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Gamifying sustainability with self-efficacy: motivating green behaviours in large industrial firms

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Abstract

Purpose – This paper aims to capture the challenges faced by large industrial firms in implementing employee green behaviour. It uses the gamification-based Octalysis framework for identifying motivational drives and entwins it to self-efficacy theory seeking to motivate and engage the employees through game techniques.

Design/methodology/approach – This paper uses qualitative approach where semi-structured interviews were conducted through snowball sampling technique with managers in senior positions in power sector holding significant decision-making authority. The interviews were transcribed and were analysed thematically.

Findings – This study offers compelling evidence that industrial firms are grappling to inculcate pro-environmental behaviour largely losing on incentivising motivation. Gamification can provide an enjoyable framework balancing intrinsic and extrinsic motivational drives.

Practical implications – This study offers a framework applicable to organisations across sectors, addressing challenges in implementing green behaviour by leveraging four phases of game mechanics. It tackles issues related to motivation and demand for incentives by striking a balance between intrinsic and extrinsic motivations.

Originality/value – This research stands out by incorporating game mechanics, specifically designed through Octalysis, to boost self-efficacy and encourage green behaviour among employees. Furthermore, it is in harmony with Sustainable Development Goals and circular principles.

Keywords Employee green behaviour, Gamification, Octalysis, Self-efficacy theory, SDG 2030 agenda

Paper type Research paper

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1. Introduction

Performing on environmental metrics is an existential requirement in the contemporary business landscape as organisations become progressively sensitive towards the ideology of "triple bottom line" (Elkington and Rowlands, 1999) and enthusiastically integrates the "sustainable" agenda in their pro-environmental practices and "eco-responsive" strategic framework. Conceptualised as a "compound performance domain" (Zacher *et al.*, 2023), employee green behaviour (EGB) is established to have a phenomenal contribution towards financial and operational performance (Ghosh and Haque, 2023) and finds a direct plausible connect with organisation's sustainable excellence (Yuriev *et al.*, 2022). EGB sustains organisational eco-initiatives and is a practicable pro-active measure driving green goals (Saleem *et al.*, 2021). EGB is described as scalable actions and behaviours displayed by employees that relate to and contribute to environmental sustainability, as defined by Ones and Dilchert (2012). Scholars such as Saleem *et al.* (2021) and Mujtaba and Mubarik (2022) have conceptualised EGB as an essential component of formal job roles, encompassing both in-role task performance and discretionary extra-role behaviours. Large industrial firms are increasingly facing enduring difficulties when it comes to adopting green behaviour and sustainable practices. Industrial firms, in this context, refer to significant players in manufacturing and heavy industry, characterised by extensive operations, substantial revenue and a diverse workforce. These entities make substantial contributions to the economy by harnessing technology and managing comprehensive supply chains (Collins and Preston, 1961). The IEA's (2023) report pointedly emphasised that industrial firms contributed to a staggering 89% of greenhouse gas (GHG) emissions in 2022, with heat generation witnessing the most significant absolute increase of 1.8% over 2021. The statistics specifically reinforce that the monitoring of carbon emission and deployment of energy efficient low-carbon activities demands synergy maximisation across all sectors. This reflects the ongoing struggle these firms encounter in effectively reducing their environmental impact (Gedam *et al.*, 2021). Despite progress in recycling and waste reduction, waste generation remains a concern with marginal reductions. Similarly, efforts to mitigate GHG emissions, crucial for sustainability, have proven challenging, with some cases even experiencing increases (Ndubisi *et al.*, 2020). These challenges are compounded by high-cost escalation, technology requirements and skill enhancement investments (Vivek *et al.*, 2021), which can deter the adoption of sustainable practices. The hierarchical structure hinders communication and green initiative dissemination, while the lack of incentives and motivation may obstruct green practice adoption (Gedam *et al.*, 2021). This motivates us to frame our first research question (*RQ*):

RQ1. What are the primary challenges faced by the large industrial firms while implementing EGB?

Large industrial firms have been strategically developing approaches to promote environmental consciousness (Mehrajunnisa *et al.*, 2022; Aboramadan, 2022). Strategies highlighted green intellectual capital (Ghosh and Haque, 2023), pro-environmental attitude (LaVan *et al.*, 2022), declarative and procedural knowledge (Campbell *et al.*, 1993) as means to implement EGB. Apart from green human resource practices that induces green behaviour through mandates and protocols (Anwar *et al.*, 2020), an eco-supportive psychological climate coupled with ethical leadership motivates employees towards green behaviour (Zhao and Zhou, 2019). However, studies have concluded that the green performance is yet to achieve appreciable scores calling for innovative practices. Strategies that tap into employees' deep passion for the environment are particularly effective, eliciting positive emotions such as joy, solace and happiness (Saleem *et al.*, 2021). This necessitates

an interactive and enjoyable framework, leading to the exploration of novel persuasive approaches such as gamification. Subsequent to its introduction in early 2000s (Marczewski, 2013), gamification has gained substantial research consideration with rapid spread to varied domains that could benefit from heightened engagement of the target users (Bassanelli *et al.*, 2022; Gupta *et al.*, 2022). Gamification is defined as the "use of game design elements within non-game contexts" (Deterding *et al.*, 2011, p. 1). From a behaviourist perspective, gamification involves orchestrating a change in behaviour through the implementation of playful experiences (Reiners and Wood, 2015). Predominantly rooted in psychological and behavioural sciences, gamification "rests on three primary factors such as motivation, ability level and triggers" (Dale, 2014, p. 85). Scholars such as Koivisto and Hamari (2019) emphasised the need for gamification to be context-specific, goal-oriented and tailored to specific users. Gamification encourages positive behavioural changes and goal-oriented actions (Schunk *et al.*, 2010) by introducing elements of thrill, challenges, fun, achievement, competition and rewards, making behaviour change engaging and enjoyable.

Several game frameworks have been postulated with wide acceptance among academicians and practitioners – Mechanics, Dynamics and Aesthetics design by Hunicke *et al.* (2004), 6D framework by Werbach and Hunter (2015) and GAME design by Marczewski (2013) to name few prevalent ones. A comprehensive "human-focused" gamification framework called the Octalysis was propounded by Chou (2019). The model considers eight motivational core drives (CD), represented octagonally, that suggestively inspires an individual to complete a desired action ending up with psychological pleasure, emotional fulfilment and sheer fun. The core drives are epic meaning and calling (CD1), development and accomplishment (CD2), empowerment of creativity and feedback (CD3), ownership and possession (CD4), social influence and relatedness (CD5), scarcity and impatience (CD6), unpredictability and curiosity (CD7) and loss and avoidance (CD8). Core drives 2, 4 and 6 deal with "logic" hence are mapped with extrinsic motivation, whereas core drives 3, 5 and 7 are "emotional" and linked with intrinsic motivation.

Positing on "motivational affordances" concept (Zhang, 2008, p. 145), gamification can be tailored to gratify fundamental human needs, in which intrinsic motives energises behaviour through enjoyment promoting "psychological vitality, well-being and growth" (Tang and Zhang, 2019, p. 90) of self and environment. However, indoctrinating EGB through fun and joyful gamified experience remains largely unexplored in the extant literature. This drives us to our next *RQ*:

RQ2. How can a gamified framework potentially resolve the obstinate problem of inculcating EGB in large industrial firms?

Adopting problematisation approach (Alvesson and Sandberg, 2011), we critically examine the pressing issue of integrating green practices within large industrial firms, recognising the growing importance of environmental sustainability. By acknowledging the persisting complications faced by these firms in reducing their environmental impact, we challenge conventional assumptions about the difficulties in adopting sustainable practices (Baig *et al.*, 2020) through gamification. This also addresses the prominent research gap present in the literature which is investigated further by two relevant and aligned *RQs*. The choice of qualitative research method adds depth to the exploration, allowing for an in-depth understanding of the complex issues at hand. The study's adoption of the power sector as a proxy for large industrial firms also aligns with the problematisation approach. We selected power sector for specific reasons. Firstly, the power sector, known for its substantial environmental impact (IEA, 2023), serves as a compelling case study. The power sector is the principal contributor to global GHG emissions accounting for almost 35% of the total

releases. With rising demand for electricity worldwide, it is extremely challenging for this sector to bridle the climate change concern even with decent renewable portfolio mix (Olabi and Abdelkareem, 2022). Concurrently, it needs to achieve circular viability through sustainable business options with critical global mandates and compliance requirements in place (Hossain *et al.*, 2022). The power sector, therefore, is in serious need to strategise for comprehensive greening options.

The present study intends to make the following novel contributions:

Firstly, it reconsiders gamification through the lens of self-efficacy theory within the context of pro-environmental behaviour, providing a novel perspective on motivational strategies. This approach effectively bridges a significant research gap by exploring the potential of gamification as a means to achieve sustainability through the implementation of green behaviour. Secondly, it suggests realistic, cost-effective and enjoyable game mechanics by balancing intrinsic and extrinsic motivations, for inculcating the desired green behaviour without extensive modification of existing skill set of the employees. The model's applicability to the entire organisation attests to its versatility, offering a holistic view of human motivation. Intrinsic motivation improves awareness and helps to understand potential benefits, while external motivation can be boosted through acknowledgement, status and incentives. Lastly, this study carries strong potential to be closely aligned with several Sustainable Development Goals (SDGs) of agenda 2030. SDGs are vital for large manufacturers as they offer a globally accepted framework to address environmental, social and economic challenges. Aligning with SDGs showcases corporate responsibility, enhances operational efficiency and ensures long-term sustainability for a more sustainable and equitable global future.

In the subsequent sections, this paper presents the conceptual framework, followed by the methodology. Next, we present our findings and discussion suggesting a gamified framework as a productive solution. Finally, the conclusion is drawn highlighting both theoretical and practical implications followed by limitations and future research directions.

2. Conceptual framework

Self-efficacy regarding greening refers to an employee's belief concerning his or her ability for successful accomplishment of green task/behaviour and creating positive worth through green initiatives. Researchers have posited that it is crucial in instigating EGB (Ghosh and Haque, 2023), as it affects an employee's choice of activities, level of effort and persistence in completing a particular task. In this study, the rationale of using the Octalysis framework of gamification (Chou, 2019) to influence EGB is grounded on the theory of self-efficacy (Bandura, 1997). The Octalysis framework, developed by Yu-kai Chou in 2012 describes a whole gamification experience through four different phases (discovery, onboarding, scaffolding and endgame) (Chou, 2019). Each of this phase shows a potential to be mapped with the source of information (mastery experiences, vicarious learning/modelling, verbal/social persuasion and emotional/physiological arousal), as well as behavioural consequences (approach vs avoidance, performance and persistence) proposed by self-efficacy theory (Koivisto and Hamari, 2019; Polo-Peña *et al.*, 2021; Chen and Liang, 2022). This integration has been presented through a conceptual framework (Figure 1).

The discovery phase can help to uncover and understand the needs and motives of the employees for tasks related to greening. This phase can enhance employee's self-efficacy for green behaviour through modelling, verbal persuasion and emotional arousal. Modelling is most effective for this stage as confidence in one's own green capabilities is low and familiarity with competent game role models adds thrust and enthusiasm. Verbal

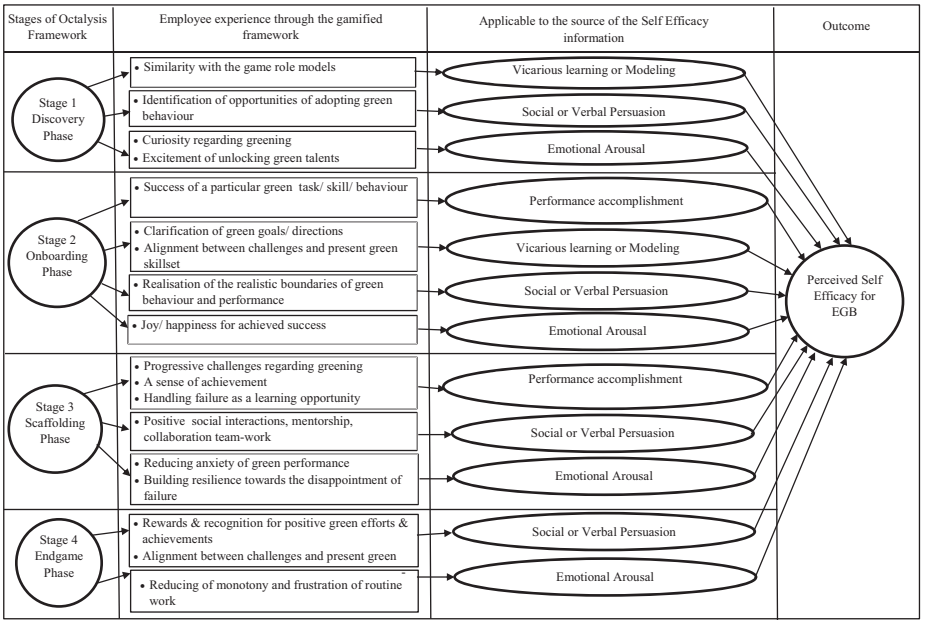


Figure 1.
Conceptual framework

Source: Created by the authors

persuasion can provide the initial inspiration for greening and this stage can also appeal to the employee's emotional arousal creating a sense of intrigue to explore further.

Onboarding phase introduces the employees to the actual experience, assists them through the initial steps and makes them familiar with the specific experience. Indicating performance progress, this stage can expose to enacted mastery of experiences. Achievements or success of peers or colleagues (vicarious learning) provides them with a sense of direction regarding greening together with perceived alignment between the challenges and the current skill sets concerning greening. This stage allows recognition of the realistic boundaries of green behaviour and performance and often persuade the employees to overcome probable challenges to achieve desired outcomes (verbal persuasion). This will not only inspire the employees to believe in their own abilities but also to strive for similar success. The joy of achieved success can boost the confidence in green skills (emotional arousal).

The scaffolding phase provides opportunities to handle progressive challenges and as the employees continue to experience a sense of achievement (mastery of experiences), it helps to develop a resilient sense of self-efficacy which will enable the employees to handle failure as learning experience through the fun element of game. Scaffolding can create a supportive environment to promote positive social interactions and mentorship for greening (social persuasion), which can reduce the anxiety of performance and enhance self-efficacy by providing emotional support for overcoming the disappointment of failure (emotional arousal).

The endgame phase can provide opportunities for positive social comparisons through constructive and reflective feedback (social persuasion). Rewards, recognitions and incentives for positive green efforts can serve as a validation of employee's green

competence and when these rewards and incentives are aligned with employee's intrinsic motivation, they reinforce self-efficacy for greening. Finally, the game experiences filled with fun, variety and excitement help the employees with mental stimulation by providing a break from the monotony of routine work (emotional arousal) and encourages them to think beyond (in this case, greening).

3. Methodology

3.1 Research approach and data collection

This research investigates the challenges faced by large industrial firms in achieving sustainability and their utilisation of gamified frameworks for addressing these challenges. Employing an interpretive qualitative research approach, the study constructs a process model (Langley, 1999) to explore a wide range of challenges and associated mitigation strategies. It integrates empirical findings with sustainability and gamification theories. Multiple case studies were conducted on a sample of 14 large power sector firms. All of these firms are large, resource intensive and follow traditional organisational design. This confirms the precise selection of this sector as a proxy for the large industrial firms. These firms prominently emphasise sustainability in their communications. Initial interactions reveal challenges and a growing adoption of gamified approaches, indicating positive outcomes and opportunities for real-world data collection.

Due to prominent research gap present in the literature, this study adopts qualitative exploratory research design (Jain, 2021). We collected data from semi-structured interviews. Prior to this, we developed themes related to research purpose (Yin, 2009). A total of 65 respondents were approached, out of which 46 agreed to participate in the interview. They belong to different organisational levels, units and designations. All the interviews were conducted either virtually or in physical mode between June 2022 and April 2023. Each interview lasted for approximately 60 min, following which, a debriefing discussion took place before moving on to the next interview (Collins *et al.*, 2013). Two workshops were conducted to validate the findings.

An interview schedule (Appendix 1) was created, drawing on existing research and refined with input from external pilot participants. The guide consisted of ice-breaking, core and closing questions, aiming to uncover challenges and remedial actions taken while adopting green behaviour.

Participants were recruited via a landing page, where they completed eligibility screening and provided consent for data handling, interview termination and recording preferences. Initial contacts targeted senior managers, with additional participants identified using the snowball sampling technique (Kirchherr and Charles, 2018). Appendix 2 contains informant details. To minimise bias, we used the bracketing technique (Janak, 2018). We ensured participant anonymity and data confidentiality, retaining only essential transcription data in accordance with consent protocols (Pascoe Leahy, 2022). Data triangulation was achieved through secondary sources, including archived materials, websites and annual reports (Bans-Akutey and Tiimub, 2021).

3.2 Data analysis

We used the constant comparison analysis method (Kolb, 2012) to explore patterns within our extensive data set of interview transcripts. This iterative approach involved uncovering insights and developing well-grounded frameworks. Our analysis consisted of multiple iterations, examining distinctions and similarities among first-order categories, second-order categories and third-order aggregate dimensions (Magnani and Gioia, 2023). Figure 2 presents the coding tree. The analytical process was structured into stages. Firstly, we

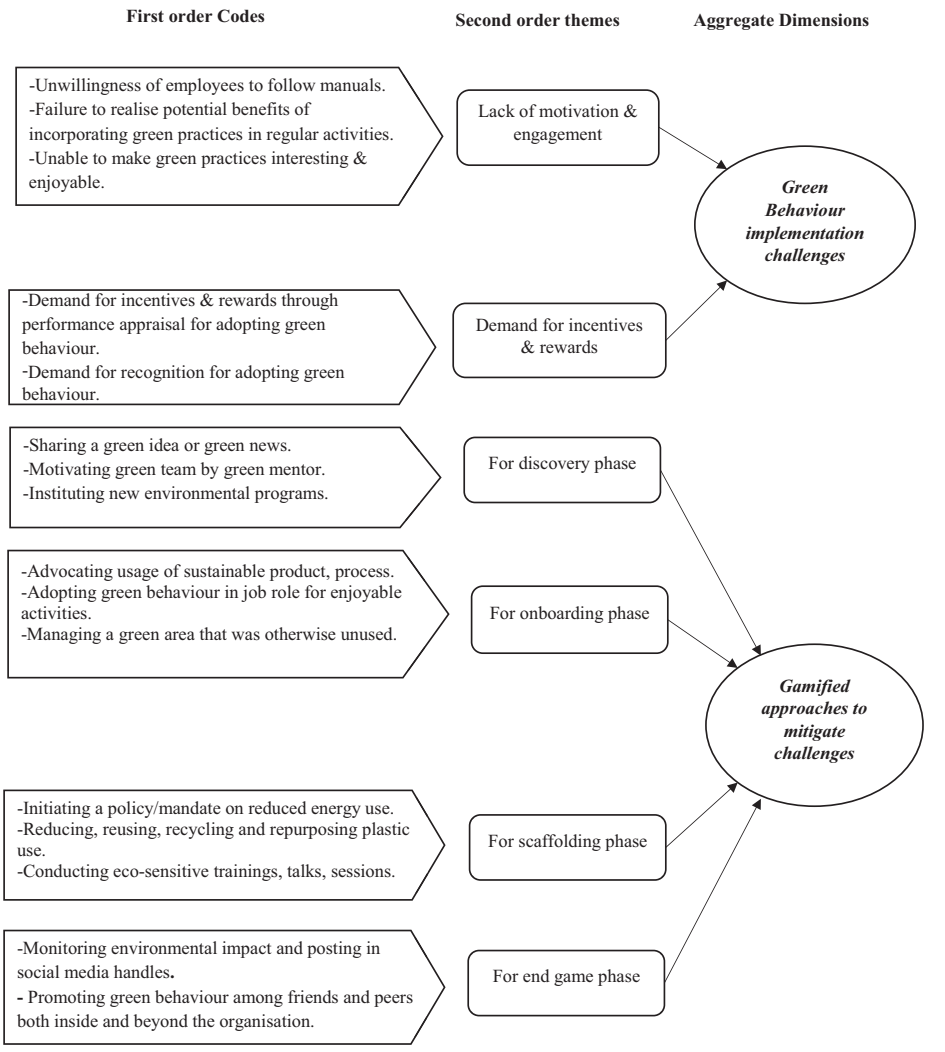


Figure 2.
Coding tree

Source: Created by authors

systematically coded the interview transcripts, converting similar terms, labels and phrases into common codes, forming the first-order categories. We then identified relationships and patterns among these first-order codes, leading to second-order coding. The first-order coding represented specific activities required for fulfilling the components highlighted in the second order. Lastly, we combined related second-order themes to create more abstract aggregate dimensions. In this study, these aggregate dimensions represented challenges and gamified approaches to mitigate those challenges (Gioia *et al.*, 2013). To ensure rigour and reliability, multiple researchers independently

developed the coding tree, resolving disagreements through discussion and modification. Transcripts were referred to for data accuracy validation.

To ensure credibility and reliability, the research adhered to Nowell *et al.* (2017) guidelines. Credibility was maintained by transparently documenting the analysis process and achieving consensus among authors through independent data analysis. Dependability was assured via member-check, soliciting feedback from informants who provided contact information. To enhance findings' applicability, responses from diverse countries were included.

4. Findings

This section provides what types of challenges large firms are facing and how they are implementing various gamified approaches to mitigate such challenges. Following the order of aggregate dimensions in the coding structure, the relevant findings of the research are described below.

4.1 Green behaviour implementation challenges

On the first aggregate level, our sample firms highlight that implementing green behaviour within these firms presents several challenges. These challenges often hinder the seamless adoption of sustainable practices, making it essential to explore and address them. The first type of challenge they confirm is *lack of motivation and engagement* among employees regarding green behaviour adoption. Despite efforts to promote sustainability initiatives, employees often struggle to find sufficient motivation to embrace eco-friendly practices in their daily tasks. This can be attributed to various factors. The firms we studied highlighted that the first issue is *unwillingness of employees to follow manuals*. For example, a deputy General Manager – HRD explains:

> In our organization, we have comprehensive manuals outlining all the dos and don'ts related to adopting green behaviour. However, the reality is, hardly anyone follows them. It's a bit disheartening, but there seems to be a gap between what's written in the manuals and what's practiced on the ground. We need a more effective way to get everyone on board with our green initiatives.

The reason lies in the next first-order challenge. All the firms collectively raise concern that they *failed to make their employees realise the potential benefits* of adopting green practices in regular activities. One Senior Lead – Innovation explains:

> It's been a challenge to truly make them realise these advantages. We believe part of the issue may be the complexity of the power sector and a more tailored approach to convey the significance of these practices in our specific context is essential.

Another aspect highlighted was that the firms find it *difficult to make green practices interesting and enjoyable* for their employees. Employees often find these practices mundane or disconnected from their daily roles, making it challenging to sustain the enthusiasm. This challenge highlights the need for innovative approaches to infuse an element of engagement and enjoyment into green initiatives. One such Internal Consultant highlighted that:

> We've been trying to promote green practices for a while now, but the reality is, it's tough to get our employees excited about them. They often see these practices as additional chores, not something that can be enjoyable. It is like they don't connect with the bigger picture. We need to find a way to make it engaging, maybe even fun, so that they willingly participate and see the benefits.

This sentiment underscores the importance of finding creative and enjoyable ways to integrate green practices into the daily routines of employees.

The firms highlighted another significant challenge in their pursuit of green behaviour adoption – the *demand for incentives and rewards*. Employees, it appears, are often reluctant to embrace eco-friendly practices in their daily job roles without concrete formal incentives. The firms highlighted that mere motivation is not enough, rather tangible rewards are instrumental in driving lasting change towards greener behaviours. Here, one notable issue identified is the *demand for incentives and rewards tied to performance appraisals* for the adoption of green behaviour. Employees are emphasising on external rewards and incentives for greening through performance appraisals. According to one executive HR:

> We've observed that employees are more inclined to adopt green behaviour when it's linked to their performance appraisal, offering the chance for winning incentives and rewards. However, we must balance this with our budget constraints. Incentivizing every single initiative isn't feasible. What we aim for is to cultivate a sense of belonging and intrinsic motivation among our employees. We believe that true sustainability comes when it's an integral part of our organisational culture and not just driven by external rewards.

Another significant issue is *demand for recognition for green activities*. Beyond monetary incentives, employees are increasingly seeking non-monetary forms of recognition, such as acknowledgement, appreciation and accolades, for their green initiatives and contributions. One Senior Manager from HRD explained:

> Employees want to know that their contributions to sustainability are valued. In response, we're actively working on this aspect. We're using innovative ideas to create a culture of appreciation and recognition for green activities. We believe that acknowledging and celebrating our employees' commitment to environmental sustainability will go a long way in fostering a sense of pride and motivation within our organisation.

4.2 Gamified approaches to mitigate challenges

Although firms reported the hurdles faced while implementing green behaviour, they also highlighted certain innovative approaches undertaken by them.

The firms we studied highlighted interesting, innovative gamified approaches which they were trying to adopt as a remedial step for the challenges encountered. The game activities reported, can be effectively clubbed into various phases found in the gamification literature. For an example, firms mentioned that they have some gamified activities for creating awareness, interest and engagement among employees. These activities can be aligned with discovery and onboarding phases. Whereas, firms also talked about another series of gamified approaches which were more elaborate, aimed at balancing extrinsic and intrinsic motivations of employees. These are primarily designed to mitigate the second challenge, i.e. demand for incentives and rewards. The gamified approaches aim to make these habits repetitive and deeply ingrained into employees' job role which they started adopting in the previous phases. Accordingly, two second-order codes had been formed, namely, gamified approaches for scaffolding and endgame phases. Table 1 shows the brief description for first-order coding along with sample interview quotes.

5. Discussion

This section presents a generalised framework, inspired by the Octalysis model, which is applicable not only in the power sector but also in any industrial firms to encourage green behaviour among employees. The Octalysis framework stands out as a practical and superior gamification model due to its human-focused design, aligning well with

First-order codes	Description	Interview quotes
Sharing a green idea or green news	Encouraging employees to share eco-friendly suggestions or significant environmental updates	"*We have this platform where employees can post green ideas or important environmental news. It's like a gamified bulletin board for eco-consciousness*" (Senior Associate Personnel)
Motivating green team by green mentor	Appointing mentors to motivate and guide employees in adopting green practices	"*We've introduced a mentorship program where experienced 'green mentors' inspire and guide teams. It's gamified with points for mentoring*" (Head Innovation and Development)
Instituting new environmental programmes	Launching fresh initiatives or programmes related to environmental awareness and sustainability	"*We frequently roll out new environmental programs, and we often turn them into gamified challenges. It keeps things exciting"* (Senior HR Manager)
Advocating usage of sustainable product, process	Promoting the use of environmentally friendly products or methods	"*We've initiated 'green product advocacy' program, where employees earn rewards for suggesting and using sustainable products*" (Head – Personnel)
Adopting green behaviour in job role for enjoyable activities	Encouraging employees to incorporate green practices into their job roles and make them enjoyable	"*We've gamified the integration of green behaviour into daily tasks. Employees now compete to see who can be the greenest*" (Senior Lead Innovation)
Managing a green area that was otherwise unused	Transforming unused spaces into eco-friendly areas	"*We've converted an unused space into a 'green oasis,' and we've gamified its management. Employees take pride in maintaining it*" (Senior Manager – Personnel)
Initiating a policy/ mandate on reduced energy use	Implementing policies and mandates for reduced energy consumption	"*We've introduced a company-wide policy that rewards departments for reducing energy use. It's become a friendly competition*" (Regional head-Overall Development)
Reducing, reusing, recycling and repurposing plastic use	Strategies to minimise plastic waste through reduction, reuse, recycling and repurposing	"*We've initiated a plastics reduction program. It's gamified, so teams compete to see who can reduce plastic waste the most*" (Senior Project Lead)
Conducting eco-sensitive trainings, talks, sessions	Providing eco-awareness training and sessions for employees	"*We've gamified our eco-sensitivity workshops. Employees earn points for participation and implementing what they learn*" (Area Manager-L&D)
Monitoring environmental impact and posting on social media	Tracking and sharing an individual's environmental impact on social media	"*Our employees monitor their carbon footprint and share their progress on social media, inspiring others*" (Senior Associate HR)
Promoting green behaviour among friends and peers	Encouraging eco-friendly practices among colleagues and acquaintances	"*We've introduced a peer advocacy program where employees inspire each other to adopt green habits*" (Senior Manager – Quality Assurance)

Source: Created by the authors

Table 1. Sample interview quotes for gamified approach to mitigate challenges

motivational psychology (Chou, 2019; Luo *et al.*, 2022). It has intrinsic and extrinsic motivational elements highlighted through its eight core drives. The left-brain core drives, dealing with logic, connect with extrinsic motivation, whereas the right-brain core drives, addressing emotions, are linked with intrinsic motivation (Luo *et al.*, 2022).

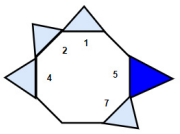
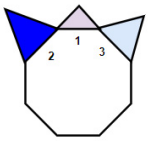
Our case studies reveal that the initial challenges are best addressed through gaming strategies relevant to the discovery and onboarding stages. The discovery phase focuses on sparking employee interest and awareness about environmental issues. This suits both newly recruited employees and also existing employees who need to realise the potential benefits of adopting green practices.

On the other hand, employees who are already motivated to incorporate green practices into their routine should progress through the scaffolding and endgame phases. This allows them to receive rewards, incentives and recognition for their committed efforts, fostering engagement and motivating others in a cyclical manner.

Although the onboarding phase introduces and acclimates employees to sustainable practices, the second set of challenges, revolving around the need for incentives and rewards, is effectively tackled in the scaffolding and endgame stages of the framework. During the scaffolding phase, through structured support and motivation they can continue cultivating green habits. The endgame phase aims to instill a sense of achievement and ongoing refinement in sustainable practices, ensuring continued involvement. This framework strategically aligns specific gaming techniques with each phase, as depicted in Figures 3 and 4, correlating them with sources of self-efficacy, motivational drives and expected behavioural outcomes. Employing this gamified approach, employees can be guided towards adopting green behaviours in a way that is both motivating and engaging.

In any traditional firm, the implementation of this framework that integrates Octalysis principles (Chou, 2019) can effectively use employees' pre-existing skills and experiences to drive green behaviour. This approach recognises the importance of enacted mastery of experience (Bandura, 1997), allowing employees to apply their existing expertise to sustainable practices, thereby reinforcing their confidence and competence. This alignment with their skills encourages an approach behaviour rather than avoidance (Betz, 2000), making them more inclined to engage in green initiatives. In addition, this framework facilitates vicarious learning (Bandura, 1997) by showcasing examples of green behaviour within the organisation. Observing peers or role models successfully engaging in green practices helps employees understand the practical applications and impacts of these behaviours, which motivates their performance and persistence (Betz, 2000) in similar activities. Social persuasion (Bandura, 1997) is another key aspect, where strategic communication emphasises the importance and feasibility of sustainable practices, positively influencing employees' attitudes and encouraging them to engage more actively. Moreover, by triggering emotional arousal (Bandura, 1997) through highlighting the urgent need for sustainability in industrial firms and the potential positive impact of individual actions, employees develop a deeper emotional connection to these initiatives. This emotional engagement drives them to actively approach and persist in implementing green behaviours, motivated by a sense of purpose and responsibility (Klöckner, 2013). Overall, this comprehensive approach helps overcome the inertia typical in traditional settings, fostering a culture of sustainability and environmental responsibility within and beyond the organisation.

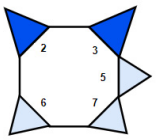
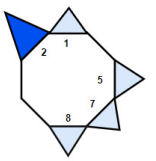
This framework presents a perfect balance of left-brain (logical) and right-brain (emotional) drives, along with intrinsic and extrinsic motivations. This is crucial for large organisations to effectively implement green behaviour. This holistic approach ensures comprehensive engagement across different employee personalities. Left-brain drives cater

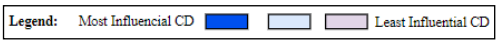
Phases	Game techniques	Octalysis	Behavioural Consequences
Discovery	***Glowing Choice:*** Applying an overlay item that visually guides the players towards desired actions by appealing to their curiosity (CD7) like using a glowing star on the screen to prompt sharing of timely any relevant "green ideas" or "critical green news" (CD2) to create awareness. ***Mentorship:*** A mentor, driven by ownership (CD4), can clock "mentorship hours" within a specified time to motivate his /her mentees (CD5) to participate in prescribed number of eco-sensitive courses/ trainings/ initiatives influencing the community at large. ***Humanity Hero:*** In the capacity of 'savior' of the world, such 'heroes' are emotionally stimulated to make compassionate contribution for 'greater good', like engaging a new team member, the team leader will become a "humanity hero" (CD1) within his team and beyond (CD5).		Approach vs avoidance, performance
Onboarding	***Build from Scratch:*** Implement the "Area Reclamation Challenge" (CD2) for new hires to transform (CD3) an unused space into a vibrant green area, fostering teamwork and creativity. This encourages habitual green actions through engaging activity loops. ***Rockstar Effect:*** Boosts employee pride and optimism by showcasing their earned achievements like a personalised trophy or digital recognition (CD2). This recognition stems from winning a competitive game suggesting transformative innovations (CD3) for a greener, more efficient ecosystem. ***Achievement symbols:*** Implement the "Eco Champion Challenge" (CD1) where employees promote and use sustainable products and processes. They earn points (CD2) for advocating and adopting eco-friendly choices, fostering a culture of sustainability and engagement.		Approach vs avoidance, performance

Source: Created by the authors

Figure 3.
Framework to mitigate lack of motivation and engagement related challenges

to those motivated by tangible rewards, focusing on logical aspects such as ownership and accomplishment. Right-brain drives appeal to emotions, fostering creativity and personal values through elements such as curiosity and social influence. Intrinsic motivations, driven by internal rewards such as recognition and satisfaction, ensure long-term commitment to

Phases	Game techniques	Octalysis	Behavioural Consequences
Scaffolding	***Mystery Box***: Random rewards appear for devising strategies or policies (CD3) to reduce energy usage within organisation and employees can win small/big prizes or reward points by opening a mystery box (CD7), that is alluring with a sense of achievement (CD2). ***Collection sets:*** Incentivizes employees to gather and complete sets of collectibles providing a sense of accomplishment like motivating employees (CD5) to reduce using plastic bottles, boxes, repurpose them with alternative usage like planters for winning performance bonanza (CD6). To promote recycling, drawing competition can be organised to design attractive bins that can appeal most employees. ***Narrative:*** Storytelling (CD3) to convey the value of completing a desired action, addressing the "why" behind achieving the goal. For eco-sensitive training sessions, storytelling approach can be employed where employees share their personal experiences and the positive impact of green practices to win recognition (CD2).		Performance, persistence
End game	***Social prods:*** Leverage social (CD5) and competition to drive green behaviours. Encourage employees to share their green initiatives on social media, competing to get the most likes and shares. The team with the highest engagement wins prizes. This fosters a sense of competition (CD2) and the fear of missing out (CD8), motivating employees to actively participate in eco-friendly activities within and outside the organisation. ***Easter Eggs:*** Unexpected rewards or surprises (CD2) are given out to add excitement. For promoting green behaviour, surprises like "Green Ambassador" (CD1) title can be introduced. Employees who consistently promote eco-friendly practices within and outside the organisation can be suddenly (CD7) rewarded with green bonus. This unexpected recognition adds excitement and encourages ongoing efforts to champion green initiatives.		Persistence



Source: Created by the authors

Figure 4.
Framework to mitigate demand for incentives and rewards related challenges

green practices. Extrinsic motivations offer immediate, tangible incentives for desired behaviours, promoting quick action. This blend not only encourages effective adoption of green behaviours but also fosters a sustained commitment. It also helps in integrating green practices into the organisational culture, making them a norm rather than an

exception. This not only benefits the internal environment but also enhances the organisation's image externally, projecting a commitment to corporate responsibility and environmental sustainability.

This framework would resemble a "serious game" (Miri and Macke, 2022) directed towards achievement of sustainable goals related to employee well-being, affordable clean energy, responsible consumption and production, climate change mitigation and a sustainable flourishing ecosystem for all.

6. Conclusions

6.1 Theoretical implications

Theoretically, our study has contributed to three significant knowledge domains, such as theory of self-efficacy (Bandura, 1997), the gamification conceptual framework (Chou, 2019) and EGB (Ones and Dilchert, 2012). We believe that self-efficacy plays a significant role in increasing employee's motivation and engagement in adopting environment-friendly behaviour (Saleem *et al.*, 2021; Osei *et al.*, 2019; Toth *et al.*, 2020). Significantly, this study has extended the previous research by integrating the theory of self-efficacy into the Octalysis framework to enhance the effectiveness of gamification in designing engaging and motivating experiences for instigating green behaviour (Figure 1).

This study illuminates intricate connections between self-efficacy and Octalysis' eight core motivational drives for eco-responsive behaviour. Self-efficacy influences an employee's sense of purpose for green behaviour (Cai and Lian, 2022), aligning with epic meaning and calling. Octalysis gamified system, with a gradual progression of challenges, moderates the relationship between self-efficacy and greening performance (development and accomplishment) (Wei *et al.*, 2020). Positive feedback mechanisms and creativity expression influence self-efficacy affirmatively (empowerment of creativity and feedback) (Wei *et al.*, 2020). Sense of ownership and control (ownership and possession), strengthens belief and motivation (Kulakow, 2020). Octalysis, incorporating social elements (social influence and relatedness), leverages social influence to enhance self-efficacy. The system creates scarcity, increasing self-efficacy to overcome limitations (scarcity and impatience), fostering patience and persistence (Yu *et al.*, 2023). By presenting novel situations, it builds self-efficacy, increasing motivation (unpredictability and curiosity). The framework highlights negative consequences, motivating employees to pursue affirmative courses (loss and avoidance), encouraging proactive avoidance of undesirable outcomes.

This research adds value to the existing EGB literature through empirical synthesis that emphasises "soft" approaches to green behaviour management (Chen and Wu, 2022). While previous studies have largely underexplored the role of green intellectual stimulation, particularly in unleashing motives related to fun, excitement and accomplishment (Katz *et al.*, 2022; Saleem *et al.*, 2021), this study demonstrates how realistic game techniques, aligned with various motivational drives, can stimulate significant green behaviours among employees, thereby extending the practical application of the green five taxonomy (Ones and Dilchert, 2012).

6.2 Practical implications

Our study not only aligns with theoretical contribution but also present three practical implications through its alignment with sustainability, circularity and scope for policy implementation. Firstly, this study establishes a nexus between diverse challenges and gamified strategies for fostering green behaviour, aligning closely with several SDGs of the 2030 agenda. Specifically, it addresses SDG 9 (Industry, Innovation and Infrastructure) by employing gamification as a technological innovation to tackle sector-specific challenges.

Moreover, it contributes to SDG 12 (Responsible Consumption and Production) by promoting eco-friendly practices and supports SDG 13 (Climate Action) through employee-driven initiatives against climate change. Despite global calls for sustainability, green behaviour remains a "wicked problem" necessitating shared accountability in the contemporary business ecosystem. By balancing intrinsic and extrinsic motivations, gamification emerges as a lively and practical solution, facilitating iteration, experimentation, trial and error, real-time learning and a desperate inner urge to "go green" (Al-Alawneh *et al.*, 2023).

Secondly, this study's findings align directly with the sustainable opportunities inherent in circular economy, which seeks to minimise waste, optimise resource efficiency and establish closed-loop systems. Green behaviour in organisations facilitates capability assessment, evaluating their environmental impact, resource efficiency, waste reduction and sustainability practices. This assessment forms the basis for gauging alignment with sustainable goals, regulatory compliance and areas for improvement. Ecosystem alignment through green behaviour promotes practices harmonious with the environment, fostering sustainable resource management and biodiversity conservation. In terms of value capture viability, organisations benefit from cost savings, enhanced reputation, heightened competitiveness, regulatory compliance, risk mitigation, increased employee engagement, access to new markets, innovation and resilience in the face of environmental challenges.

Finally, by acknowledging the sincere efforts of employees to follow the framework, firms can create a clear policy by integrating it into performance management system and provide recognition, certification, gifts and promotions as intangible and tangible incentives. This not only encourages green behaviour but also establishes a systematic and perceptible way of acknowledging and reinforcing sustainable practices within the organisational structure.

7. Limitations and future directions

This study, centred on the power sector, may require minor customisation for applicability in other industries, considering differences in organisational culture and employee demographics. The effectiveness of the gamified framework could vary, and ethical concerns around potential manipulation in influencing employee behaviour must be considered. Employee receptiveness to gamification also varies, affecting the success of the framework. Future research could explore the framework's effectiveness in different cultural contexts and integrate emerging technologies like virtual reality to further enhance engagement. Addressing ethical concerns, developing metrics for measuring green behaviour and evaluating the economic viability of the framework can be future research directions.

References

Aboramadan, M. (2022), "The effect of green HRM on employee green behaviors in higher education: the mediating mechanism of green work engagement", *International Journal of Organizational Analysis*, Vol. 30 No. 1, pp. 7-23, doi: 10.1108/IJOA-05-2020-2190.

Al-Alawneh, R., Othman, M. and Zaid, A.A. (2023), "Green HRM impact on environmental performance in higher education with mediating roles of management support and green culture", *International Journal of Organizational Analysis*, Vol. ahead-of-print No. ahead-of-print, doi: 10.1108/IJOA-02-2023-3636.

Alvesson, M. and Sandberg, J. (2011), "Generating research questions through problematization", *Academy of Management Review*, Vol. 36 No. 2, pp. 247-271, doi: 10.5465/amr.2009.0188.

Anwar, N., Mahmood, N.H.N., Yusliza, M.Y., Ramayah, T., Faezah, J.N. and Khalid, W. (2020), "Green human resource management for organisational citizenship behaviour towards the environment and environmental performance on a university campus", *Journal of Cleaner Production*, Vol. 256, pp. 1-36.

Baig, S.A., Abrar, M., Batool, A., Hashim, M. and Shabbir, R. (2020), "Barriers to the adoption of sustainable supply chain management practices: moderating role of firm size", *Cogent Business and Management*, Vol. 7 No. 1, p. 1841525, doi: 10.1080/23311975.2020.1841525.

Bandura, A. (1997), *Self-Efficacy: The Exercise of Control*, W. H. Freeman, New York, NY.

Bans-Akutey, A. and Tiimub, B.M. (2021), "Triangulation in research", *Academia Letters*, Vol. 2, pp. 1-6.

Bassanelli, S., Vasta, N., Bucchiarone, A. and Marconi, A. (2022), "Gamification for behavior change: a scientometric review", *Acta Psychologica*, Vol. 228, p. 103657, doi: 10.1016/j.actpsy.2022.103657.

Betz, N.E. (2000), "Self-efficacy theory as a basis for career assessment", *Journal of Career Assessment*, Vol. 8 No. 3, pp. 205-222, doi: 10.1177/106907270000800301.

Cai, J. and Lian, R. (2022), "Social support and a sense of purpose: the role of personal growth initiative and academic self-efficacy", *Frontiers in Psychology*, Vol. 12, p. 788841, doi: 10.3389/fpsyg.2021.788841.

Campbell, J.P., McCloy, R.A., Oppler, S.H. and Sager, C.E. (1993), "A theory of performance", in Schmitt, N. and Borman, W.C. (Eds), *Personnel Selection in Organizations*, Jossey-Bass, San Francisco, pp. 35-79.

Chen, J. and Liang, M. (2022), "Play hard, study hard? The influence of gamification on students study engagement", *Frontiers in Psychology*, Vol. 13, p. 6342.

Chen, T. and Wu, Z. (2022), "How to facilitate employees' green behavior? The joint role of green human resource management practice and green transformational leadership", *Frontiers in Psychology*, Vol. 13, p. 906869, doi: 10.3389/fpsyg.2022.906869.

Chou, Y.K. (2019), *Actionable Gamification: Beyond Points, Badges, and Leaderboards*, Packt Publishing.

Collins, N.R. and Preston, L.E. (1961), "The size structure of the largest industrial firms, 1909-1958", *The American Economic Review*, Vol. 51 No. 5, pp. 986-1011.

Collins, K.M., Onwuegbuzie, A.J., Johnson, R.B. and Frels, R.K. (2013), "Practice note: using debriefing interviews to promote authenticity and transparency in mixed research", *International Journal of Multiple Research Approaches*, Vol. 7 No. 2, pp. 271-284, doi: 10.5172/mra.2013.7.2.271.

Dale, S. (2014), "Gamification: making work fun, or making fun of work?", *Business Information Review*, Vol. 31 No. 2, pp. 82-90, doi: 10.1177/0266382114538350.

Deterding, S., Dixon, D., Khaled, R. and Nacke, L. (2011), "From game design elements to gamefulness: defining 'gamification'", Proceedings of the 15th International Academic MindTrek Conference: Envisioning Future Media Environments, pp. 9-15.

Elkington, J. and Rowlands, I.H. (1999), "Cannibals with forks: the triple bottom line of 21st century business", *Alternatives Journal*, Vol. 25 No. 4.

Gedam, V.V., Raut, R.D., Priyadarshinee, P., Chirra, S. and Pathak, P.D. (2021), "Analysing the adoption barriers for sustainability in the Indian power sector by DEMATEL approach", *International Journal of Sustainable Engineering*, Vol. 14 No. 3, pp. 471-486, doi: 10.1080/19397038.2021.1874072.

Ghosh, A. and Haque, S. (2023), "Can the components of green intellectual capital influence employee green behavior? An empirical analysis on Indian energy sector using the partial least squares method", *Journal of Intellectual Capital*, Vol. 24 No. 3, pp. 632-652, doi: 10.1108/JIC-10-2021-0284.

Gioia, D.A., Corley, K.G. and Hamilton, A.L. (2013), "Seeking qualitative rigor in inductive research: notes on the Gioia methodology", *Organizational Research Methods*, Vol. 16 No. 1, pp. 15-31, doi: 10.1177/1094428112452151.

Gupta, M., Behl, A. and Kumar, Y.L.N. (2022), "Prevention is better than cure: challenges in engaging employees through gamification", *International Journal of Manpower*, Vol. 43 No. 2, pp. 380-394, doi: 10.1108/IJM-03-2021-0172.

Hossain, R., Islam, M.T., Ghose, A. and Sahajwalla, V. (2022), "Full circle: challenges and prospects for plastic waste management in Australia to achieve circular economy", *Journal of Cleaner Production*, Vol. 368, p. 133127, doi: 10.1016/j.jclepro.2022.133127.

Hunicke, R., LeBlanc, M. and Zubek, R. (2004), "MDA: a formal approach to game design and game research", *Proceedings of the AAAI Workshop on Challenges in Game AI*, Vol. 4 No. 1, p. 1722.

International Energy Agency (2023), "CO2 emissions in 2022", IEA, Paris, available at: www.iea.org/reports/co2-emissions-in-2022

Jain, N. (2021), "Survey versus interviews: comparing data collection tools for exploratory research", *The Qualitative Report*, Vol. 26 No. 2, pp. 541-554, doi: 10.46743/2160-3715/2021.4492.

Janak, E. (2018), "Bracketing and bridling: using narrative reflexivity to confront researcher bias and the impact of social identity in a historical study", *Philanthropy and Education*, Vol. 1 No. 2, pp. 82-93.

Katz, I.M., Rauvola, R.S., Rudolph, C.W. and Zacher, H. (2022), "Employee green behavior: a meta-analysis", *Corporate Social Responsibility and Environmental Management*, Vol. 29 No. 5, pp. 1146-1157, doi: 10.1002/csr.2260.

Kirchherr, J. and Charles, K. (2018), "Enhancing the sample diversity of snowball samples: recommendations from a research project on anti-dam movements in Southeast Asia", *Plos One*, Vol. 13 No. 8, p. e0201710, doi: 10.1371/journal.pone.0201710.

Klöckner, C.A. (2013), "A comprehensive model of the psychology of environmental behaviour—a meta-analysis", *Global Environmental Change*, Vol. 23 No. 5, pp. 1028-1038, doi: 10.1016/j.gloenvcha.2013.05.014.

Koivisto, J. and Hamari, J. (2019), "The rise of motivational information systems: a review of gamification research", *International Journal of Information Management*, Vol. 45, pp. 191-210, doi: 10.1016/j.ijinfomgt.2018.10.013.

Kolb, S.M. (2012), "Grounded theory and the constant comparative method: valid research strategies for educators", *Journal of Emerging Trends in Educational Research and Policy Studies*, Vol. 3 No. 1, pp. 83-86.

Kulakow, S. (2020), "How autonomy support mediates the relationship between self-efficacy and approaches to learning", *The Journal of Educational Research*, Vol. 113 No. 1, pp. 13-25, doi: 10.1080/00220671.2019.1709402.

Langley, A. (1999), "Strategies for theorizing from process data", *The Academy of Management Review*, Vol. 24 No. 4, pp. 691-710, doi: 10.5465/amr.1999.2553248.

LaVan, H., Zilic, I. and Basappa, S. (2022), "Attitudes of employees in green companies regarding CSR communication", *International Journal of Manpower*, Vol. 43 No. 6, pp. 1301-1315.

Luo, X., Ono, K. and Watanabe, M. (2022), "Exploring the relationship among user personality, second-hand selling motivation and gamification core drive", *Journal of the Science of Design*, Vol. 6 No. 1, pp. 1_39-1_48, doi: 10.11247/jsd.6.1_1_39.

Magnani, G. and Gioia, D. (2023), "Using the Gioia methodology in international business and entrepreneurship research", *International Business Review*, Vol. 32 No. 2, p. 102097, doi: 10.1016/j.ibusrev.2022.102097.

Marczewski, A. (2013), *Gamification: A Simple Introduction*, Lulu, Raleigh

Mehrajunnisa, M., Jabeen, F., Faisal, M.N. and Mehmood, K. (2022), "Prioritizing green HRM practices from policymaker's perspective", *International Journal of Organizational Analysis*, Vol. 30 No. 3, pp. 652-678, doi: 10.1108/IJOA-12-2019-1976.

Miri, D.H. and Macke, J. (2022), "Gamification, motivation, and engagement at work: a qualitative multiple case study", *European Business Review*, Vol. 34 No. 2, pp. 263-276, doi: 10.1108/EBR-04-2020-0106.

Mujtaba, M. and Mubarik, M.S. (2022), "Talent management and organizational sustainability: role of sustainable behaviour", *International Journal of Organizational Analysis*, Vol. 30 No. 2, pp. 389-407, doi: 10.1108/IJOA-06-2020-2253.

Ndubisi, N.O., Al-Shuridah, O. and Capel, C. (2020), "Greening multinational enterprises in the oil, gas and petrochemicals: environmental sustainability and the moderation role of environmental sensitivity", *International Journal of Manpower*, Vol. 41 No. 7, pp. 967-985, doi: 10.1108/IJM-08-2019-0361.

Nowell, L.S., Norris, J.M., White, D.E. and Moules, N.J. (2017), "Thematic analysis: striving to meet the trustworthiness criteria", *International Journal of Qualitative Methods*, Vol. 16 No. 1, doi: 10.1177/1609406917733847.

Olabi, A.G. and Abdelkareem, M.A. (2022), "Renewable energy and climate change", *Renewable and Sustainable Energy Reviews*, Vol. 158, p. 112111, doi: 10.1016/j.rser.2022.112111.

Ones, D.S. and Dilchert, S. (2012), "Employee green behaviors'", in Jackson, S.E., Ones, D.S. and Dilchert, S. (Eds), *Managing Human Resources for Environmental Sustainability*, Jossey-Bass, San Francisco, pp. 85-116.

Osei, H.V., Agyapong, A. and Owusu Kwateng, K. (2019), "The moderated mediation processes in firm-specific human capital development and task performance relationship", *International Journal of Organizational Analysis*, Vol. 27 No. 3, pp. 396-413, doi: 10.1108/IJOA-11-2017-1274.

Pascoe Leahy, C. (2022), "The afterlife of interviews: explicit ethics and subtle ethics in sensitive or distressing qualitative research", *Qualitative Research*, Vol. 22 No. 5, pp. 777-794, doi: 10.1177/14687941211012924.

Polo-Peña, A.I., Frías-Jamilena, D.M. and Fernández-Ruano, M.L. (2021), "Influence of gamification on perceived self-efficacy: gender and age moderator effect", *International Journal of Sports Marketing and Sponsorship*, Vol. 22 No. 3, pp. 453-476, doi: 10.1108/IJSMS-02-2020-0020.

Reiners, T. and Wood, L.C. ((2015), Eds, *Gamification in Education and Business*, Springer Cham, Switzerland.

Saleem, M., Qadeer, F., Mahmood, F., Han, H., Giorgi, G. and Ariza-Montes, A. (2021), "Inculcation of green behavior in employees: a multilevel moderated mediation approach", *International Journal of Environmental Research and Public Health*, Vol. 18 No. 1, p. 331, doi: 10.3390/ijerph18010331.

Schunk, D.H., Pintrich, P.R. and Meece, J.L. (2010), *Motivation in Education: Theory, Research, and Applications*, Pearson, Upper Saddle River.

Tang, J. and Zhang, P. (2019), "Exploring the relationships between gamification and motivational needs in technology design", *International Journal of Crowd Science*, Vol. 3 No. 1, pp. 87-103, doi: 10.1108/IJCS-09-2018-0025.

Toth, I., Heinänen, S. and Nisula, A.M. (2020), "Personal resources and knowledge workers' job engagement", *International Journal of Organizational Analysis*, Vol. 28 No. 3, pp. 595-610, doi: 10.1108/IJOA-07-2019-1830.

Vivek, C.M., Ramkumar, P., Srividhya, P.K. and Sivasubramanian, M. (2021), "Recent strategies and trends in implanting of renewable energy sources for sustainability–a review", *Materials Today: Proceedings*, Vol. 46, pp. 8204-8208, doi: 10.1016/j.matpr.2021.03.208.

Wei, J., Chen, Y., Zhang, Y. and Zhang, J. (2020), "How does entrepreneurial self-efficacy influence innovation behavior? Exploring the mechanism of job satisfaction and Zhongyong thinking", *Frontiers in Psychology*, Vol. 11, p. 708, doi: 10.3389/fpsyg.2020.00708.

Werbach, K. and Hunter, D. (2015), *The Gamification Toolkit: Dynamics, Mechanics, and Components for the Win*, University of Pennsylvania Press, USA.

Yin, R.K. (2009), *Case Study Research: Design and Methods*, Sage, USA.

Yu, L., Gao, J., Kong, Y. and Huang, L. (2023), "Impact of perceived scarcity on delay of gratification: meditation effects of self-efficacy and self-control", *Current Psychology*, Vol. 43 No. 3, pp. 1-9, doi: 10.1007/s12144-023-04455-x.

Yuriev, A., Boiral, O. and Talbot, D. (2022), "Is there a place for employee-driven pro-environmental innovations? The case of public organizations", *Public Management Review*, Vol. 24 No. 9, pp. 1383-1410, doi: 10.1080/14719037.2021.1900350.

Zacher, H., Rudolph, C.W. and Katz, I.M. (2023), "Employee green behavior as the core of environmentally sustainable organizations", *Annual Review of Organizational Psychology and Organizational Behavior*, Vol. 10 No. 1, pp. 465-494, doi: 10.1146/annurev-orgpsych-120920-050421.

Zhang, P. (2008), "Motivational affordances: reasons for ICT design and use", *Communications of the ACM*, Vol. 51 No. 11, pp. 145-147, doi: 10.1145/1400214.1400244.

Zhao, H. and Zhou, Q. (2019), "Exploring the impact of responsible leadership on organizational citizenship behavior for the environment: a leadership identity perspective", *Sustainability*, Vol. 11 No. 4, p. 944.

Appendix 1. Interview schedule

Inclusion criteria

- Must be an employee working in power sector with long-term experience (at least 7-10 years)
- Must be a decision maker with minimum 5 years of experience at managerial level.
- Must be aware of the challenges of adopting green behaviour in the power sector.

Respondent details

Name (Optional):
Organisation Name:
Current Designation:
Gender:
Age:
Overall Work Experience in power sector:

Ice-breaking questions

- How do define green behaviour among employees in an organisation?
- Do you think that adopting green behaviour is essential for an organisation?

Core questions

- Tell us something about the green behavioural practices in your organisation.
- What challenges do you face while adopting green behaviour in your organisation?
- What remedial actions you have adopted to address such challenges faced?

Closing question

- Is there anything else you would like to include in this discussion?
- Can you recommend someone who could potentially serve as an informant for this interview?
- Are you interested in learning about the findings of this study?

Source: Created by the authors

Appendix 2

# ID	Region	Gender	Age (in years)	Designation	Work experience in power sector (in years)
1	Eastern Asia	Male	43	Senior Associate – HR	8
3	Southern Asia	Male	42	Internal Consultant	10.8
4	Middle East	Male	48	Area Manager – Learning and Development	7.2
7	Europe	Female	51	Senior Manager – HRD	10
8	North America	Female	47	Senior Project Lead	9
10	Southern Asia	Male	45	Senior Associate – Personnel	8
11	Eastern Asia	Female	49	Head – Innovation and Development	7.5
15	Southern Asia	Female	58	Senior Associate – HR	13
18	Middle East	Male	47	Deputy General Manager – HRD	8.5
21	Southern Asia	Male	52	Regional Manager	10.7
23	North America	Female	41	Regional Head – Overall Development	6.9
24	Middle East	Male	54	Manager – Project Planning	12.3
33	Southern Asia	Male	49	Senior Manager – Personnel	9
36	Europe	Male	51	Associate Lead – Quality Control	8
38	Europe	Male	46	Senior Manager – Quality Assurance	8.6
39	Southern Asia	Male	49	Manager – HR	10.5
41	Southern Asia	Female	39	Executive HR	7
43	Southern Asia	Male	49	Head – Personnel	10.2
44	Europe	Female	39	Senior Lead – Innovation	7
46	Southern Asia	Female	41	Senior Manager – Personnel	9

Source: Created by the authors

Table A1. Sample profile of the respondents (20 out of 46 respondents)

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