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# The structural modelling of significant organisational and individual factors for promoting sustainable campus in Saudi Arabia

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**Introduction:** In recent years, campus sustainability has gained global prominence, with a focus on sustainability initiatives and environmental activities within university campuses. This study aims to explore the factors contributing to the expansion of sustainability initiatives in Saudi Arabian university campuses.

**Methods:** The research utilizes the Interpretive Structural Model (ISM) as a framework for public universities. A literature review incorporating rational choice theory (RCT) and organizational change theory (OCT) is conducted to identify variables relevant to campus sustainability. The hierarchical interrelationships among these variables are examined, and the Matrice d'Impacts Croises-Multiplication Appliqué and Classment Analysis (MICMAC) categorize the study variables. Associations between the variables are validated through expert consultations from selected case study institutions.

**Results:** The findings highlight the significance of organizational structure and decision-making processes in determining the prevalence of other sustainability-related variables. Organizational structure and decision-making processes are recognized as key factors exerting significant influence over other variables. Additionally, leadership is categorized as a linkage variable, representing a strong relationship within the hierarchical model.

**Discussion:** The study acknowledges the challenges in implementing sustainability initiatives, including conflicts in strategic planning, absence of campus sustainability policies and regulations, financial barriers, and lack of support from leadership. The study offers valuable insights and recommendations for stakeholders involved in sustainability initiatives within higher education institutions, particularly university leaders and decision makers in facility and project management departments (F&PM). By addressing the organizational and decision-based factors, effective integration of sustainability practices into university planning and activities can be achieved. This research contributes to filling the knowledge gap regarding the factors influencing the implementation of sustainability in Saudi Arabian higher education institutions (HEIs). The study emphasizes the importance of addressing organizational structure, decision-making processes, and leadership in order to successfully implement sustainability practices on university campuses.

## KEYWORDS

campus sustainability, higher education, facility and Project Management (F&PM) department, organisational factors, individual-related factors, organisational change theory, rational choice theory, Interpretive Structural Modelling (ISM)

## 1 Introduction

Over the last 40 years, the notion that human activities and actions have led to harmful effects on environments and ecosystems, including climate change and resource depletion, has provided a growing area of interest and concern for policy makers and academics. Since the first United Nations Conference on the Human Environment—the ‘Earth Summit’—was convened in 1972, sustainable development has become widely acknowledged as a promising approach to fostering sustainability initiatives. Sustainable development emphasises the responsible use of natural resources, production of energy from renewable sources, living within finite resource limits, and reductions in atmospheric greenhouse gases (IPCC, 2014). At this time, the United Nations (UN) also highlighted education as a critical element in addressing the challenge of realising sustainable development approaches, particularly in terms of increasing individual awareness to facilitate involvement towards a low-carbon future. Thereafter, higher education institutions (HEIs) have made efforts to consider sustainability in their daily practices and activities (Velazquez et al., 2006; Michelsen, 2016). This movement has emerged in HEIs largely due to their role as change agents for sustainability (Cortese, 2003; Wright and Horst, 2013) through which they advance societal knowledge and create partnerships with stakeholders (Zutshi and Creed, 2018). Broadening knowledge of and interest in sustainability can lead to transformation for a range of governmental entities and other organisations beyond HEIs (Adomssent et al., 2007). According to Ngo and Trinh (2016), considered that HEIs as the wheel of development on the level of the individual (i.e., in daily practices and users behaviour) and the built environment (e.g., daily operation and construction projects). As a result, Wright (2006) argued that it is both reasonable and logical to encourage HEIs to become leaders in sustainability initiatives.

However, many studies have addressed the challenges of implementing such initiatives, including strategic planning conflicts, a widespread lack of campus sustainability policies and regulations, financial and funding obstacles and a dearth of leadership support. Due to the interdependent nature of key dimensions of sustainability at HEIs, clarification on the nature of these dimensions is essential to recognising gaps in implementing sustainability initiatives. Whereas many HEIs at UK, European, North American and Asian universities have reported successful implementation of sustainability initiatives into their policies and daily practices (Edwards and Naboni, 2013; Leal Filho et al., 2015), others have seemingly stalled in their progress regarding campus sustainability. In fact, for many countries the level of sustainability initiatives at HEIs is still in its early stages and remains widely underreported (Velazquez et al., 2006; Zutshi and Creed, 2018). This appears to be the case for Saudi HEIs. As such, a comprehensive assessment of HEIs in Saudi Arabia for implementing campus sustainability into their planning and activities is generally lacking (Alshuwaikhat et al., 2016). The pursuit of campus sustainability has gained global recognition in recent years, with a focus on promoting sustainable practices and environmental initiatives within HEIs. In the context of Saudi Arabia, this article aims to explore the factors that contribute to the proliferation of sustainability initiatives on university campuses. Specifically, it seeks to identify the organisational and individual-related factors (i.e., organisational structure, culture, leadership and management) that play a significant role in promoting sustainable practices in HEIs in Saudi Arabia.

While previous studies have examined sustainability initiatives in various contexts, there is a dearth of comprehensive research focused on Saudi HEIs. This study aims to fill this research gap by utilising the Interpretive Structural Modelling (ISM) approach to identify and analyse the organisational and decision-related factors that influence sustainability implementation in Saudi campuses. By doing so, it seeks to contribute to the existing body of knowledge by providing insights into the specific factors and their interrelationships within the Saudi Arabian context. Accordingly, the primary research questions of this study are: What are the organisational and decision-related factors influencing the implementation of sustainability practices in Saudi HEIs? How do these factors interrelate and influence the sustainability initiatives on university campuses? By addressing these questions, the study aims to uncover the key elements that contribute to the proliferation of sustainability initiatives and practices in Saudi Arabia's HEIs. To achieve these objectives, this article begins by providing an overview of the significance of sustainability in HEIs globally and within the Saudi context. It then outlines the research questions and aims of the study. Subsequently, it reviews relevant literature on sustainability initiatives in HEIs and the organisational factors that influence their implementation. The methodology section describes the research approach, including the use of ISM as an analytical tool. The article concludes with the presentation and discussion of the study's findings, highlighting the key organisational and individual factors identified and their implications for promoting sustainable practices on Saudi university campuses.

## 2 The sustainable university campus as a notion

The importance of sustainability in higher education is underscored by the urgency of global environmental challenges and the pivotal role that educational institutions play in shaping societal values (Thompson and Green, 2005). According to the Brundtland Report (1987), Higher Education Institutions are influential establishments that ought to actively incorporate the principles of sustainability into their strategies, endeavours, and undertakings, encompassing the frameworks that regulate the functioning of college campuses. Growing concerns pertaining to global warming and climate change, in conjunction with the increasing costs connected to operational activities within campuses, have prompted novel considerations regarding educational and research programs, as well as decisions regarding the built environment of university campuses. Campus sustainability efforts typically aim to increase environmental awareness at universities, with many campuses considering sustainability as a transition on the level of institutional change (Allen, 1999; Allen, 2003). Furthermore, the progress of campus sustainability practices has led many institutions to adopt a broad range of initiatives in their teaching and research activities, to engage university communities and to establish new operations and maintenance approaches (Humblet et al., 2010). Therefore, Goni et al. (2013) highlighted that the integrating sustainability practices into HEI required a coherent planning procedures involves the systemisation and integration of campus activities. According to previous studies the focus were on the most significant areas that should be considered in developing sustainable university campus schemes include (1) education and research, (2) campus physical plant activities, (3)

TABLE 1 Classification for key sustainability dimensions at HEIs (Moganadas et al., 2013).

| Sustainable development dimensions | Current and suggested practices  | Authors   |
|------------------------------------|--|---|
| Environmental                      | <ul style="list-style-type: none"> <li>• Resource management systems (e.g., energy, water, and raw material consumption)</li> <li>• Pollution reduction and recycling activities</li> <li>• Environmental research centres and committees</li> </ul>   | Krizek et al. (2012); Endut et al. (2011); Yen et al. (2010); Newman and Fernandez (2007); Emmanuel and Adams (2011); Mat et al. (2009) |
| Social human measures              | <ul style="list-style-type: none"> <li>• Sustainability-related curricula and courses</li> <li>• Healthy lifestyle programmes for faculty and staff</li> <li>• Healthy and ergonomic work environments</li> <li>• Work-based and lifelong learning programmes</li> <li>• Student government involvement in decision-making processes</li> <li>• Employment of skilled environmental professionals</li> </ul>   | Fien (2002); Ferrer-Balas et al. (2008); Johnston (2007)  |
| Social measures                    | <ul style="list-style-type: none"> <li>• University-wide sustainability change agents</li> <li>• Sustainability-related information and knowledge sharing via media</li> <li>• Student and faculty task forces for education and promotion of campus sustainability initiatives</li> <li>• NGOs and consultant collaborations to anticipate future needs of and demands on graduates</li> <li>• Institutes and projects that ensure equal opportunities and address social issues</li> <li>• Student participation in community and social activities</li> </ul> | Fadzil et al. (2012); Newman and Fernandez (2007); Johnston (2007)  |
| Economic and physical measures     | <ul style="list-style-type: none"> <li>• Green design and construction management procedures</li> <li>• Sustainable transportation systems</li> </ul>  | Newman and Fernandez (2007); Johnston (2007); Fien (2002); Krizek et al. (2012)   |
| Financial measures                 | <ul style="list-style-type: none"> <li>• Green campus loan funding mechanisms</li> <li>• Ethical and life-cycle costing systems</li> <li>• Green purchasing policies</li> <li>• Sustainable and responsible procurement practices</li> </ul>   | Newman and Fernandez (2007); Johnston (2007)  |

community connections, and (4) management and assessment processes (Karatzoglou, 2013; Alonso-Almeida et al., 2015).

In addition, The Brundtland Report (1987) stated that as influential institutions, HEIs should actively integrate sustainability principles into their organisations and activities, including those that govern campus operations (Wang and Ching, 2015). A decade later, UNESCO stated that "...the goal of higher education is to make people wiser, more knowledgeable, better informed, ethical, responsible, critical, and capable of continuing to learn. Education, in short, is to achieve sustainable development" (UNESCO, 1997, p. 40). In response, growing concerns about climate change and the escalating costs of campus operations have led to new conceptualizations of teaching and research programmes as well as the built environments of HEIs. For many HEIs, these emerging concerns have served to promote global sustainable development and increase the awareness of community members about development and environmental challenges (UNCED, 1992).

Despite the complexity that facing transitions towards the integration of environmental sustainability activities and practices in HEIs, the concept encourage researchers, decision-makers and other stakeholders to consider the implementation approaches that can transfer campuses to become more sustainable (Stephens and Graham, 2010). In response, many HEIs have incorporated sustainability initiatives into their strategic plans, educational curricula, research processes and organisational systems (Goni et al., 2013). Here, some of this shift concerns the influence HEIs, due to their size, staff and student numbers, and material consumption, have over their environmental policies, social activities, and actions with respect to

stakeholders at various community levels (de Castro and Jabbour, 2013). Table 1 summarises many current and proposed campus sustainability initiatives across a range of studies.

Humblet et al. (2010) found that establishing sustainability principles at universities requires a focus on resources, energy efficiency and enhancing built environment quality through stakeholder education as well as creating positive living and learning environments that encourage the incorporation of sustainability practices into daily activities. These transitions should aim to reduce both on-campus and off-site environmental impacts and to raise environmental consciousness on university campuses (Creighton, 1998). In sum, Wright (2006) argued that it is both logical and reasonable for universities to become sustainability leaders. Furthermore, the success of sustainability initiatives in HEIs on both individual and organisational determinants. At the individual level, educators, students, and staff play a crucial role. Their beliefs, values, and actions shape the sustainability culture of the institution (Blanco-Portela et al., 2018). Organisational factors, encompassing leadership commitment, policy frameworks, and resource allocation, are equally critical. Universities with visionary leadership, clear sustainability policies, and adequate resources tend to fare better in their sustainability endeavours (Zepeda Quintana et al., 2022). The recent literature underscores the interplay between individual actions and organisational structures. For instance, Karabetyan (2023) highlighted how individual champions, often in leadership roles, can galvanise entire institutions towards sustainable practices. Concurrently, organisational mechanisms, like sustainability committees or dedicated offices, provide the requisite support,

channelling individual energies into institutional achievements (Argento et al., 2020).

In 2015, the international community embraced the 2030 Agenda for Sustainable Development, encompassing the Sustainable Development Goals (SDGs). This comprehensive framework serves as a global roadmap for fostering sustainable development across five interconnected pillars: people, planet, prosperity, peace, and partnership (United Nations, 2015). The SDGs comprise 17 ambitious goals, demanding transformative interventions across economic, social, and environmental dimensions, relevant to both developed and developing contexts (Sachs et al., 2019). The visibility of the SDGs has increased in recent years, and HEIs play a crucial role in supporting their achievement. HEIs have the capacity to engage in sustainability efforts and contribute to various SDGs (Chankseliani and McCowan, 2021). These goals encompass social aspects and address economic aspects, infrastructure, and sustainable practices, including energy (SDG 7), economic growth (SDG 8), sustainable cities (SDG 11), and responsible consumption (SDG 12). Additionally, SDGs cover urgent issues like climate change (SDG 13). Notably, SDG 4, in particular, is closely linked to other goals and aims to ensure providing quality education at all levels, including lifelong learning opportunities and unlocking the transformative potential of knowledge for a more sustainable future (Fonseca et al., 2020).

In relation to campus daily operation, HEIs play a crucial role in promoting sustainable development by adopting green practices such as using renewable energy, improving energy efficiency in buildings, and promoting energy conservation (SDG11; Gui et al., 2021). HEIs are also urged to enhance their solid waste management strategies, which are often overlooked, thereby impeding sustainability (Rimantho et al., 2019). Campuses can strive to reduce their carbon footprint by improving transportation systems within the institution, including travel between and within campuses. This could involve the use of public transportation such as buses and promote carpooling and eco-friendly transportation methods such as cycling and walking (Logan et al., 2020), which could help in reducing carbon emissions and contributing to SDGs like SDG13. Additionally, academic courses can stimulate students to design innovative renewable energy systems for campus use (SDG4; Wang and Guo, 2021).

While the trajectory appears promising, integrating sustainability into higher education is fraught with challenges. Institutional inertia, competing priorities, and a lack of resources often hinder the seamless integration of sustainability principles (Zepeda Quintana et al., 2022). However, one possible explanation for the limited integration of sustainability into mainstream academia and management of HEIs could lie in its inherent complexity. Achieving sustainability necessitates systemic transformation rather than mere adaptation (Lattu and Cai, 2020; Bauer et al., 2021). While any transition to a more sustainable HEI can be challenging, this process does not generally involve 'reinventing the wheel' or making radical changes to existing practices. However, this process does not occur without planning and action, but rather requires commitment, motivation and strategic approaches (Eagan and Keniry, 1998). Moreover, many studies have addressed the challenges of implementing such initiatives, including strategic planning conflicts, a general lack of campus sustainability policies and regulations, financial and funding obstacles and a dearth of leadership support (Ramos et al., 2015; Aasa et al., 2020; Amaral et al., 2020). In this research, the focus will be on exploring the influence of management and decision making aspects

including organisational structure and culture, leadership and management in achieving and implementing sustainability and sustainable development goals.

### 3 Policy and regulation for HEI sustainability initiatives

Beyond national and regional regulations, institutional policies play a critical role. Progressive HEIs are proactively formulating sustainability strategies, often surpassing regulatory requirements. These policies, tailored to the unique context of each institution, emphasise a holistic approach, integrating sustainability into education, research, operations, and community engagement (Ruiz-Mallén and Heras, 2020). While a range of initiatives have contributed to promoting sustainability at HEIs, these must also be enacted as concrete policy to achieve local and regional sustainability targets (Abaza, 2003). Velazquez et al. (2006) found that "a policy leads the aim of the goals and objectives and also the procedures to fulfil the goals." Moreover, Sterling (2004) stated that for any system, 'four Ps'—paradigms, purposes, policies and practical changes—are required for any successful transition. This suggests that university administrators can create paths towards enacting sustainability strategies (Wright, 2004; Velazquez et al., 2006). As a first step, many HEIs have implemented environmental policies in ways that appeal to the morality of university communities (Wright, 2006). Nevertheless, Nomura and Abe (2010) asserted that governments and universities should ground their sustainability discussions in terms of research, education, awareness, operations and funding concerns.

Campus sustainability policies often require government support to succeed (Vaughter et al., 2013). For instance, the Japanese government drafts and supports sustainability policies at its universities, and Swedish government policy has driven most of its sustainability approaches. The UK document *Securing the Future: Delivering UK Sustainable Development Strategy (2005)* is one of that country's primary guides for enacting campus sustainability initiatives, as is its *Sustainable Development in Higher Education (HEFCE, 2005a, 2005b)*, which details strategic positions critical to bringing about campus environmental policies (Shiel and Williams, 2015). Thereafter, in 2009 the UK's Higher Education Funding Council for England (HEFCE) set its HEI carbon emissions reduction targets at 34% by 2020 and 80% by 2050 (HEFCE, 2009). As Shiel and Williams (2015) stated, these targets have helped to focus HEIs policies on sustainability issues and have allowed for an organisational context for environmental initiatives. It is evident that a strategic, policy-driven approach, complemented by effective regulation and institutional commitment, is pivotal in embedding sustainability into the fabric of HEIs.

### 4 Sustainability within Saudi Arabian university campuses

Compared with other global universities, particularly those of developed countries, Saudi HEIs lag somewhat behind in implementing sustainability policies (Alshuwaikhat and Mohammed, 2017). Moreover, to date only limited research on campus sustainability has been conducted in Saudi Arabia, with only three



Saudi campuses currently showing signs of progress. One of these, King Abdullah University of Science and Technology (KAUST), which promotes research in renewable energy and environmental initiatives, has adopted several sustainability initiatives in its operations, including recycling 75% of its building materials, using daylighting and ventilation systems, and building waste composting and recycling systems. As a result, the U.S. Green Building Council's (USGBC) awarded its main academic building a LEED platinum rating.

Abubakar et al. (2016) evaluated student perception and awareness of campus sustainability along three axes: campus operations, community involvement, and curriculum and research. The authors found that despite the considerable knowledge about environmental sustainability found among respondents, participants largely showed little interest and willingness to engage with HEI sustainability initiatives. In terms of curricula, students indicated few examples of integration of sustainability concepts into courses and research activities, and in terms of campus operations, they reported knowledge of sustainability initiatives with respect to transportation and energy and water use programmes but few landscape design and waste recycling practices.

Similarly, Alshuwaikhat et al. (2016) investigated the uptake of sustainability initiatives on Saudi public universities and found that these institutions have been relatively unsuccessful in these efforts, with participating HEIs showing a general lack of commitment to operational practices with respect to reduced energy consumption, resource use and waste generation. For instance, the authors reported that most institutions had yet to employ high-efficiency HVAC and lighting systems and set energy use standards, which suggests that Saudi HEIs require further initiatives to enhance their efficiency and performance. In addition, the authors found that one of the key challenges Saudi HEIs face is securing financial support for campus sustainability initiatives.

Alsharif et al. (2020) carried out a study that reflects the level of recognition and action on the three central sustainability 'pillars' as a strategic priority by facilities and projects management (F&PM) decision makers through the lens of rational choice theory. The study emphasised that F&PM decision makers are considering the cost as a dominant their choices and decisions, alongside other key organisational factors such as leadership and organisational culture. A number of barriers facing the incorporation of sustainability emerged with clarity, such as the lack of supportive leadership, the lack of sustainability knowledge and awareness among senior management and an absence of sustainability-related legislation policy or strategic direction in the HEIs concerned.

## 5 Theoretical perspective

### 5.1 HEIs as a unique organisation

The distinctiveness of university campuses is grounded in their unique management style, organisational structures and operational requirements. In particular, due to the loosely coupled and independently operating academic and administrative divisions of HEIs (Goldman et al., 2004; Lechtchinskaia et al., 2011) and their authority structures and decentralised decision-making approaches (Rabaa'i, 2009; Lechtchinskaia et al., 2011), campus management

approaches are deeply influential in terms of institutional change and transformation. In addition, Pittman (2004) found that the organisational structures of universities are key in effecting change in their activities and performance.

Conversely, Bekessy et al. (2007) found that top-down management approaches at HEIs can be detrimental due to their complex structures and diverse values. However, it remains unclear if bottom-up approaches can deliver campus sustainability initiatives due to the often-shifting cultural values of university communities (Brinkhurst et al., 2011). As a result, a mix of top-down and bottom-up strategies with respect to management approaches and staff and student engagement can hold the potential to deliver campus sustainability initiatives (Lozano et al., 2013; UNEP, 2013).

Moreover, Walton and Galea (2005) found that HEIs can benefit from adapting the best practices of like organisations with respect to management, implementation, and operations, rather than focusing on the differences between HEI and other organisational types. A number of studies concluded that most campus activities explored in the literature were managed by top leaders that could assist in the implementation campus sustainability initiatives (Sharp, 2002; Bolman and Deal, 2008; Wang et al., 2013). To this end, due to the relatively unique structure of HEIs, a broad range of challenges and opportunities exist with respect to sustainability programs, which suggests the importance of understanding the role change actors can play in moving these programs into practice.

### 5.2 Rational choice theory

For this study, rational choice theory (RCT) was employed to better understand the influence on decision makers within F&PM departments have with respect to campus sustainability initiatives. Specifically, RCT was used to investigate the influence of social interactions and the outcomes of individual decisions (Zey, 1997; Scott and Davis, 2007). A primary assumption of RCT is that rational thought processes guide individual decisions and actions (Friedman and Allen, 2011). However, these actions and decisions are also influenced by factors such as knowledge, beliefs, time and structural environment (Voss and Abraham, 2000).

### 5.3 Organisational change theory

As discussed previously, the primary aim of this study is to investigate the organisational factors that affect campus sustainability initiatives. This research focuses on how implementing these initiatives can be influenced by the following factors: decision-making process, organisational structure and culture, leadership, and management and stakeholder participation. According to the organisational change theory literature, investigating the nature of complex organisations is critical in understanding the culture and behaviour of individuals and groups within these organisations. Doppelt (2003) defined organisation as a system comprised of two or more parts, whereby individuals and structures cooperate to shape collective performance. Further, understanding the cultural and structural interactions between organisational components can provide frameworks for organisational change (Kegan and Lahey, 2001; Lozano, 2012; Verhulst, 2012; Verhulst and Lambrechts, 2014). For HEIs, these

individuals and groups often include management, administration, faculty, academic staff, and students.

A variety of components involved in affecting change exist within organisations. Lippitt et al. (1958) classified these components into six elements consistent with organisational change theory:

- Outcomes** including goals and direction;
- History** including causality, motives and context;
- Actors** including their roles and other social dimensions;
- Phases** including sequences and activities;
- Communication** including interactions, culture and sense making; and
- Steering** including guiding, managing and raising awareness.

Moreover, organisational change processes encompass myriad actors operating on multiple levels (Brinkhurst et al., 2011). Thus, transitions towards new states require the analysis of a broad range of assumptions and considerations, including leadership, individual and group relationships, organisational structure and culture, and change management processes (Kuh, 2003). In addition, Verhulst and Lambrechts (2014) highlighted that sustainability initiatives within HEIs require transitional approaches that concentrated on organisational components and processes. Several factors common among HEIs can hinder organisational change, including cultural diversity, lack of accountability, competing power structures and loosely coupled systems (Sharp, 2002). Nonetheless, Fantini (1981, p. 402) notes that organisational change can succeed even under very strong and adverse bureaucratic conditions.

### 5.3.1 Organisational structure and culture

To better understand the unique structures of HEIs, Schiefen (2010) considered them to be hierarchical and functionally structured institutions. However, HEI governance systems are not analogous to business organisations (Tierney, 1999), as campus decision-making processes are often distributed across individuals and groups such as university presidents, vice chancellors and academic staff (Barnett, 2005). Further, the nature of HEI governance systems is broadly acknowledged to affect campus sustainability initiatives. Brinkhurst et al. (2011) emphasised that the governance structures of HEIs pose challenges to promoting organisational change. Moreover, HEIs typically exhibit functional arrangement structures, bureaucracies, high turnover and unclear and widespread responsibilities, all of which suggest complexity in understanding the mechanisms for facilitating sustainability initiatives (Cameron and Freeman, 1991; Breyman, 1999). Finally, Evangelinos et al. (2009) found that an absence of control centres in these systems can further hinder to sustainability initiatives and policies for change.

However, Rogers (2010) found that organisations can adopt new practices within current cultures and thus foster positive perceptions of their organisational environments. Many factors can be considered in moving organisations towards more sustainable practices, including cultural concerns, new technologies, and investments in building performance. At the same time, engagement of organisational communities in these issues can result in reductions in energy, water and waste consumption (Levy and Marans, 2012). Thus, addressing organisational culture is vital in enacting new practices and facilitating organisational change. However, failure can sometimes occur due to disparities between institutional goals and entrenched organisational

mindsets (Adams et al., 2007; Doppelt, 2009). As Cameron and Freeman (1991) and Raimi (2020) maintained that without accompanying cultural change, most organisational changes fail or remain temporary. In addition, Dyer (1986) showed that organisational culture can affect a broad range of factors such as structure, management approach and decision-making processes. Finally, Turner (1986) found that organisational culture can indeed be changed to facilitate campus sustainability policies.

### 5.3.2 Leadership and management approach

Campus leadership and management systems play a critical role in shaping a broad range of the informational, behavioural and emotional attitudes of organisations (Kotler and Armstrong, 2010; Lozano, 2012) as well as their organisational structures and cultures (Creighton, 1998; Blanco-Portela et al., 2017). In the HEI context, complex leadership systems encompass an array of stakeholders, including governing boards, students, faculty and administrative staff. Further, HEIs often exhibit decentralised systems of authority, serve a diverse range of participants and depend on distinct institutional cultures (Birnbaum and Edelson, 1989; Storberg-Walker and Torracco, 2004; Leal Filho et al., 2020) all of which pose formidable challenges for leadership bodies (McRoy and Gibbs, 2009; Leal Filho et al., 2020; Klein et al., 2022; Lozano, 2022). In addition, many campus stakeholders (i.e., academic staff, deans and mid-level managers) can behave in a divided manner when interacting with leadership figures. For example, academic staff typically exhibit greater loyalty to their respective departments than to senior management bodies, particularly with respect to issues of academic freedom and autonomy (Gibbs and Murphy, 2009; Murphy, 2009; Moutsios, 2023). In an organisational change context, the knowledge, skills and capabilities of senior management figures and their ability to enact their visions have increasingly become essential requirements within campus senior management structures (Boyett, 1996; Breakwell and Tytherleigh, 2008; Amaral et al., 2020; Rieg et al., 2021).

Thus, the nature of leadership should not be underestimated in university environments (Ramsden, 1998; Breakwell, 2006; Ghasemy et al., 2023), as accomplishing goals requires leadership figures to inspire confidence and manage uncertainty in their organisations (Jarzabkowski, 2003; van Niekerk and Jansen van Rensburg, 2022), support stakeholders at various levels (Shattock, 2010; Marshall, 2019) and consult academic staff in the process (Ramsden, 1998; Jarzabkowski, 2003). As Allen (2003) stated, the organisational complexity and bureaucracy of HEIs requires leadership capabilities to bring about change with respect to sustainability initiatives.

### 5.3.3 Governance and decision-making system

According to Jones (2007), decision-making is the process of addressing issues or problems by providing alternatives that add value for stakeholders. Harrison (1999) stated that organisational decision-making processes occur “primarily through the basic functions of the manager, which include planning, organising, staffing, directing and controlling.” Hambrick et al. (1996) found that as managers and other decision makers of course possess bounded knowledge and perceptions, this results in limited capabilities that do not allow for the anticipation and management of all outcomes within organisational environments. Moreover, managers generally tend to perceive only a limited range of phenomena in their areas and often do not possess the knowledge or experience to objectively react to these phenomena,

thus basing their decisions mostly on their values, experiences and belief systems (Ambrosini et al., 2009; Finkelstein et al., 2009). Thus, tight schedules often make decision makers more likely to rely on their limited breadth of knowledge and experience, and as decision makers tend to perceive their reality through their prior experience and knowledge, they also use these foundations as a basis for unconsciously evaluating their organisations (Davis, 1993). As a result, organisations develop strategies and policies to help guide decision-making processes, as they are often grounded in bounded rationality.

However, sustainability initiatives should ideally serve to invigorate organisations and change the belief systems and practices of management figures (Waas et al., 2011; Valente, 2015). Thus, incorporating sustainability measures into organisational directives should be encoded within organisational goals and targets and managerial activities (Avery and Bergsteiner, 2011; Ameer and Othman, 2012). This process requires (1) an integration of environmental and social sustainability initiatives within economic and financial decision-making processes, (2) leadership interventions by leadership and establishment of sustainability cultures, and (3) organisational arrangements that support and promote environmental policies (Harris and Crane, 2002; Linnenluecke and Griffiths, 2010; Avery and Bergsteiner, 2011). Such changes can facilitate organisational actions by senior management and can result in longer-term adoption of sustainability initiatives (Wiley, 2007; Avery and Bergsteiner, 2011). Thus, the decisions of governing bodies and organisations are often critical to adoption of sustainability efforts, an attribute that distinguishes them from other organisations (Harrison, 1999).

Embedding sustainability principles into decision-making processes also creates challenges for decision makers, including diverse and wide-ranging interpretations of sustainability principles (Dahl, 2012; Nambiar and Chitty, 2014; Fonseca et al., 2021), which can hinder the adoption of sustainability programs. Accordingly, requiring senior management figures to account for sustainability initiatives into their decision-making processes requires a broad shift from a singular focus on financial considerations (Gladwin et al., 1995; Crane and Ruebottom, 2011; Dyllick and Muff, 2016) to one that considers the social, financial and environmental facets of sustainability programs that take into account a range of stakeholders (Avery and Bergsteiner, 2011; Perrott, 2014).

### 5.3.4 Stakeholder consideration

Generally speaking, complex HEI administrations tend to resist change, as change is often considered a threat to existing institutional culture and practices (Farmer, 1990; Kezar, 2011). However, one of the more successful approaches to enacting sustainability programs at HEIs concerns the participation of a broad range of university stakeholders (Shepard and Johnson, 2009; Vaughter et al., 2013). Indeed, programs that consider only limited stakeholder participation can hinder the enactment of environmental initiatives and can lead to organisational resistance (Evangelinos et al., 2009). As Spira et al. (2013) found, increasing stakeholder involvement in decision-making activities can facilitate the adoption of campus sustainability measures and play a deep role in changing organisational cultures. Conversely, limited or absent participation in these processes can also limit to knowledge of environmental issues and lead to the perception that responsibility for environmental issues does not fall to HEIs (Evangelinos et al., 2009).

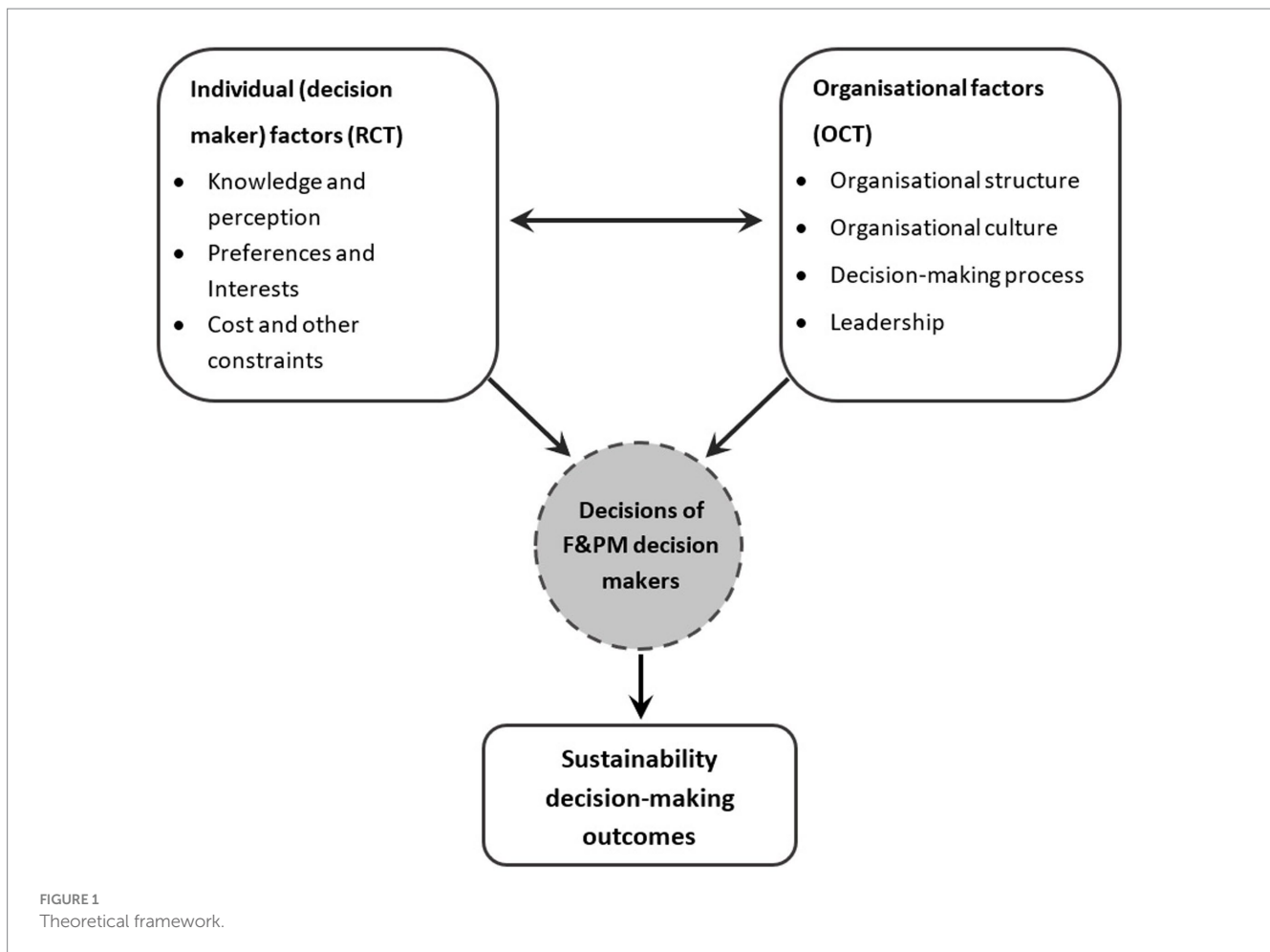
In sum, sustainability-related transitions require changes in both culture and behaviour across a broad range of decision-making structures. As campus administrations typically involve a range of stakeholders (i.e., managers, faculty, administrative staff and leaders), it is often a challenge to forge common purpose across the orientations, shared beliefs, values, and norms of these groups (Hedstrom, 2005; Sharp, 2009).

To investigate the influence F&PM decision makers have on implementing sustainability initiatives in HEIs, this framework incorporates factors related to RCT and organisational change theory. These factors included levels of sustainability knowledge, perceptions and preferences senior administrators on sustainability initiatives, and exogenous constraints on administrators with respect to enacting sustainability programs. In addition, the participants discussed the respective organisational climates of their institutions, which assisted the researchers in identifying the connections across organisational factors (i.e., culture, structure, leadership and management, decision-making processes and stakeholder participation) and in investigating their effects on the implementation of sustainability initiatives, issues that deter sustainability innovation and strategies for optimising organisational cultures.

The ISM approach was also employed to determine the influences of relationships between the identified individuals and organisational factors on implementing sustainability across the case study universities. This method identified and ranked the primary relationships among specific variables, which could facilitate defining their respective levels of influence. The framework was expressed as a diagram (see Figure 1) that highlights the links between and strategies related to each critical organisational factor, which can guide F&PM decision makers in implementing sustainability initiatives.

## 6 Research method

The Interpretive Structural Model (ISM) is a systematic and interactive learning process designed to identify relationships among specific items or issues. In essence, it provides a structured modelling approach that aids in arranging complex sociotechnical systems into well-defined structures. By identifying and structuring variables or elements interconnected within a system, ISM offers a multi-level, interconnected model that depicts the relationships among these elements in a diagraph or hierarchical pattern (Warfield, 1974a). This approach was first proposed by Warfield in 1973 (Warfield, 1974a, 1974b; Sage, 1977) to analyse complex socioeconomic systems. Thus, it can be applied to investigate complex and subjective phenomena. The method is also useful in multilevel research design and for cases in which research outcomes are difficult to predict (Klein and Kozlowski, 2000). The basis of ISM lies in using expert experience and knowledge to decompose complicated systems into sub-systems or elements and to construct multilevel structural models (Warfield, 1976; Anantamula and Kanungo, 2005). The ISM approach was used in this research to identify the relationships between factors with respect to implementing sustainability across the case study universities. This method supports the identification of primary relationships between specific variables, which can help in identifying challenges or issues (Sage, 1977; Charan et al., 2008). This approach can also impose order and direction on the complexity of relationships among variables (Kannan and Haq, 2007). There are various features of this methodology, some of which are given



below (Warfield, 1974b; Kumar et al., 2019; Arantes and Ferreira, 2023; Bianco et al., 2023): (1) ISM is characterised by an interpretive nature, in which a panel of experts deliberates on the connections between variables. (2) ISM concentrates on shared associations to construct a framework for a complex array of dimensions. (3) ISM aids in the modelling of variables and the identification of existing interrelationship structures among them. (4) ISM is not limited to any specific domain but rather exhibits flexibility, as it has been effectively used in various fields including supply chain management, environmental studies, healthcare, and organisational behaviour (Mandal and Deshmukh, 1994). (5) ISM is inherently collaborative, involving multiple stakeholders in the construction of the model. This method ensures a comprehensive comprehension of the system being studied, taking into account different perspectives and areas of expertise (Attri et al., 2013).

As the objective of this study is to explore the interrelationships between organisational and decision-related factors that influence the adoption of sustainability measures for three Saudi HEI case studies. Case study methods allow for the use of a range of data collection and analysis techniques necessary to satisfy the research and data analysis aims (Corcoran et al., 2004; Kyburz-Graber, 2015). A case study-based research design was adopted due to the need to capture a sufficiently broad understanding of the phenomena involved in this context. This method not only facilitated the identification of organisational and human-related factors that affect the implementation of sustainability

practices within Saudi HEIs from the perspective of F&PM departments, but also the determination of relationships between these factors and the confluence of issues associated with Saudi campuses in terms of sustainability.

This method was selected and designed based on the theoretical framework and the study aims and objectives. Focus group participants were selected based on their knowledge of the perspectives of decision makers within F&PM departments in Saudi universities, and they contributed to the exploration of the effect of organisational and human factors on the integration of sustainability principles into mainstream thinking and practice. The researcher acted as the facilitator. Table 2 lists the participants' positions and areas of expertise.

The data were collected from focus group discussions. Focus group approaches are commonly used to capture expert and stakeholder opinions, to obtain knowledge concerning phenomena and to steer discussions (Kitzinger, 1994; Stewart and Shamdasani, 2014). According to Hugé et al. (2016), this technique is also commonly used to collect knowledge concerning participant preferences, opinions, and values, as it enriches the topic under study. However, Kitzinger (1994) maintained that the success of this method depends on the skill of the researcher and the careful selection of study participants. In addition, consideration of the power dynamics between participants during focus group sessions and employing effective session management strategies must be taken into account



TABLE 2 Participants list.

| Cases  | Interviewee code | Position   | Area of expertise       |
|--------|------------------|--|-------------------------|
| Case 1 | 1.1              | Director of sustainability department                    | Architecture            |
|        | 1.2              | Deputy director of sustainability department             | Architecture            |
|        | 1.3              | Director of studies and design department                | Architecture            |
| Case 2 | 2.1              | Director of studies and design department                | Architecture            |
|        | 2.2              | Vice chancellor of facilities and projects               | Mechanical engineering  |
|        | 2.3              | Consultant working with F&PM                             | Construction management |
| Case 3 | 3.1              | General supervisor of facilities and projects department | Mechanical engineering  |
|        | 3.2              | Director of operation and maintenance department         | Civil engineering       |

(Kitzinger, 1994). For this reason, it was necessary to provide an open and welcoming environment during discussions that facilitated unrestricted interaction between participants.

The number of experts and specialists fluctuates in accordance with the specific investigation being conducted, presenting a considerable degree of variation, as evidenced by the range typically falling within the parameters of 5 to 15 individuals (Goyal and Kumar, 2017; Ribeiro et al., 2022; Kaur et al., 2023). In this study, seven participants were involved in focus group sessions of approximately one to one and a half hours. Based on participant preference, Arabic was used in conducting these sessions, as using the native language of participants can assist in obtaining interview data. Ethical concerns were crucial in our approach. Consent was obtained from participants before sessions, ensuring their awareness of the study's purpose, their involvement, and their rights. The study followed strict confidentiality protocols, anonymizing and storing data securely to protect participant identity. According to Merriam (2014), interview data can be obtained in three ways: (1) recording entire sessions; (2) noting the salient information that emerges in sessions; and (3) recalling details from memory post-session. It is worth noting that the third method of recording data is not recommended, as it can be inaccurate. For this study, sections of the sessions were recorded and transcribed, and notes were taken and translated into English. The discussions centred on an ISM protocol and showed a pairwise relationship between identified organisational and human factors (Figure 1). Based on the adopted framework, an ISM methodology was used to analyse the transcript data. This process culminated in the development of an ISM-based model that represented the relationships between the identified factors.

## 7 Results and discussion

### 7.1 Interrelationships between human and organisational elements within HEIs

Organisational components are often interrelated and thus influence the adoption of new systems and practices (e.g., sustainability). For instance, university organisational structures often play an important role in shaping governance and decision-making approaches. This phenomenon is also linked to the influence of leaders and the impact of senior administrators. University culture, including shared values, goals and strategies and how choices and decisions are made can also contribute to realising university goals. Moreover,

stakeholder participation and involvement can influence shifts in organisational culture. Thus, it is essential to identify interconnections and relationships between these organisational components.

In addition, the actions and choices of decision makers could influence the adoption and emergence of new practices (i.e., sustainability) due to other limitations and boundaries such as their beliefs, knowledge, interests, time and budgets. Based on the participant data, the interdependences between organisational variables were identified (see Figure 2). In addition, issues that relate to organisational elements are often internally connected. For example, a lack of sustainability policies and effective leadership within HEIs can lead to challenges in considering sustainability in decision-making processes, as some senior administrators and decision makers struggle with processing such decisions.

### 7.2 The development of influential factors on implementing sustainability across HEIs

The main points were derived from the rational choice theory (RCT) and organisational change theory (OCT) literatures (see Figure 2). These points represent the most influential factors on decision makers within F&PM departments and the organisational factors related to the delivery of plans for the establishment and promotion of campus sustainability. As Figure 2 shows, an interpretive structural methodology was used to identify the relationships between organisational elements, which allowed the researcher to evaluate mutual influences among factors and to map their complex interactions in the decision-making process (Charan et al., 2008). For this study, an interpretive structural model (ISM) was used to develop a model that assisted in identifying and ranking the relationships among factors and defining their level of influence.

#### 7.2.1 Self-interaction matrix

The first step in this process was to identify contextual relationships by developing a structural self-interaction matrix (SSIM), which was based on the results shown in Figure 2. The comparisons of the relationships between variables were derived from the interview data.

When adopting a SSIM approach, in order to define the contextual relationship for each dimension, the existence of the relationship between any two factors (i and j) and the direction of this relationship must be defined (see Table 3). To denote the direction of the relationship between the factors (i and j), four symbols were used:

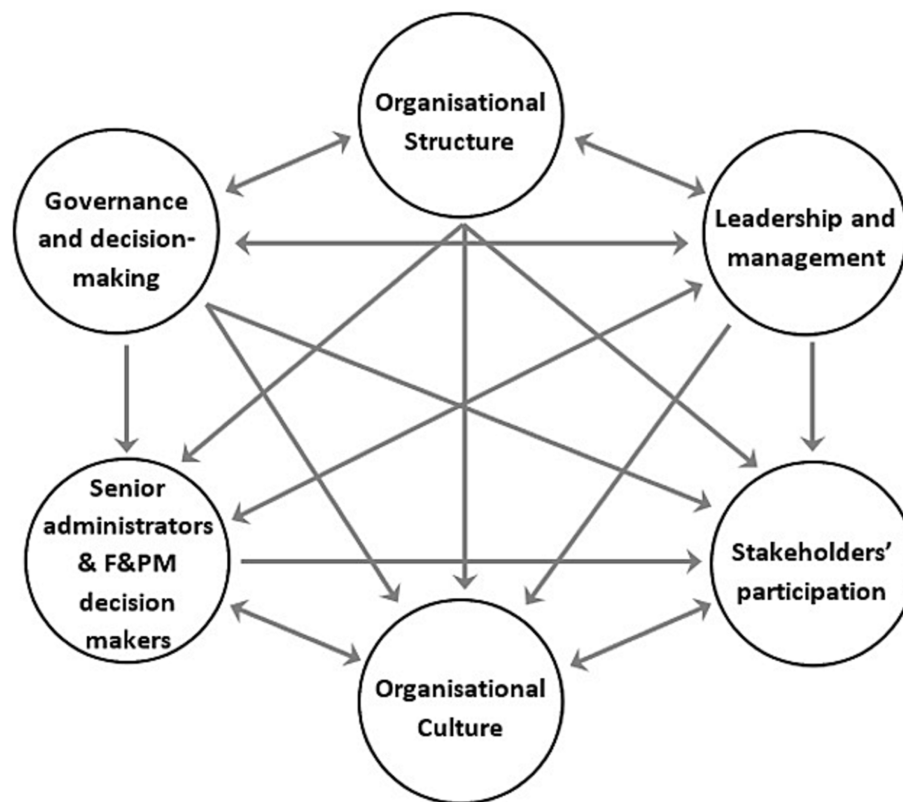


FIGURE 2  
The relationship between organisational elements.

- V: Factor *i* influences Factor *j*;
- A: Factor *j* influences Factor *i*;
- X: Factor *i* and *j* influence each other; and
- O: Factor *i* and *j* are unrelated.

The SSIM then was transformed into a binary matrix called the initial reachability matrix by substituting the symbols V, A, X and O with 1 and 0, respectively per. The rules for the substitution of 1s and 0s follow:

- If the (*i*, *j*) entry in the SSIM is V, then the (*i*, *j*) entry in the reachability matrix becomes 1 and the (*j*, *i*) entry becomes 0.
- If the (*i*, *j*) entry in the SSIM is A, then the (*i*, *j*) entry in the reachability matrix becomes 0 and the (*j*, *i*) entry becomes 1.
- If the (*i*, *j*) entry in the SSIM is X, then the (*i*, *j*) entry in the reachability matrix becomes 1 and the (*j*, *i*) entry becomes 1.
- If the (*i*, *j*) entry in the SSIM is O, then the (*i*, *j*) entry in the reachability matrix becomes 0 and the (*j*, *i*) entry also becomes 0.

The initial reachability matrix for the variables is shown in Table 4. The final reachability matrix for the factors was achieved by incorporating the transitivity of some entries from the pairwise comparisons and some inferred entries (see Table 5). It is important to note that for this matrix, the sum of each row represents the drive power for each factor, or how much each factor can affect other factors. The sum of each column represents the dependent power of each factor, or how much each factor can be affected by the others.

## 7.2.2 Specifying relationships and level partitioning between factors

After the reachability matrix was created, a level partition was conducted to determine the hierarchy of all variables. The reachability and antecedent sets for each variable were then derived from the final reachability matrix (Warfield, 1974a, b; see Table 5). The driving and dependence power of each variable are also shown for this matrix. The driving power of a particular variable consists of the total number of variables (including itself) that it may help to achieve. The dependence is the total number of variables which may help in achieving the variable in question. These driving and dependence values were used in the MICMAC analysis, for which the variables be classified into four groups: autonomous, dependent, linkage and independent.

Table 6 shows that the locations of 'organisational culture' and 'stakeholder participation' were identified at Level I. The top-level factor in the hierarchy would not greatly assist the achievement of any other factors above its own level. The act of separating the other factors is done after the recognition of the top-level factor. The same process is then repeated to discern the next level of variables. This pattern is continued until the levels of each measure are obtained. Both the diagraph and the final model of the ISM are assisted by the recognition of these levels. The results show that 'leadership' and 'organisational structure' are both infrastructure factors and are the most influential factors in adopting sustainability across university campuses at Level III for formatting of ISM based model as clarified from the level partitions for factors, given in Table 5. Thus, these

TABLE 3 Structural self-interaction matrix (SSIM).

| The influential organisational factors       | 1 | 2 | 3 | 4 | 5 | 6 |
|--|---|---|---|---|---|---|
| Organisational structure                     | V | X | V | V | V |   |
| Decision-making approach                     | V | X | V | V |   |   |
| Senior administrators & F&PM decision makers | V | X | X |   |   |   |
| Organisational culture                       | X | A |   |   |   |   |
| Leadership                                   | V |   |   |   |   |   |
| Stakeholders participation                   |   |   |   |   |   |   |

TABLE 4 Initial reachability matrix.

| The influential organisational factors       | 1 | 2 | 3 | 4 | 5 | 6 |
|--|---|---|---|---|---|---|
| Organisational structure                     | 1 | 1 | 1 | 1 | 1 | 1 |
| Decision-making approach                     | 0 | 1 | 1 | 1 | 1 | 1 |
| Senior administrators & F&PM decision makers | 0 | 0 | 1 | 1 | 1 | 1 |
| Organisational culture                       | 0 | 0 | 1 | 1 | 0 | 1 |
| Leadership                                   | 1 | 1 | 1 | 1 | 1 | 1 |
| Stakeholders participation                   | 0 | 0 | 0 | 0 | 1 | 1 |

TABLE 5 Final reachability matrix.

| The influential organisational factors       | 1 | 2 | 3 | 4 | 5 | 6 | Driving power |
|--|---|---|---|---|---|---|---------------|
| Organisational structure                     | 1 | 1 | 1 | 1 | 1 | 1 | 6             |
| Decision-making approach                     | 0 | 1 | 1 | 1 | 1 | 1 | 5             |
| Senior administrators & F&PM decision makers | 0 | 0 | 1 | 1 | 1 | 1 | 4             |
| Organisational culture                       | 0 | 0 | 1 | 1 | 0 | 1 | 3             |
| Leadership                                   | 1 | 1 | 1 | 1 | 1 | 1 | 6             |
| Stakeholders participation                   | 0 | 0 | 0 | 0 | 1 | 1 | 2             |
| Dependence power                             | 2 | 3 | 5 | 5 | 5 | 6 |               |

TABLE 6 Levels of factors.

| The organisational factors                   | Reachability set | Antecedent set | Intersection set | Level |
|--|------------------|----------------|------------------|-------|
| Organisational structure                     | 1,2,3,4,5,6      | 1,5            | 1,5              | III   |
| Decision-making approach                     | 2,3,4,5,6        | 1,2,5          | 1,2,5            | II    |
| Senior administrators & F&PM decision makers | 3,4,5,6          | 1,2,3,4,5      | 1,2,3,4,5        | II    |
| Organisational culture                       | 3,4,6            | 1,2,3,4,5      | 1,2,3,4,5        | I     |
| Leadership                                   | 1,2,3,4,5,6      | 1,2,3,5,6      | 1,2,3,5,6        | III   |
| Stakeholders participation                   | 5,6              | 1,2,3,4,5,6    | 1,2,3,4,5,6      | I     |

infrastructure factors play a crucial role in supporting the ‘decision-making approach’ and ‘senior administrators and F&PM decision makers’ which were placed at Level II. The identified levels assist in building the directed graph and the final ISM framework (see Figure 3).

The ISM model was then built based on the final analysis of variables (see Figure 3) in order to interpret the contextual relationships between the influential organisational factors and their representation in the hierarchy graph. The use of directed graphs, or digraphs, is a common representation technique that is derived

through modelling (Iyer and Sagheer, 2009). Here, the digraph represents the relationships and links among organisational factors with arrows indicating the direction of influence to depict the hierarchical flow of interrelationships among these factors.

### 7.2.3 The MICMAC analysis

This study employed a Matrice d’Impacts Croisés Multiplication Appliquée a un Classment (MICMAC) or Cross-Impact Matrix Multiplication Applied to Classification analysis (Godet, 1986). The MICMAC principle is grounded in using multiplication properties of

matrices (Sharma et al., 1995) to evaluate both driving and dependence power of variables (Mathiyazhagan et al., 2013). For this study, the organisational variables were categorised into four clusters based on driving and dependence power (Mandal and Deshmukh, 1994; Guo et al., 2012):

- **Independent (driving) variables** which have strong driving power and weak dependence;
- **Linkage variables** which have strong driving power and dependence;
- **Dependent variables** which have weak driving power but strong dependence; and
- **Autonomous variables** which have a weak driving power and weak dependence

Figure 4 shows that ‘senior administrator and decision makers’, ‘organisational culture’ and ‘stakeholder participation’ were categorised as dependent variables, as they exhibited a very high degree of dependence but a weak driving power of 2 and 5, respectively. These organisational factors placed at the top and middle levels (II and I) of the ISM hierarchy as the result of the other variables in this system. The model revealed that these factors depend on others (i.e., driving and linkage variables) in order to achieve the adoption of sustainability measures.

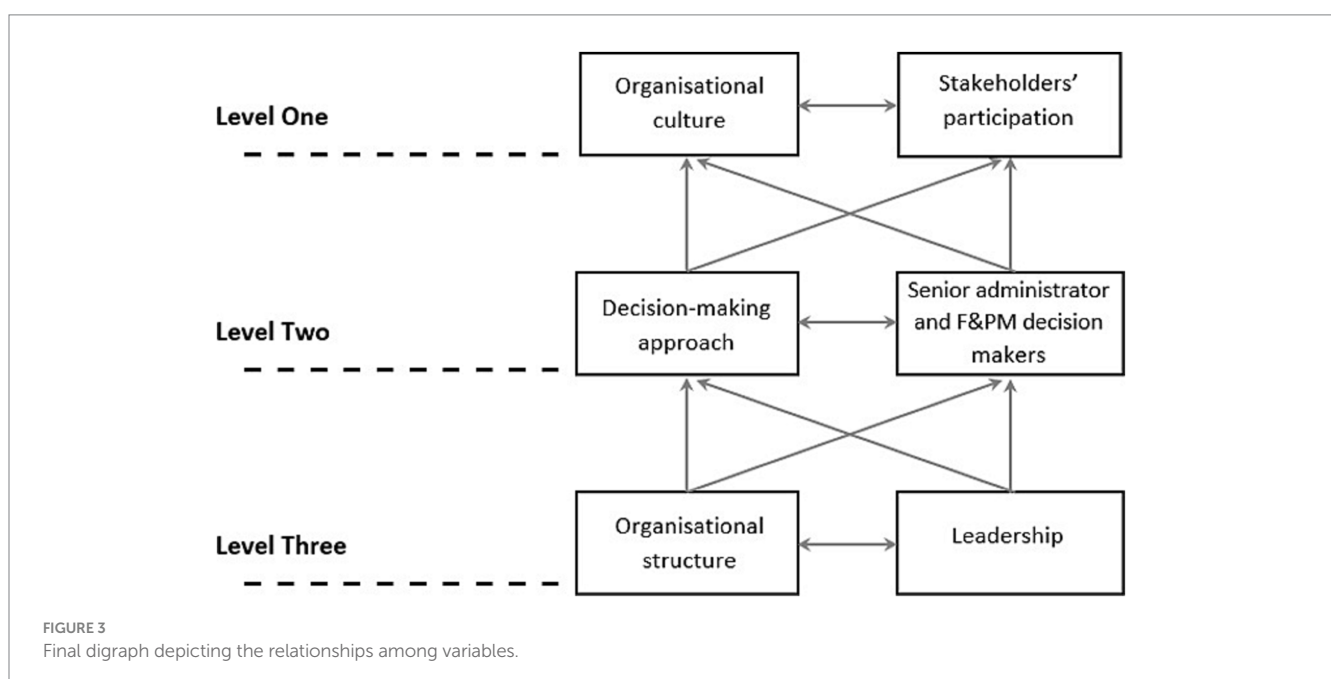
The final reachability matrix (see Table 5) shows that ‘organisational structure’ and ‘decision-making process’ were classified as driving (independent) variables with high driving power but low dependence. Thus, these two variables were considered to be important factors that exert influence on the others and that require immediate attention. It is obvious that ‘organisational structure’ (6) and ‘decision-making process’ (5) have similar driving power and provide a meaningful contribution to encouraging university campuses towards sustainability initiatives. Thus, providing enough room to accommodate sustainability into organisational structure and decision-making process could lead to great strides in implementing sustainability within HEIs.

Moreover, the ‘leadership’ factor fell into the linkage variables category, which suggests that this variable represents a strong linkage element in the model hierarchy due to its high driving and dependence power. Linkage variables are unstable factors, as any action towards these variables has consequences not only for them but also for other variables (Hu et al., 2009; Iyer and Sagheer, 2009). For this study, ‘leadership’ was located in the bottom of the model, with ‘organisational structure’ as a driving variable. This suggests that this variable, along with ‘organisational structure’, has influence over the ‘decision-making process’, ‘senior administrator and decision makers’, ‘organisational culture’ and ‘stakeholder participation’ factors. Moreover, the apparent significance of the ‘leadership’ variable in the model suggests that to implement and deliver sustainability initiatives, it is important for HEIs to introduce sustainability into their organisational culture, provide space within their organisational structures for sustainability, enhance sustainability knowledge and awareness among senior administrators, decision makers and other stakeholders, integrate sustainability into decision-making process, and increase stakeholder engagement and involvement.

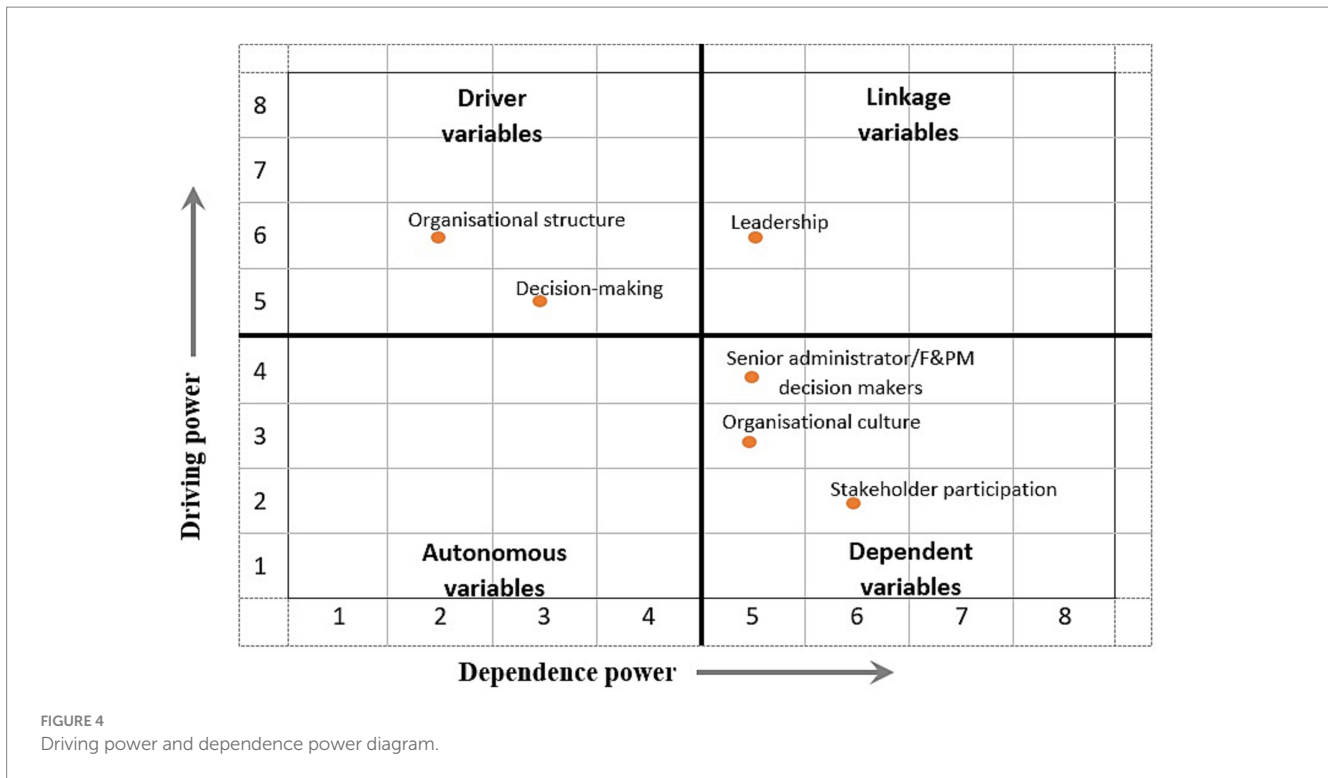
## 8 Research implications

The ISM-based model can assist Saudi university F&PM departments in guiding their implementation efforts. Ideally, these outcomes can provide guidance in encouraging the incorporation of sustainability initiatives into the operation of HEIs. The findings suggest recommendations and strategies relevant for a broad range of university campus structures, and are outlined below.

- Campus sustainability efforts tend to originate from the shared views and interests of a group, and can emerge from a range of disciplines and departments. Therefore, decision makers in







positions within an organisational hierarchy structure often have a high level of influence that can increase sustainability-related practices.

- The model emphasises the importance of the ‘leadership’ factor, as it constitutes a link between various factors in promoting campus sustainability measures. Senior management commitment seems essential in encouraging campus sustainability initiatives and identifying both common and specific modes of communication as well as in considering current communication cultures and preferences.
- Despite preferences and choices, cost is a dominant factor in implementing sustainability at selected case studies. Cost saving benefits of sustainability are recognised, but implementation is often considered prohibitive. Financial issues are challenging for decision makers concerned about sustainability. Opposition to initial costs of sustainable design cannot be overcome, however, supporting a strategic process could provide sufficient financial resources and incentives in terms of sustainability.
- Organisational culture is crucial for promoting campus sustainability. Shifting campus culture requires short-term and long-term strategies, effective leadership, and stakeholder involvement. Advancing awareness, changing behaviour, and engaging stakeholders can be achieved by integrating sustainability into a university’s mission and values.

Thus, the model provides a step-by-step guide to establishing a proper approach to campus sustainability and assists in tackling obstacles that can hinder campus sustainability movements. The study findings can also assist Saudi universities in more effectively prioritising and allocating resources that contribute to the implementation of sustainability initiatives.

## 9 Conclusion

This study explores the influence of organisational and individual factors in integrating sustainability practices into university planning and operations practices in Saudi HEIs. Using an Interpretive Structural Model (ISM) approach based on input from stakeholders in the Saudi university context, the research illustrates the relationships between these factors. The results of the ISM-based model suggest that two factors—organisational structure and decision-making process— influenced the other organisational and human factors. Moreover, the analysis showed that leadership is a crucial factor, as it is presumed to be a link between various factors that relate to both human and organisational variables. Essentially, leadership plays a crucial role in embedding sustainability within the organisational structure and decision-making processes, fostering a culture of sustainability, and promoting sustainability knowledge and awareness among stakeholders. Accordingly, as similar studies have shown, the absence of inspiring leadership and effective communication can contribute to undermining sustainability efforts and implementation at HEIs.

The exploration of decision- and organisation-related factors in an under-researched area has presented challenges in this study. The selection of three case study campuses was intended to allow for in-depth analysis, as opposed to a breadth of inquiry across many cases. The study also contributes to scientific knowledge of understanding the impact of organisational and decision-related elements in HEIs and provides a new framework for designing and implementing sustainability practices on university campuses. Lastly, it introduces a set of guidelines for effective management and policy-making within Saudi Arabian HEIs. However, it is important to note that the scope of this study was to understand the relationships between decision and organisational factors that influence the implementation of sustainability practices in a case study context. Thus, Technical aspects of sustainability

or the integration of sustainability into teaching and research practices were not extensively analysed. Nonetheless, there were references made to technical concerns regarding infrastructure, the local surroundings, applications, technologies, and educational challenges associated with the broader sustainability of the campus. Conversely, the primary emphasis was on exploring barriers in management, decision-making, and organisational factors. These limitations are mitigated to some extent by the study's findings serving as a foundation for further research on sustainability implementation in the context of Saudi Arabian HEIs.

Nevertheless, it is important to interpret these findings cautiously as they were obtained within a controlled research framework and specific timeframe. In terms of the research method, while the use of ISM to illustrate the relationships between decision and organisational factors was successful, it is necessary to be stated that the outcomes reached in this study should be subjected to further generalisation in subsequent studies. These studies could involve comparing different HEIs across various geographic and economic contexts. Furthermore, the findings and limitations of this study lead to recommendations for future research. Firstly, additional research is needed to provide more evidence on key factors such as leadership by examining the organisational environment from different perspectives. A focused study on leadership and interpersonal relationships could contribute to the development of a model for organisational change strategies. Secondly, research is suggested to explore the relationship between leadership strategies for campus sustainability in different countries. Thirdly, there is a need for research on the interactions between stakeholders and different departments within universities to understand their impact on sustainability. Lastly, this study primarily focuses on internal conditions within Saudi HEIs and does not consider external factors and pressures. Future research examining external factors could provide a deeper understanding of campus sustainability.

## Data availability statement

The datasets presented in this article are not readily available to protect the anonymity of the participants. The data was generated for

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the purpose of this research and the participants agreed to take part on the agreement that their names and organizations would remain anonymous. Requests to access the datasets should be directed to [malsharif@bu.edu.sa](mailto:malsharif@bu.edu.sa).

## Author contributions

The author confirms being the sole contributor of this work and has approved it for publication.

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## Conflict of interest

The author declares that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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