's and running and stuff that they ... further donate the money to another" (P-4).

This shows an additional marketing strategy that could be seen as an incentive for organisations to be more sustainable, as it markets them well. In contrast, a majority of participants (P-2; P-4; P-5; P-6; P-7) stated that sustainability was indeed a core organisational value. For instance, P-5 described that this value strongly aligned from top management:

"It is there from the top already. I mean, it's one of the main things. Everyone has that as their core value" (P-5).

This shows that while it is important that individual engagement is present, employees value top managements actions. In this sense, the presence of top-down support may significantly increase employees' willingness to engage in sustainability efforts. However, as mentioned

previously, the degree in which these initiatives affect employee involvement and communication, varies. While most participants mentioned a sustainability team or role within their organisation, they were not always the ones responsible for sharing related information. For instance, in P-2 and P-5 organisation, a dedicated sustainability team managed environmental policies and goals. In contrast, P-1 noted that in their organisation only a single individual was responsible for overseeing these goals. This is further connected with how sustainability initiatives and goals were communicated to employees, which differed notably between participants. P-3 noted that their organisation did not effectively ensure that environmental goals were clearly communicated to employees:

> *"Not in a good way, not at all, I'd say. We did have, last year, we did have four-hour lesson-ish where they talked briefly about it, but that is kind of the only way they have informed us. So, not the best, in my opinion, but it is what it is" (P-3).*

This reflects on a weak internal communication, illustrating that strategic alignment is not only about having a sustainability vision, but it also requires consistent communication and alignment with broader organisational context.

4.5 Theme 4: Organisational Impacts and Culture Change

This theme explores how green gamification impacts the organisational ecosystem, including culture, leadership, and processes, with a focus on broader organisational outcomes beyond the individual level. P-2 emphasises the importance of organisational context and culture, suggesting that the mindset of employees can shift depending on the workplace environment. As noted by P-2:

> *"So, I think those are mostly the mindset of people and depending on which organisation you're in" (P-2).*

Moreover, when asked if employee mindset was seen as a limitation in relation to gamification initiatives, P-5 highlighted that environmental sustainability was deeply embedded in the organisation's core values and a central focus across all organisational levels. Being part of such organisation, influenced employees view on sustainability practices, internalising those values. Further P-5 stated:

> *"I think it does affect your mindset and I don't think anyone here is super negative about it or would be more difficult to be super negative about it because everyone else is pretty into that." (P-5)*

Additionally, P-7 supported this view noting that sustainability was deeply rooted in the company's culture and mirrored employee behaviour, suggesting that when sustainability is strongly valued in the organisation, it is a mindset that follows everywhere:

> *"It's also kind of ingrained in the employees because a lot of times I feel like you would see some things being said on like social media and stuff like that different communication channels but it's also a very like grassroots thing. People at the bottom care about what's happening at the top in regards to the sustainability" (P-7).*

This suggests that for some employees, green gamification may serve as a reinforcement of existing behaviours rather than an initial motivator for sustainable behaviour. Which P-5 exemplifies as following:

> *"Believe in it and me having fun with which is like it's fine it's good but I don't think it's going to make me do it more, I think it has more sense with someone who's maybe not already believing in it like if you change some behaviour, so that's why I think even here, like okay let's say the pant and the things, like that it's not necessarily gamified but it's working, like people are still doing it and people are still choosing sustainable more sustainable practices" (P-5).*

Most participants viewed gamification as a creative and engaging tool that could encourage sustainable behaviours by making tasks feel more rewarding and meaningful (P-2; P-3; P-4; P-5; P-6; P-7). P-3 noted that gamification could help reduce the perception that sustainability tasks are difficult or unimportant, emphasising that making work tasks easier would encourage participation:

> *"If some things make their workload easier, that'd be one big, big thing to do it for, because what I've heard people are always talking about in terms of environmental things. 'It's, oh it's so hard, ah no one cares'. So if we have the ability to make something easier in terms of, I don't know, collecting waste or whatever it is, that'd be a good thing" (P-3).*

However, for long-term change, P-2 highlighted a potential barrier, engaging older generations or employees with more traditional mindsets. They noted that these individuals might be more resistant to new ideas, particularly in industries with established practices. Despite this, P-2 suggested that these individuals could serve as ambassadors for sustainability if they were open to change:

> *"I think the most challenge will be the older generations. Those are probably the ones that are like, 'what is this nonsense' or something like, especially like in manufacturing business, there are a lot of people with more traditional way of thinking … some of them are very open minded … I think they could be the best ambassadors for this [gamification]" (P-2).*

Additionally, gamification's potential to drive collaboration and innovation within the organisation was emphasised. By engaging employees, especially younger generations, P-2 noted that gamification could generate a sense of shared purpose and innovation, aligning with the need for sustainability in the future:

> *"Gamification will get the attention of especially young people … they are the ones who need to follow it to keep it sustainable as well" (P-2).*

Ultimately, shared values around sustainability, and collaboration can facilitate cultural shifts within the organisation, with gamification playing a key role in making sustainability both engaging and meaningful.

4.6 Theme 5: Conditions for Effective Use

This final theme ties everything together, identifying practical insights and recommendations that need to be taken into consideration for successful use of gamified green IS. When asked about the potential benefits of combining sustainability initiatives with gamification, particularly through competition, P-1 expressed that such an approach could motivate employees and ultimately foster behavioural change. P-7 agrees with P-1, and states:

> *"Any gamification would get somebody to do something more than they would want to do it otherwise, so if your goal is to be more sustainable, I think using gamification to get there would be a smart idea" (P-7).*

P-7 explained that by incorporating green gamification, organisations could drive employees to engage in sustainable practices even more. Nonetheless, to successfully be able to incorporate this, awareness and information sharing has to be improved. Participants highlighted that their organisation regularly shared information through teams' channels, e-mails, meetings or their intranet (P-2; P-4; P-6; P-7). P-4 works in a consultancy firm, where all employees are included in a team, with their own mentor. P-4 explained that all employees have access to the organisational goals, but it is every mentor's responsibility to share the information to their team, and depending on the mentor, the information is shared differently. Furthermore, P-6 pointed out that both sharing and absorbing information can be difficult when time is limited. An example of how information was shared within the organisation, was discussed by P-6:

> *"We have also a thing that we usually do that we call [initiative for information sharing] that where we like someone that has expertise in something makes a presentation about it so that more people can learn about it" (P-6).*

Educational strategies were also raised (P-1; P-2; P-3; P-6), such as workshops or "lunch and learns" to help employees better understand the topic, as P-5 suggests:

> *"… could have some like a lunch and learns with how to better assess like the sustainability metrics" (P-5).*

Which aligns with P-6 information sharing initiative involving people to teach and learn about certain subjects, in this case related to sustainability. However, P-5 takes it one step further trying to imagine what skills or badges employees could earn when attending or engaging with these initiatives. Moreover, participants noted that while basic sustainability initiatives like recycling and pant are common in the workplace, remote work poses challenges to sustainability practices. P-1 observed that working remotely could limit direct impacts, as most colleagues work from home. When other participants were asked about environmental initiatives, many participants mentioned the organisations focus on sustainable transportation options, such as encouraging train travel over flights (P-1; P-2; P-5; P-6). P-6 further highlighted that the organisations office locations are near public transport hubs to encourage sustainable commuting. However, having a work-life balance sometimes requires plane travel, despite having a higher environmental impact. Additionally, to incorporate game design elements, P-6 suggested that sustainable travel behaviour could be rewarded or tracked:

> *"We could have like stronger policies, or maybe do some kind of statistics there as well, and try to like reward sustainable behaviour somehow …*

because I right now it feels like it's really up to, because we have the policy, but it's not hard to motivate a flight" (P-6).

Within P-5 organisation they have sustainability policies when it comes to traveling and ordering new equipment. For instance, all employees can order new equipment without permission and approval, meaning that they could order more than what is necessary. P-5 describes their current practices, where a field pops up in the system before ordering new equipment to encourage sustainable purchasing decisions. This aligns with P-5 explanation of their organisations trip-booking process, where their booking system provides recommendations for low-carbon-emission routes:

"When it comes to traveling, we have some policies there. Something that I think can be very good is for example, guiding the person to choose the best environmental option and making it a default. And then if you want to do something that is outside of that "default", making the end user actually take some action, and that's more difficult" (P-5)

Nonetheless, while some factors can be influenced and worked on within the organisation, other factors such as company location and size, are harder to change. P-4 observed, that while there are plenty of initiatives regarding social sustainability within the company, it varies a lot from office to office:

"In Stockholm, because we our mailbox is the same, they have plenty more activities but I guess it's because it's Stockholm" (P-4).

This shows that while it is the same organisation, office location matters in term of initiatives as resources may differ. Additionally, P-1 refers to the company size being the foremost reason for less focus on sustainability:

"Vi är ju ett ganska litet företag ändå så att jag tror de precis har börjat med det … ganska nytt det här med hållbarhet och att verkligen printa ner vad det är, tror jag är nytt"[English] (We are a pretty small company, I think that they just started with it … sustainability is pretty new and to actually print down what it is, I believe is new) (P-1).

This highlights the pre-disposition a company has to be able to incorporate green gamification elements, referring to an organisation's readiness. Most participants work in larger companies than P-1, which is a potential reason for the different view. P-2 highlights that sustainability thinking is already being a core value within both organisation and employees, which would suggest that using game design elements to motivate environmentally sustainable practices would not be seen as a barrier. The next step would however be to tailor gamified green IS to organisational context. Here, collaboration emerged as an important factor for successful use of green gamification. P-2 noted that for green gamification to be effective, it is essential that colleagues and teams work closely together, fostering a supportive environment that encourages participation. Additionally, P-2 confirmed that this value is reflected not only in the company's vision, but also in everyday actions:

"… the basic of it is to be sustainable … but they are also like very encouraging and very small steps as well like there are recycling sections like in every place" (P-2).

This reinforces what has been discussed throughout previous themes, that organisational prioritisation, culture and readiness mostly dictates its ability to use gamified green IS effectively. Some of these factors, such as organisational size, limited resources, or time-constrained employees, are more difficult to influence. Others, however, like internal culture, can be shaped over time. When sustainability is ingrained in the company's values, supported through education, and made visible in daily practices, it becomes easier to embed environmentally responsible behaviours across all levels of the organisation. Therefore, for gamified green IS to succeed in organisations, some enabling conditions must be in place, such as raise awareness, investing in education, and establish clear and actionable sustainability policies. In this way, when employees understand the relevance of these initiatives and see how their actions contribute to broader goals, they are more likely to feel motivated, engaged, and accountable, making sustainable behaviour not only possible, but also meaningful.

4.7 Summary of the Findings

The master's thesis research findings showed that individual employees' engagement with gamified green IS are shaped by both intrinsic motivations (e.g., curiosity, pride, purpose) and extrinsic incentives (e.g., rewards, competition), with emotional drivers and clear communication playing key roles. Effective game design elements, such as visibility, feedback, and interactivity, can enhance motivation, especially when integrated into collaborative and culturally aligned initiatives. Organisational factors, including strategic alignment, leadership support, and communication practices, significantly influence the integration and scalability of gamified approaches. Challenges such as remote work, time constraints, communication gaps, and limited leadership support were also noted. Gamified green IS tends to reinforce existing sustainable behaviours and can motivate broader cultural change when sustainability is embedded in core values. Successful use of gamified green IS depends on tailoring strategies to organisational context and maturity, supported by education, incentives, and inclusive engagement practices.

5 Discussion

5.1 Overview of Findings

The following Table 4 shows an overview of the themes, which represent the findings, connected to the posed research questions.

Table 4: Research Questions Related to the Themes

Research Questions (RQs)	Themes
Main RQ: How can gamified green IS influence individual employees' motivation and behaviour toward environmentally sustainable practices within organisation?	**Theme 3:** Organisational Integration and Strategic Alignment
	Theme 4: Organisational Impacts and Culture Change
	Theme 5: Conditions for Effective Use
RQ1: What are the key elements of green gamification that influence employees' behaviour toward sustainable environmental practices in organisations?	**Theme 1:** Motivational Drivers and Individual Engagement
	Theme 2: Key Game Design Elements that Influence Behaviour
RQ2: How can green gamification strategies be integrated into organisational practices to motivate and support employees' sustainable environmental behaviours?	**Theme 3:** Organisational Integration and Strategic Alignment
	Theme 5: Conditions for Effective Use

The following sections of the discussion are structured around the research questions. The findings, addressing each question, are discussed in relation to the reviewed literature. Finally, all findings are synthesised and discussed through the lens of Self-Determination Theory.

5.2 Answer to RQ1

The first research sub-question is the following: *What are the key elements of green gamification that influence employees' behaviour toward sustainable environmental practices in organisations?* The two findings related to this question are Theme 1 – Motivational Drivers and Individual Engagement; and Theme 2 – Key Game Design Elements that Influence Behaviour.

Veit and Thatcher (2023) highlight the difficulty caused by the amount of sustainability definitions, which resonates with our findings where participants showed varied interpretations

of sustainability, and some admitted lacking personal interest in sustainability efforts. This diversity in understanding is reflected in the 1st finding, where despite different views and personal attitudes, all participants recognised the urgency and importance of environmental issues. This observation aligns with Kotlarsky et al. (2023), who emphasise the growing need for IS research to address environmental challenges. Furthermore, our findings show a significant gap between organisational sustainability goals and employees' access to sustainability-related information, confirming not only Kotlarsky et al.'s (2023) argument that there is a lack of knowledge in academia, but insufficient in practical domains as well.

While Veit and Thatcher (2023) describe sustainability as a balance between the sustainability pillars – environmental, social, and economic – our master's thesis only focuses on the environmental aspect as this one tends to be under-prioritised within organisations. Our findings confirm this discussion by showing that, at the individual-level within organisations, social sustainability often receives more attention than environmental aspects. Which shows a misalignment with strategic sustainability goals and employees' everyday experiences.

Moreover, our master's thesis supports the optimism expressed by Kotlarsky et al. (2023) regarding the role of digital solutions as a potential solution in promoting sustainable practices. Participants generally perceived digital innovations, gamification in this case, as a promising tool to motivate environmentally sustainable behaviours. In this way, our findings extend the literature by showing an initial step that gamified green IS, when designed carefully, is welcomed at an employee level to foster engagement and in the long-run, behavioural change.

Andraschko et al. (2023) proposed the REDUSE framework (Relief, Empowerment, Default, User-centricity, Salience, Engagement) as key antecedents for sustainable use of information systems. Our findings align strongly with several of these dimensions. First, the concept of relief, which describes how technology can help reduce environmental footprint, was reflected in participants' initial motivation to adopt green gamification, particularly when environmental benefits were made more tangible and understandable. Second, empowerment was also noticed, as participants expressed feeling more seen, heard and therefore felt more valued when their contributions were recognised and saw that their work had made an impact on the organisational sustainability agenda. This supports prior research emphasising the increasing importance of psychological empowerment in sustainability systems (Kirchner-Krath et al., 2024b).

Additional drivers according to Andraschko et al. (2023) – default settings – relates to the system design, guiding users towards sustainable behaviours unless they opt something different. While our master's thesis did not develop an actual platform, some participants emphasised the importance of ease of use and clarity into their daily routines, showing relevance when incorporating green gamification elements. Similarly, although user-centricity, which relates to the personalisation of the system, is less related to our scope, the idea that different motivations such as competition, collaboration or individual growth, drive different users, suggests that a personalised approach or at least varying approaches would enhance effectiveness. Moreover, salience, the visibility and accessibility of sustainable information, was both an important finding and an established need in academia (Andraschko et al., 2023; Kirchner-Krath et al., 2024b). Participants noted that feedback, visual dashboards, and leaderboards would improve engagement and participation. Finally, engagement, the core of gamification, was widely expressed by participants. Different extrinsic and intrinsic motivators were highlighted, confirming prior suggestions that combining fun, purpose, and social influence is a critical factor for success.

All participants mentioned factors that influence sustainable behaviour, as well as their perceptions and how they value sustainable practices. As Zhou et al. (2024) explain, there are three distinct types of motivation that can lead to meaningful engagement. Some participants expressed a lack of intrinsic motivation to sustainability, suggesting their motivation align more closely with controlled extrinsic motivation – a form of motivation driven by external pressures or obligations. In such cases, behaviour such as recycling or selecting sustainable travel options may be adopted not out of personal commitment but to meet organisational expectations or to avoid social disapproval (Zhou et al., 2024).

One participant illustrated that choosing a more sustainable option, such as taking the stairs instead of the elevator, was perceived as a "loss" due to the additional time and effort required, with no immediate personal benefit. The participant suggested that implementing game design elements, such as rewards, could incentivise employees to engage in sustainable behaviours by offering tangible benefits that offset perceived costs. This aligns with Deterding et al. (2011), who argue that gamification introduces elements of game design into non-game contexts which could foster engagement and encourage desired behaviours. Crucially, gamification does not merely add superficial rewards, but in practice often encourages a playful behaviour and mindset, which can reshape how employees perceive and interact with otherwise mundane or effortful tasks (Deterding et al., 2011). By reframing sustainability efforts through playful mechanisms, such as points, rewards or challenges, gamified green IS may transform perceived losses into opportunities for achievement, competition, or social recognition. Which can thereby encourage instrumental outcomes, ultimately enhancing employee motivation and meaningful engagement (Zhou et al., 2024).

Our findings identified competition as a key driver for engaging employees and fostering sustainable practices within organisations. Some of the participants had a stronger drive for competition and even expressed that it was a trait required to be successful in their role. This suggest that integrating game design elements could significantly enhance employee engagement in sustainable practices, ultimately leading to lasting behaviour change, which Silic et al. (2020) highlight. While these strategies could be associated with controlled extrinsic motivation, as they rely on external rewards or recognition, they also have the potential to be connected to intrinsic motivation. According to Zhou et al. (2024) intrinsic motivation arises from an internal drive to engage in activities for personal enjoyment, curiosity, or challenge, rather than external pressures or incentives. In this context, competition, which some employees noted as enjoyable and personally fulfilling, could drive engagement in sustainability initiatives not merely for external rewards but also for the intrinsic satisfaction derived from the sense of accomplishment. This also encourages both experiential outcomes, such as enjoyment and satisfaction, and instrumental outcomes, such as receiving rewards, which together creates meaningful engagement (Zhou et al., 2024).

However, some employees cautioned that excessive competition could lead to a destructive work environment. Prakash and Manchanda (2021) explain that the intended benefits of gamification are to improve engagement and encourage desired behavioural changes, which could be undermined by excessive competition. Our participants further suggested that, to avoid this pitfall, competition should be designed to foster collaboration and encourage shared goals rather than creating rivalry within or between teams. The work by Bui et al. (2015) mentions that while competition is a strong motivator and enabler for new techniques, if poorly designed, competitive elements can result in the opposite effect, which is further confirmed by our participants' concerns, suggesting that it can instead promote unhealthy competition ultimately undermining collaboration. A hybrid approach may provide a more inclusive and motivating

structure/foundation for behavioural change. By aligning competitive elements with cooperative efforts, gamified green IS can encourage collective action toward sustainability, enhancing both individual and group engagement in environmentally responsible behaviours. This approach not only mitigates potential negative effects but also reinforces the idea that sustainability is a common organisational objective, which can help build a more supportive and collaborative work culture. As Zhou et al. (2024) highlight, there is a conjunction between the three types of motivation and working together to shape meaningful engagement. Our findings confirm the model proposed by Zhou et al. (2024).

Thus, to answer the first research sub-question, our findings identify several elements that influence individual behaviour in green gamification contexts. These include intrinsic and extrinsic motivators, the perceived impact of actions, and how gamified green IS are designed and integrated within organisational culture. By aligning game design elements such as points, rewards or challenges with various motivational drivers, organisations can foster sustainable employees' behaviours. This illustrates how gamified green IS can be tailored to different user needs and organisational settings, aiming to contribute to long-term behavioural change.

5.3 Answer to RQ2

The second research sub-question is: *How can green gamification strategies be integrated into organisational practices to motivate and support employees' sustainable environmental behaviours?* The two findings related to this question are Theme 3 – Organisational Integration and Strategic Alignment; and Theme 5 – Conditions for Effective Use.

Hedman and Henningsson (2016) distinguish between two organisational approaches to sustainability initiatives: one focused primarily on cost-saving and the other rooted in genuine environmental responsibility. Their case study emphasises the importance of structural integration and alignment, such as hiring a dedicated CSR manager to incorporate sustainability within the organisation. Our findings confirm that while several companies do have designated sustainability teams/roles, their actual presence and influence on daily individual behaviour varies widely. Dedrick (2010) also highlights the importance of organisational context – noting that CIOs and IT managers often lack direct control over sustainability agendas. Which aligns with our findings that even when sustainability roles exist in organisations, their influence on everyday behaviour is often inconsistent or limited. In many cases, as highlighted by our participants, sustainability initiatives were perceived as top-down directives rather than integrated into everyday work practices. Furthermore, Kirchner-Krath et al. (2024b) argue that Green IS has the ability to facilitate bottom-up changes in organisational behaviour and culture. Some of our participants agree with this concept, indicating that change stems from individual motivation and internalisation of sustainable values. Participants suggested that organisational culture already supports sustainability from the top-down. This, while Green IS – and by extension, green gamification – can empower bottom-up change, pre-existing organisational culture and leadership support are crucial enablers.

Moreover, Kirchner-Krath et al. (2024b) highlight how Green IS initiatives are increasingly seen as potential tools to change employees' practices and underlying beliefs, a finding that is strongly reflected in our participants responses. Particularly, our findings illustrate how repeated engagement in sustainable practices, even when initially externally triggered, can lead to deeper belief changes over time. This supports prior findings by Harnischmacher et al.

(2020), who notice an increasing shift in focus on individual behavioural and engagement for Green IS to be able to have a stronger effect within organisations.

Furthermore, the importance of the “knowledge stage” in the adoption of Green IS (Kirchner-Krath et al., 2024b), aligns closely with our findings. In our findings, the necessity of understanding or at least increasing awareness of internal sustainability initiatives to encourage meaningful engagement is strongly emphasised. Lack of communication and education about sustainability efforts was repeatedly cited as a barrier to successfully implement green initiatives.

Gamified green IS can be effectively integrated into organisational practices by embedding sustainability into everyday decisions and using behavioural cues to encourage environmentally responsible actions. Some of the participants mentioned that when choosing a travel option, they got recommended the most environmentally friendly option and when going outside of these recommendations’, employees needed to motivate the reason for this. This aligns with employee green behaviour (EGB), which is described as actions and behaviours displayed by employees to contribute to environmental goals (Haque et al., 2024; Norton et al., 2015). Which can be aligned with both required and voluntary EGB (Norton et al., 2015). Our findings showed that some organisations have explicit policies mandating sustainable practices, which mostly aligns with required EGB. In contrast, other participants noted that while no strict formal policies exist, there is an expectation that employees will independently choose the most sustainable options, which relates closest to voluntary EGB. In these cases, the expectation is rooted in the organisation’s values and culture, encouraging employees to reflect these principles through their actions.

Furthermore, our findings identified several barriers that could hinder the effectiveness of green gamification initiatives in promoting EGB. To achieve long-term environmental sustainability, organisations must actively engage their employees. A critical factor in this engagement to motivate EGB is employees’ self-efficacy, the belief in their ability to successfully perform specific tasks, which plays a vital role in driving pro-environmental behaviour (Haque et al., 2024). However, when employees face excessive workloads and elevated stress levels, their self-efficacy may be diminished, consequently hindering their participation in green gamification initiatives, which aligned with our findings. When employees feel overwhelmed, sustainability initiatives – especially those framed as "games" – are often deprioritised, perceived as non-essential or even burdensome. This reflects a key insight which is for successful use of gamified green IS, organisational readiness is crucial. If green gamification initiatives are introduced during periods of organisational strain such as resource allocation, restructuring or peak workload times, they may be met with resistant. Highlighting the importance of timing and organisational capacity.

Thus, to answer the second research sub-question, to effectively integrate green gamification strategies into organisational practices and motivate sustainable environmental behaviours, it is essential to design initiatives that are embedded in daily practices. This involves including gamified elements, such as progress tracking and recognition, within existing work practices and sustainability policies, rather than treating them as add-ons. It also involves having the rightful support, whether it is with strong leadership, dedicated sustainability teams, and/or fostering a culture where sustainability is viewed as valuable to the organisation. This means having clear communication, education and environmental initiatives to build awareness, reduce resistance, and support employee integration. Most importantly, initiatives must be

introduced under conditions that support employee participation, avoiding periods of high workload and stress, and designed to enhance employee's sense of relevance and self-efficacy.

5.4 Answer to main RQ

To answer the main research question – *How can gamified green IS influence individual employees' motivation and behaviour toward environmentally sustainable practices within organisation*? – this section brings together insights from findings in Theme 3 – Organisational Integration and Strategic Alignment; Theme 4 – Organisational Impacts and culture change; and Theme 5 – Conditions for Effective Use. These findings offer a broader understanding of how gamified green IS can be integrated meaningfully into organisations.

The most frequently mentioned challenge from our participants was employee's mindset. For instance, some participants noted that older generations may be resistant to change, believing that existing practices are sufficient. This is particularly relevant in cases where employees, view such initiatives as trivial or misaligned with professional expectations, potentially undermining their effectiveness. These mindset-related barriers can inhibit both required and voluntary EGB, as they reduce engagement with tools and systems designed to encourage environmentally sustainable behaviours. In terms of behavioural outcomes, several participants provided suggestions of policies that either encouraged or required environmentally choices (e.g., train travel over flights). Reflecting both voluntary and required EGB, as outlined by Norton et al. (2015). Participants noted that gamification could amplify these behaviours, given that the gamified elements are aligned with existing policies, values and daily workflows.

Furthermore, Harnischmacher et al. (2020) suggests that individual engagement is increasingly recognised as a key factor for effective Green IS initiatives, which is supported by our findings. The 4th finding illustrates how repeated participation in sustainability practices, especially in cases where there is positive reinforcement, can lead to deeper individual shifts and may help foster a culture where environmental responsibility becomes a standard. However, findings also reveal issues across organisations in how sustainability is communicated at different levels. In organisations where sustainability is seen as a marketing tool rather than a standard practice, or where it is inconsistently shared, the potential of gamification to drive behavioural change is less. In line with Kirchner-Krath et al. (2024b) that emphasises the importance of organisational transparency and the role of clarity in successful use of Green IS initiatives.

A key insight from the 4th finding, is the role of organisational culture in enabling or inhibiting green gamification efforts. Many of our participants emphasised that sustainability, if embedded into the company's vision and values, creates an environment where gamified sustainability practices are more accepted and integrated into the workplace. This aligns with findings from Kirchner-Krath et al. (2024b), who argue that Green IS can facilitate bottom-up culture change when there is organisational support. While cultural alignment is an important enabler, our 5th finding shows that organisational readiness, which can be defined by structural and motivational factors, determines whether gamified green IS can be used effectively. An organisation's size and maturity both appeared to influence readiness. As discussed by Kirchner-Krath et al. (2024b), the "knowledge stage" is fundamental for behavioural change. Participants pointed out the role of internal communication channels and learning opportunities (e.g., information sharing sessions or "lunch and learns") as mechanisms for increasing environmental acceptance and involvement.

Employees also noted how sustained exposure to sustainability values in the workplace can influence personal beliefs and behaviours over time, even with more disengaged employees. Our findings suggest that when implementing green gamification strategies within organisations, employees might primarily rely on extrinsic motivation, such as offering rewards, points or acting to avoid negative judgement. However, such approach may be less effective if employees are sceptical about the purpose of these initiatives or feel overwhelmed by other work-related demands. In the absence of clear environmental framing and strong organisational support, these behaviours may not be internalised, thereby limiting the development of extrinsic autonomous motivation, where employees act out of personal endorsement and alignment with their own values (Zhou et al., 2024). If gamified green IS initiatives are not perceived as engaging or meaningful, they are unlikely to elicit intrinsic motivation, which is based on genuine enjoyment and interest (Zhou et al., 2024).

Some employees emphasised that sustainability is deeply embedded in their organisations core value and therefore all processes within the organisation, which in turn shape employee behaviour and potentially attitude. Our findings further indicated that sustainability is so deeply embedded within employee's organisation's culture that expressing scepticism or negative attitudes toward it may be perceived as unacceptable or discouraged. This reflects a shift toward autonomous extrinsic motivation, where individuals internalise organisational values and act in accordance with them, even if sustainability is not inherently self-motivated, which confirms Zhou et al. (2024). While their engagement is not purely intrinsic, it is reinforced by a sense of identification with the organisation's mission and values. In this context, the organisation's identity becomes a significant influence, shaping how employees think and act in relation to environmental sustainability. This finding reflects the motivational spectrum described by Zhou et al. (2024), where controlled extrinsic motivation may, over time, evolve into autonomous extrinsic or intrinsic motivation through internalisation. Furthermore, our findings confirm Zhou et al.'s (2024) statement that conjunction, asymmetry and equifinality, shapes the relationship between motivation and meaningful engagement.

Building on the previous sub-questions, which provided a foundation, the main research question can now be addressed, especially through the insights gained from the 3rd, 4th and 5th findings. Gamified green IS can influence individual employees' motivation and behaviour toward environmentally sustainable practices by creating engaging, goal-oriented experiences that align with both organisational values and employee needs. When used within a supportive organisational culture that reflects the practical realities of daily work, game design elements can enhance both extrinsic and autonomous motivation. Over time, this can foster internalisation of sustainability values, encouraging behavioural change and meaningful engagement. Thus, the effectiveness of gamified green IS depends not only on its design but also on the cultural and strategic context in which it is used.

5.5 Discussion of the Findings through Self-Determination Theory

To discuss our findings, we use the Self-Determination Theory, which is appropriate for understanding how and why employees respond to gamified initiatives aimed at motivating environmentally sustainable behaviours. SDT emphasises individuals drive for personal growth and their basic psychological needs – autonomy, competence and relatedness – which influence self-motivation and overall development (Ryan & Deci, 2000). The 1st finding – *Motivational Drivers and Individual Engagement* – is a key finding for understanding how gamified green

IS could trigger employee's sustainable behaviour. SDT focuses on human motivation and more precisely on factors that hinder or support engagement in activities (Ryan & Deci, 2000). Ryan and Deci (2000) present three different types of motivation: *amotivation*, *extrinsic motivation* and *intrinsic motivation*. Our findings show that the motivations from employees differed. Some employees had a strong personal commitment, reflecting on a high degree of intrinsic motivation, where behaviour is aligned with personal values (Ryan & Deci, 2000). Others were motivated by more extrinsic factors, such as rewards, competition or organisational incentives.

There are four types of regulations within extrinsic motivation, where two of them appear to be highly relevant to our findings. Firstly, *introjected regulation*, described as individuals internalising external expectations without fully accepting them as their own, which could result in feelings of guilt when those expectations are not met. The employees shared that their organisations encouraged them to engage in sustainability practices, such as recycling or choosing the most sustainable travel option. Our findings indicate that, without external reinforcement, engagement in sustainable practices was likely to remain limited. Secondly, this reflects the least autonomous form of extrinsic motivation, known as *external regulation*, where behaviour is driven primarily by external contingencies such as rewards (Ryan & Deci, 2000). In this case, sustainable actions are not internally valued by the individual but are instead performed to obtain external incentives. Moreover, when motivation is driven exclusively by external incentives, there is a significant risk that individuals will disengage once these incentives are removed, thereby compromising the long-term internalisation and sustainability of such behaviours. These findings suggest that gamified green IS are considered most effective when designed to support the core psychological needs outlined by SDT, thereby motivating more autonomous and enduring forms of sustainable engagement within the workplace.

Within the 2nd finding – *Key Game Design Elements that Influence Behaviour* – our findings showed that leaderboards, dashboards, feedback and competition were practical game elements, employees perceived as effective. These elements had the potential to engage the motivational needs of *competence*, referred to ones need to feel capable, and *relatedness*, referred to as ones need to feel connected to others, as outlined in SDT (Deci & Ryan, 2000). For instance, performance tracking tools such as leaderboards and dashboards could help employees perceive themselves as capable and effective, satisfying the need for competence both individually and within teams. Relatedness refers to the desire to feel connected to others and to experience a sense of belonging (Deci & Ryan, 2000). These social components, encourage relatedness by creating a sense of shared effort and community. These game design elements can facilitate the internalisation of extrinsic motivation, particularly through identified or integrated regulation, when aligning with personal values and are perceived as supportive rather than controlling (Ryan & Deci, 2000). However, if such game design elements are experienced as overly controlling, they may foster only external or introjected regulation, driven by pressure or avoidance of guilt rather than genuine interest. In contrast, when gamified green IS lack relevance or fails to connect with users' values or perceived competencies, it may result in *amotivation* – where individuals feel disengaged and lack intentionality (Ryan & Deci, 2000). Thus, the motivational impact of these game elements is highly dependent on how they are designed and perceived in relation to users' psychological needs.

The 3rd finding – *Organisational Integration and Strategic Alignment* – strongly relates to the autonomy component of SDT, as it becomes central to understand how gamified green IS are embedded into organisational practices. *Autonomy*, defined as the experience of volition and psychological freedom in one's actions (Deci & Ryan, 2000), is influenced by structural and cultural factors within the organisation. When sustainability goals and green gamification

strategies are communicated and meaningfully aligned with employees' roles, individuals are more likely to internalise their goals and thereby feel a sense of ownership over their actions. However, this entails that employees have the time within their work to focus on such initiatives. One employee mentioned that giving more freedom or flexibility within their work would increase engagement, enhancing SDT's impact on well-being and personal growth. As Ryan & Deci (2000) describe, in organisations that support and encourage individual autonomy and competence, employees tend to grow, making them more prone to continue using gamification.

The employees noted that a supportive mindset and shared values within the organisation can create an environment where sustainable actions feel self-endorsed rather than forced. For instance, when sustainability aligns with the organisations core value and is framed as a part of the organisations mission, our findings highlight that employees are more likely to internalise these behaviours. However, remote work was mentioned as a barrier to fostering autonomy in this domain. Being physically disconnected from the workplace, limited engagement with gamified elements and hindered the social reinforcement of sustainable behaviours. Moreover, timing and organisational maturity were seen as influential, depending on which organisational stage they currently are in, sustainability initiatives might be a higher or a lower priority. Therefore, autonomy in gamified green IS depends not only on the individual's perception of choice but also on how organisational structures and timing enable or limit that perception.

The 4th finding – *Organisational Impacts and Culture Change* – is tied to the SDT concept of *relatedness*, as it reflects shifts in social norms and shared values within an organisation. When gamified green IS becomes embedded in daily work practices, it fosters a culture where sustainable behaviour is socially reinforced and valued. The employees shared how mindset within teams, departments and in an organisational level could either strengthen or weaken sustainability efforts. The employees emphasised that introducing playful and interactive dynamics into environmental initiatives, gamification could transform sustainability from a moral obligation into a social and engaging experience. This perception shift could potentially help foster *intrinsic motivation* (Ryan & Deci, 2000), where individuals adopt sustainable actions because they align with both personal and group values. Thus, relatedness not only supports motivation but also acts as a cultural mechanism through which sustainability can become a meaningful and enjoyable part of everyday work life.

Lastly, the 5th finding – *Conditions for Effective Use* – relates to all three psychological needs for driving motivation (Deci & Ryan, 2000). This finding synthesises the conditions under which gamified green IS can be viewed as a blueprint for satisfying all three SDT needs. The findings showed that organisational size influenced the practical ability to incorporate gamified sustainability initiatives. Larger companies seemed to have more resources, which increased the potential for employees to feel competent and supported in their efforts in comparison to smaller organisations. Organisations that had already begun integrating sustainability into their strategic agendas and employee routines were more likely to use gamification in ways that felt aligned and meaningful, thus fostering *intrinsic motivation* and *integrated regulation*. In contrast, organisations without such readiness risked shallow use, undermining feelings of *autonomy* or triggering *extrinsic motivation*. When conditions were favourable across these dimensions, gamification became more than a tool for behavioural change, it became a mechanism for embedding sustainability into organisational identity through motivation that is self-determined and enduring. Our findings indicate that when the three psychological needs are well incorporated with gamified green IS initiatives, employee engagement and motivation increases, aligning with the conclusions of Shi and Cristea (2016) as well as Yan and Zhao

(2023). Additionally, when employees are experiencing more positive than negative emotions, it may result in feeling more satisfied with life, which ultimately encourages well-being (Ryan & Deci, 2001).

The findings showcase that the success for gamified green IS depends on motivations and ultimately, when supporting autonomy, competence and relatedness, it creates well-being and personal growth, confirming the SDT developed by Deci and Ryan (2000). The findings show that while extrinsic motivators can initiate engagement, long-term impact depends on internalisation and alignment with personal and organisational values. The findings also show the importance of organisational structure in either enabling or constraining motivation. This extends the SDT framework by highlighting how contextual and structural factors within organisations shape the fulfilment of psychological needs. When well-integrated, gamified green IS foster self-determined motivation, making sustainable behaviour more meaningful, engaging, and enduring.

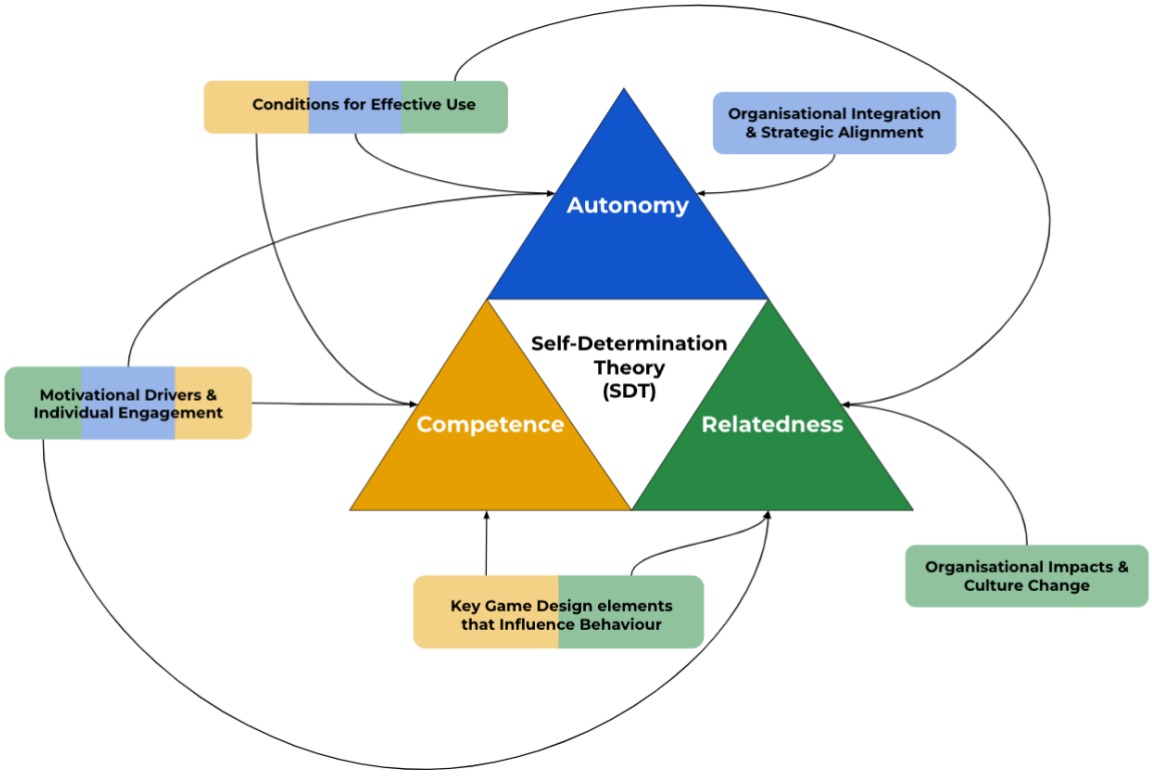

Figure 4: Employee Engagement within Gamified Green IS Initiatives based on SDT (made by the authors, 2025)

The developed framework (see Figure 4) illustrates how the findings of this master's thesis relate with Self-Determination Theory as conceptualised by Ryan and Deci (2000). It highlights that that effective use of gamified green IS depend not only on the design of gamification elements or individual motivation, but also on the extent to which organisational structures and practices satisfy basic psychological needs. These motivational needs – autonomy, competence, and relatedness – are placed at the centre of the framework, representing their central role in fostering self-determined motivation.

Each finding is placed around the triangle and connected to the SDT need(s) it most closely supports. *Motivational drivers and individual engagement*, is connected to all three needs,

reflecting the range of intrinsic and extrinsic motivators. It also highlights the risk of amotivation if values are misaligned. *Key game design elements that influence behaviour*, enhance a sense of competence and relatedness. With game design elements such as leaderboards, feedback and competitions, they are seen to reinforce feelings of competence when individuals are allowed to monitor progress. *Organisational integration and strategic alignment* closely aligns with autonomy. When gamified green IS initiatives are clearly communicated in a supportive environment, and embedded into roles and practices, employees are more likely to internalise and take ownership over their sustainable actions. *Organisational impacts and culture change*, strongly associates with relatedness, showing how shared values, social norms, and organisational support can make green gamification an engaging and meaningful experience for employees. Lastly, *Conditions for effective use*, connected to all three needs, shows that organisational readiness, maturity, and timing, can either enable or hinder the effective use of gamified green IS. Ultimately, when organisational conditions and individual motivations are aligned, employees are more likely to engage in environmentally responsible behaviours, resulting in effective use of gamified green IS.

5.6 Suggestions for the Effective Use of Gamified Green IS

It was the aim of the master's thesis to 'translate' employees' experiences into suggestions regarding the effective use of gamified green IS. These insights connect individual-level motivation with organisational integration, translating employee-centric motivations into practical suggestions for environmentally sustainable practices. So, drawing from our findings, we propose the following suggestions on how gamified green information systems can be effectively used to encourage individual sustainable behaviours and advance environmental objectives within organisations. They represent the core outcomes of our master's thesis research.

- **Design IS features to align green gamification with employee motivation:** Develop gamified elements within the green IS that appeal to both intrinsic (e.g., personal values, sense of purpose) and extrinsic (e.g., rewards, recognition) motivators. This enhances user engagement and fosters sustained behavioural change through the IS interface.
- **Embed gamified green IS into organisational strategies and culture:** Ensure that the gamified components are integrated into existing systems, policies and processes instead of treating them as add-ons. This ensures relevance within the organisation, reinforces sustainability objectives and long-term motivation.
- **Support both top-down and bottom-up commitment:** Ensure that top management actively acts and serves as "role models" for sustainable behaviours. Simultaneously, empower employees at all levels to take ownership of their environmental actions, encouraging inclusiveness and individual responsibility. This could be done with personalised feedback mechanisms that allow for participation and progress tracking.
- **Focus on clear communication:** Build awareness across the organisation to ensure a clear sense of purpose, reduce resistance, and highlight the environmental significance of individual employees' actions.
- **Build a foundation of knowledge and transparency:** Before using the gamified strategies, employees must be aware of relevant sustainability knowledge and organisational goals. Educational initiatives such as workshops, "lunch and learns", or

internal presentations are essential to ensure that employees understand the value of their actions while also making them more engaged.

- **Customise gamified green IS to reflect organisational structure:** Design the gamified green IS to accommodate different roles, teams, departments, and user preferences.
- **Reinforce long-term engagement:** Encourage collaboration, track and show progress, and link achievement to environmental goals to maintain motivation over time. For instance, embed visual analytics, badges, leaderboards, and milestone trackers into the IS to reflect employees' environmental impact over time.

6 Conclusion

6.1 Conclusions

The master's thesis focuses on Gamified Green IS. Green gamification refers to the application of game design elements in a non-game context to motivate employee engagement in environmentally sustainable behaviours. Green gamification is built into and enabled by information systems, the gamified green IS. Research on using gamification to encourage employee behaviour toward sustainable practices in organisational contexts is limited, highlighting the need to explore it further. Thus, the purpose of this master's thesis research was to explore how gamified green IS influence individual employee behaviour within organisations, and to explore and understand the motivational factors that encourage environmentally sustainable practices. By focusing on the employee experience, the master's thesis study aimed at providing suggestions into how green gamification can be effectively used to support organisational environmental goals. To achieve the purpose and aim of the master's thesis, we posed the following overarching research question: *How can gamified green IS influence individual employees' motivation and behaviour toward environmentally sustainable practices within organisations?* For this, qualitative research was conducted, and data were collected through semi-structured interviews from seven employees. The data were analysed thematically to conclude to five themes, which represent the research findings, and were discussed with the help of Self-Determination Theory.

The findings showed that that individual employees' engagement with green gamification is shaped by both intrinsic motivations (e.g., pride, purpose) and extrinsic incentives (e.g., rewards, competition), with emotional drivers and clear communication playing key roles. Effective game design elements, such as visibility, feedback, and interactivity, can enhance motivation, especially when integrated into collaborative and culturally aligned initiatives. Organisational factors, including strategic alignment, leadership support, and communication practices, significantly influence the integration and scalability of gamified approaches. Challenges such as remote work, time constraints, communication gaps, and limited leadership support were also noted. Green gamification tends to reinforce existing sustainable behaviours and can motivate broader cultural change when sustainability is embedded in core values. Successful use depends on tailoring strategies to organisational context and maturity, supported by education, incentives, and inclusive engagement practices.

Based on our findings, we offer the following insights into how gamified green information systems can be effectively used to motivate individual sustainable behaviours and support broader environmental goals within organisations. These insights bridge the gap between individual-level engagement and organisational-level integration, translating employee-centric motivations into suggestions for environmentally sustainable practices. The following insights represent our master's thesis research outcome:

- Design IS features to align green gamification with employee motivation.
- Embed gamified green IS into organisational strategies and culture.
- Support both top-down and bottom-up commitment.
- Focus on clear communication.
- Build a foundation of knowledge and transparency.

- Customise gamified green IS to reflect organisational structure.
- Reinforce long-term engagement.

6.2 Contributions

The master's thesis offers both theoretical and practical contributions. It contributes theoretically in the IS field by linking green gamification with Self-Determination Theory (SDT) to show how fulfilling motivational needs enhances employee engagement in sustainability. Practically, it offers organisations actionable guidance on designing gamified IS initiatives that motivate sustainable behaviours and support environmental goals.

More analytically, this master's thesis contributes to the IS research field by addressing the underexplored intersection of green gamification, employee engagement and organisational behaviour. While gamification has been studied within the IS field, its application toward promoting sustainable practices through employee engagement remains limited. By focusing on green gamification within an organisational context, the master's thesis expands the scope of IS research to include environmental sustainability. A key theoretical contribution lies in the application of Self-Determination Theory and the framework presented by Zhou et al. (2024), to design and implement game elements. Zhou et al. (2024) presented the term *green gamification* and connected it to the different types of motivators presented in SDT. Our findings confirm that the psychological needs for autonomy, competence and relatedness are essential not only for fostering employee motivation, but also for successful use and adoption of green gamification initiatives. These insights extend existing IS research by integrating Self-Determination Theory with green gamification in an organisational context, highlighting how addressing core motivational needs can enhance employee engagement in environmental sustainability initiatives and processes.

Practically, this master's thesis offers valuable insights for organisations seeking to foster sustainable behaviours through green gamification. By conducting interviews with employees, the master's thesis captures firsthand perspectives on what motivates or hinders engagement with green gamification initiatives. These insights offer organisations a deeper understanding of how different employees perceive and interact with sustainability-oriented gamified systems, highlighting the importance of tailoring game design elements to fit varying organisational cultures. Furthermore, the master's thesis supports organisations in recognising the role of fulfilling the psychological needs of autonomy, competence and relatedness, to sustain long-term engagement. Our master's thesis also provides actionable recommendations for managers, leaders and organisations on how to implement green gamification strategies to motivate environmentally friendly behaviours. As result, the master's thesis not only contributes to theory but also offers practical guidance for fostering employee engagement and strengthening organisational commitment to environmental initiatives and goals.

6.3 Suggestions for Future Research

In this master's thesis, we adopted a qualitative research approach to explore individual employees' perspectives on the use of gamified green IS for motivating sustainable practices. While this approach offered valuable depth and contextual understanding, future studies could

benefit from employing quantitative methods, or a mixed-methods design, to provide a more comprehensive and generalisable view of the phenomenon. Our analysis was grounded in Self-Determination Theory, which highlighted key motivational drivers. However, alternative theoretical frameworks such as Practice Theory could offer additional insights by examining workplace behaviours and/or social dynamics in organisational settings. Furthermore, while our study concentrated on the environmental dimension of sustainability, future research could expand the scope to include the economic and social pillars, either independently or through an integrated lens, to deepen understanding of sustainability in its full complexity. Finally, as highlighted in our literature review and echoed throughout scholarly discourse, there remains a pressing need for further research in the Information Systems field, particularly within the Basket of Eight journals, on the role of gamified technologies in advancing sustainability goals.

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Appendix A: Informed Consent Form

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I, the undersigned, confirm that (please tick the appropriate box):

1.	I understand the information about the project.	☐
2.	I have been given the opportunity to ask questions about the project and my participation.	☐
3.	I voluntarily agree to participate in the project titled "Gamification for Environmental Sustainability in Organisations" (the possibility of making slight changes to the title are declared).	☐
4.	I understand I can withdraw at any time without giving reasons and that I will not be penalised for withdrawing nor will I be questioned on why I have withdrawn.	☐
5.	I understand that my identity and contribution will not be revealed nor shared with others outside this interview and those involved in this research, such as our supervisor.	☐
6.	The use of the data in research, publications, sharing and archiving has been explained to me.	☐
7.	I agree that this interview is recorded for the purpose of data collection.	☐
8.	I understand that if I have questions about the research or about my role, I can contact Maria Dalgren (ma1141da-s@student.lu.se) or Madeleine Tran (ma1364tr-s@student.lu.se) by e-mail.	☐
9.	I, along with the researchers, agree to sign and date this informed consent form.	☐

Participant:

_____	_____	_____
Name of Participant	Signature	Date

Researcher:

		March-April 2025
_____	_____	_____
Name of Researcher	Signature	Date

Researcher:

		March-April 2025
_____	_____	_____
Name of Researcher	Signature	Date

Appendix B: Interview Guide

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Maria Dalgren & Madeleine Tran

Interview Guide

Introduction

- Introduce ourselves, describe the research, confidentiality and why we would like to record

The purpose of our research is to explore the connection of green gamification and individual behaviour in organisations, with the aim of providing insights into how gamification can be effectively used to promote sustainable practices and support environmental goals in organisations. To achieve this, the following research question is posed:

"How can green gamification be effectively implemented in organisations to drive sustainable environmental practices and support organisational environmental goals?"

- Sign the consent form before starting

Background & Control Questions

1. Could you tell us about your company, and your role in it?
2. Could you describe a typical/regular day for you in the company based on your role?
3. When you hear the term environmental sustainability, what does it mean for you?
    a. No matter if the definition is a bit unclear or not, reassure with this: Based on literature we define environmental sustainability as "*Using information systems to support practices that improve environmental sustainability of organisations, which means acting in ways that protect the natural environment today, ensuring that future generations can meet their needs too.*" So, could you please have it in mind during our interview when we refer to it.
4. Do you have any experience with sustainability initiatives in your current or previous organisation?

Main Questions – Sustainability

1. Can you tell us about the environmental goals within your company? For example, which are the environmental goals that you take into consideration in your organisation, could you tell us more and give us some examples?
2. How does your company ensure that employees are aware of these environmental goals?
3. Do you happen to know when these environmental goals were implemented and what triggered this decision?
4. Are there any specific strategies or practices that encourage employees to achieve these goals, or at least to be more mindful regarding them?
    a. Could you provide any examples of such strategies or practices?
5. Does your organisation measure the impact of sustainability initiatives? If so, how is this done?

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6. Are there any differences in the set environmental goals among different branches, departments, or groups?
7. What challenges have you faced in integrating sustainability into everyday work practices?
8. Do you have any ideas on what could encourage you to be more mindful with these practices?

Main questions - Gamification

1. Have your heard about "gamification"?
    a. If yes, could you tell us what does it mean for you?
    b. If no: gamification definition "*...gamification is defined as putting game like elements in a non-game environment, aiming to improve engagement and encourage desired behavioural changes.*"
    c. For example, in 2012, Citi introduced their global fitness challenge, focusing on steps. Employees that signed up committed to increase their daily physical activity over four weeks, earning points through walking, running, cycling, etc. The earned points could then be donated to international charities, reinforcing social responsibility while also encouraging employees to walk up the stairs instead of using the elevator, saving energy consumption.
2. Now that you have an understanding of gamification, could you think if you have encountered any gamification strategies in your organisation?
3. Has your organisation ever used gamification (e.g., rewards, competitions, leaderboards) to encourage behaviour change?

If no gamification

1. Our research has introduced us to the term "*green gamification*", which is practically combining game elements (examples) with the environmental and sustainable goals that the organisation has set in order to strengthen people's engagement with sustainability. So now that we have explained green gamification to you, could you share with us your opinion?
    a. What would you think of gamification in relation to sustainability? Let us explain before you reply to this question.
2. Do you see any potential for gamification to support sustainability efforts?
3. Do you think that gamification could have an impact on employees' engagement to sustainability initiatives?
4. Could you elaborate on the impact it could have and your thoughts on that?
5. In your opinion, what are the most significant benefits of using gamification to promote sustainable behaviour?
6. Do you see any limitations or challenges to gamification in this context? If so, what are they?
    a. Mindset

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If using gamification

1. In what ways has your organisation implemented gamification to encourage sustainable behaviour? (How does your organisation communicate and promote green gamification initiatives among employees?)
2. How do employees typically respond to these gamification-based sustainability initiatives? Are there any resistance or engagement issues?
3. What specific gamification elements (e.g., rewards, leaderboards, challenges) have you found most engaging in promoting sustainable behaviours?
4. In your opinion, what are the key elements of a successful gamification system for promoting sustainability?
5. What organisational support or resources do you think are necessary to integrate gamification into sustainability efforts effectively?
6. What challenges or barriers have you observed in the implementation of green gamification strategies?
7. Have you noticed any long-term changes in organisational sustainability practices as a result of gamification?
8. How do you think green gamification could be improved to have a stronger impact on sustainability efforts?

Conclusion

- Any final comments/insights that you would like to share with us regarding what we have discussed today?
- Thank the respondent for their time and participation

Appendix C: AI contribution statement

In the completion of this master's thesis, the following AI-based tools were used:

1. **Tools:** ChatGPT and Whisper.
2. **Degree of use:**
    - **a.** Whisper was used to transcribe the recorded interviews into written text. This tool facilitated an accurate transcription process, ensuring that the empirical data are coded more efficiently.
    - **b.** ChatGPT was used primarily to enhance the language throughout the text. Initially, it was used in the brainstorming phase when searching about the topic. Later on, it assisted with improving the clarity, coherence of the text, and improving transitions between sections. However, all content was reviewed and finalised by the authors to ensure originality.