

# A Human-Centric Sustainability Framework to Support Organisational Development and Change

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## SUMMARY

This paper outlines initial work conducted to develop a framework covering the human contribution to environmental sustainability. The work draws upon Human Factors (HF) and broader Behavioural Science literature, existing frameworks and the experience of Sustainability experts within Frazer-Nash Consultancy (FNC).

## KEYWORDS

Sustainability, Human Factors, Behavioural Science, Psychology, Ergonomics, Framework

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## Aim

Current sustainability approaches in organisations are largely compliance based and metrics driven. Without integrating human and behavioural factors, these approaches risk being ineffective (Jones, 2020, Dent, 2026). The primary aim of this work is to develop a framework enabling systematic consideration of the human contribution to environmental sustainability. The framework will support organisational assessments currently undertaken by sustainability specialists within Frazer-Nash Consultancy (FNC), based on the observation that such assessments are currently deficient in terms of considering the human component. Application of the framework should improve organisational sustainability whilst continuing to support business objectives.

A secondary intent behind the work is to stimulate further interest and research into the contribution Human Factors (HF) and Behavioural Science can make to undertaking human activity more sustainably. The focus so far has been to bring together relevant factors identified within research and to conduct discussions with Subject Matter Experts (SMEs).

This paper identifies and synthesises human-centric factors required to inform development of the framework. At the time of writing, this work is ongoing as a Private Venture activity within FNC.

## Introduction

Organisations and their workforces are anthropogenically contributing to environmental degradation through direct and indirect human activity (Wu, 2010). This could be through, for example, burning fossil fuels and the release of Green House Gasses (GHGs), and through use of resources leading to deforestation, land use change and water overuse (Wittneben, 2009, Desmoitier, 2025, Mimura, 2013, Trenberth, 2018, Driga, 2019). One outcome of this degradation is climate change/ global warming. If the Earth warms by 1.5C, which it is soon to exceed (Lenton, 2025), a tipping point will be reached resulting in potentially irreversible change to the climate system (IPCC, 2018). As such it is imperative to refocus current business practices and implement

sustainability measures effectively to stay below this critical point (Jørgensen, 2014), whilst allowing for businesses to continue operating successfully (Hoffman, 2007).

A focus on sustainability is essential to mitigate environmental degradation, however; there are also business benefits organisations can reap from prioritising sustainability. Such efforts can lead to increased profits due to lower energy usage and improved operations and enhanced corporate reputation due to growing pressures/ expectations from investors and consumers. They also allow companies to gain a competitive advantage due to being able to anticipate future regulations and targets (Dixon, 2005, Gallego-Álvarez, 2018). These aspects will likely become increasingly important as governments adopt policies to reach net zero targets and implement measures to meet Environmental, Social, and Governance (ESG) goals (UK Government, 2025). Organisations will be required to reduce emissions across the value chain to meet these objectives. Without integrating human and behavioural factors current approaches risk being ineffective (CDP, 2022). This is because they don't currently specify how organisations should facilitate behavioural change, effectively underplaying the human contribution to sustainability. This can lead to a lack of direction or ability to implement sustainable plans that make a real difference.

Whether the focus is direct behavioural intervention or the design of the context in which humans operate, the overall intent is the same; to maximise the potential for the human element to contribute positively to the environmental sustainability of a whole system. In this way integrating Human Science and environmental sustainability together requires only a minor development of the term 'system performance' as referenced by the International Ergonomics Association (IEA) and Chartered Institute of Ergonomics and Human Factors (CIEHF). Core system functions obviously need to be realised; whilst also addressing transversal aspects such as safety, cyber security and now environmental sustainability. One way to achieve this is to incorporate HF and Behavioural Science to support and/or improve sustainable business practices and inform future framework development. It is proposed that HF considers human health and system performance simultaneously (Naeini, 2020) in a manner that can support both sustainability and wider business objectives (Hoffman, 2007).

## **Method**

The work described in this paper represents an exploratory and integrative phase aimed at defining requirements and informing the subsequent development of a human-centric sustainability framework. The methodology adopted for this work is detailed below. It should be noted that further development of the framework, coupled with evaluation involving SMEs and subsequent iteration, will be conducted as part of future work.

## ***Literature Review***

A brief literature review was conducted between October 2025 to February 2026 to identify people related factors relating to sustainability. An appropriate search strategy was carried out to identify and bound a wide evidence base of relevant academic and industry literature. It involved the identification of sources, search term categories and production of a database to compile information. Search strings were constructed using Boolean operators (OR and AND) and other search rules (e.g. quotation marks, brackets). An iterative approach was used, where additional search terms emerged during the search, and using forward and backward citations on key literature. Example search terms included 'Human Factors', 'Behavioural Science', 'Psychology', 'Sustainability', 'Energy', 'Fuel Efficiency', 'Habitat' and 'Pollution'.

### **Subject Matter Expert Input**

In addition to the literature review, input was sought from Sustainability and Environmental Assurance professionals who have experience within a range of sectors (e.g. manufacturing, energy, defence, infrastructure), business units (e.g. procurement, HR). They have experience in creating client specific sustainability frameworks, investigating company's current environmental plans/strategies, and assisting and calculating companies reporting requirements. Interviews and discussions were conducted to provide additional detail to the topics identified from the literature review. They specifically related to identifying people related factors which have played a role within real world sustainability projects, and to fill any gaps in our knowledge. The interview format was loosely based on Early Human Factors Analysis (EHFA). SME engagement will continue in order to evaluate and iterate the framework.

### **Findings**

The potential contribution of HF and Behavioural Science to the design and evaluation of environmentally sustainable systems has been explored by a range of researchers (e.g. Saravia-Pinilla, 2016, Daza-Beltrán, 2020, Bolis, 2023, Thatcher, 2019). The fields of HF and Behavioural Science can contribute knowledge and skills relating to, for example, decision making, cognitive processes, usability, ergonomics and design of interventions. This knowledge can be applied to improve current and future sustainability practices/systems (Flemming, 2008).

Naeini (2020) researched the integration of ergonomics and sustainability, recommending the ErgoSustaiNomics approach, whereby a user centred design approach that is environmentally friendly is used. This work focused specifically on product design with the authors concluding that further research is required to realise and integrate this approach.

The literature review highlighted that there are specific factors that can affect the inclination or ability of people to behave in sustainable ways. This has been the focus within a range of studies, not solely related to organisations and employees. For example, work has been conducted relating to the potential of display technologies to support provision of 'feedback' to system users relating to their use of resources (Harvey, 2013, Pullinger, 2014). A key hypothesis being that enhancing awareness of the implications of one's own usage behaviour will motivate users to behave in a more environmentally friendly way. Also highlighted, however, is that provision of feedback is necessary but not in itself sufficient for bringing about behavioural change as other task/operational objectives often compete with the objective of being sustainable (e.g. getting a vehicle to a destination quickly). This was also identified by Vogel (2017) whereby the flight crew were dissatisfied with a fuel saving application, which reduced their motivation and impacted workload, therefore impacting the crew's ability to make a sustainable choice. This highlights how, even if a product has the potential to enhance sustainability, this potential will not be realised unless users can interact with it successfully. Also noted within Peffer's research (2012) is that whilst programmable thermostats have the ability to reduce energy consumption by up to 15%; in practice savings are often minimal compared to manual thermostats due to user errors and other usability factors (Lockton, 2008).

Choudhary et al (2023) use an adapted version of the Theory of Planned Behaviour (TPB) to illustrate how a range of factors are relevant to bringing about environmentally focussed behavioural change. These include perceived behavioural control, organisational culture/norms and personal beliefs. Communication and norms play a particularly important role, as social normative messaging effectively encourages individuals to change their behaviour via the predicted behaviours of others (injunctive norms) or through observation of actual behaviours (descriptive norms) (Berger, 2019, Mollen, 2016). Both injunctive and descriptive norms have been found to influence multiple areas of sustainable behaviour these being energy consumption (Schultz, 2008),

reducing water usage (Cialdini, 2021), and changing eating behaviours (Jensen, 2019, Thomas, 2017).

The role of leadership, governance and accountability has been researched and identified as an important factor within organisational sustainability (Jones, 2020). Alongside these, other factors have also been identified such as usability of systems or products (Peffer, 2012), cognitive and physical ergonomics (Durugbo, 2013, Naeini, 2020, (Daza-Beltrán, 2026), change management and culture (Ulus, 2016, Jones, 2020), workplace design (Durugbo, 2013), emotions, feelings and attitudes (Thatcher, 2012), communication and engagement (Flemming, 2008) and workload (Vogel, 2017). It should be noted that these factors form part of a complex wider picture and combine/ interact to impact an individual's and organisation's ability to function in a sustainable way.

### **Levels of Implementation**

There are multiple levels at which sustainability can be implemented; government, industry, organisational, and/ or individual (Poore, 2018). Within HF, there are core domains that to a degree reflect these levels; individual, organisation, and job. At an individual level it is important to understand how individuals can be encouraged or 'nudged' to make more sustainable choices. Previous research identifies individual level factors such as visual cues (Durugbo, 2013), cognitive and physical ergonomics (Durugbo, 2013, Naeini, 2020), usability (Peffer, 2012), and attitudes and emotions (Thatcher, 2012). Within the organisational level there has been research on change management (Ulus, 2016), communication (Flemming, 2008), ergonomic design (Daza-Beltrán, 2026), governance and culture (Jones, 2020).

Although it is important to understand each level separately, it should be acknowledged that they are interconnected and can therefore interact to impact behaviour. For example, an individual may have the ability or knowledge to act sustainably but constraints may exist within an organisation which may prevent them enacting this behaviour. These could include financial and resource constraints, supply chain complexities, organisational and cultural barriers, regulatory and external pressures, and/or strategy and governance.

### **Outcomes**

It should be noted that this work is still in progress and as such it is not possible to provide finalised outputs and/ or a fully formed framework at this stage. As part of the current work, initial requirements have been identified. The present analysis highlights the currently identified process, requirements and factors in a provisional manner. This is the first step towards developing the framework, with subsequent iteration and development now needing to take place.

The framework will be constructed around a cyclical process that allows for structure and continuous progress and improvement. This could follow/ mirror current traditional reputable processes such as the NHS healthcare 'Plan, Do, Study, Act' cycles (NHS England, 2023) and change management good practice such as the three-phase cycle (identify, engage and implement). Through the literature, SME discussions and cycles in other domains, there are identifiable phases/ steps/ sections that the framework development can follow or be divided in to.

Table 1: Tentative Cyclical Process with Stages and Example Descriptors

Phase/Step/Section	Description/Detail
Investigate	<p>This is where the context will be identified and ultimately will give the direction of the required input/output.</p> <p>This may include, but not be limited to:</p> <ul style="list-style-type: none"> <li>• Company profile                             <ul style="list-style-type: none"> <li>○ size</li> <li>○ sector</li> <li>○ inputs</li> <li>○ outputs</li> </ul> </li> <li>• Resource                             <ul style="list-style-type: none"> <li>○ Skills</li> <li>○ attitudes</li> <li>○ number</li> </ul> </li> <li>• Business Goals, Aims and Objectives</li> <li>• Current Sustainability Profile                             <ul style="list-style-type: none"> <li>○ Goals, Aims and Objectives</li> </ul> </li> </ul>
Current State (evaluate)	<p>Based on the context, the industry and company specific profile can be understood which will allow us to better understand what measurements are relevant (i.e. an IT consultancy firm will be very different to a product manufacturing facility) During this stage, the current positioning of the company would be evaluated, potentially against maturity levels and identified best practice.</p>
Action and Implement	<p>Following the identified current state, areas of focus can be identified and prioritised. A tailored plan will be developed and implemented against the best practice in Human Factors and Behavioural Science including Change Management.</p>
Monitor and Measure	<p>Based on the implemented changes, specific and tailored KPIs and outcomes can be identified that can be used to monitor and measure success. This will enable an organisation to demonstrate success and to formulate realistic, achievable goals.</p>
Feedback	<p>Following delivery and measuring success, the process will allow for eliciting feedback throughout. On the basis of this, the new context and current measures can be taken and a new plan developed, thereby continuing the cycle.</p>

Within the process there will be specific factors or areas of focus that will be identified and prioritised. A high-level overview of these is provided below, however, the next phase of work will determine how granular those requirements need to be.

Table 2: Tentative Requirements and how these could relate to the tentative process (table 1)

Requirements	Description/Detail	Process Stage
Industry Specifics	<p>Priorities and objectives may vary between industries therefore this may need to be considered, such as, but not limited to:</p> <ul style="list-style-type: none"> <li>• Design Requirements</li> <li>• Policies and Procedures</li> <li>• Systems</li> </ul>	Context

Requirements	Description/ Detail	Process Stage
Best Practice	A potential toolkit or guide for each requirement/ factor that contains HF, Behavioural Science and Change Management activities and measures that are best practice across all domains.	Current State Action and Implement Monitor and Measure
Competencies	There is the potential to develop or use generic and tailored sustainability competency frameworks that contain goals and objectives that are within the employee's core performance profile. The Competence Framework for Sustainability in the Built Environment is an example from the Construction Industry Council (CIC). This embeds sustainability across all roles within design and construction (Edge & CIC, 2025).	Current State Action and Implement Monitor and Measure
Generalisability vs Specificity	Across all identified factors and requirements there will be a need to be able to generalise and bring the framework to all industries. However, it is noted that there will be some requirements that are bespoke to particular industries. These could even vary within companies if different units and roles are explored.	All
Resources	This would likely focus on the resource pool and there will be multiple sub factors under this requirement, these being, but not limited to: <ul style="list-style-type: none"> <li>• Tasks</li> <li>• Workload</li> <li>• SQEP</li> <li>• Skills</li> <li>• Attitudes</li> <li>• Knowledge</li> </ul>	All
Training	This is likely to fall under a couple of the other factors i.e. competencies and resource. However, this is an important requirement to include as it can impact the ability.	Current State Action and Implement
Governance/ Accountability	This includes planning, ownership, responsibility, leadership	Investigate Current State Action and Implement
Awareness and Engagement	The ability to communicate the process and to ensure that the right people are informed and understand the common aims.	Current State Action and Implement Monitor and Measure
Health and Safety	This should be part of a sustainability profile under the social pillar with requirements in relation to, but not limited to: <ul style="list-style-type: none"> <li>• Human exposure to hazards</li> <li>• Social value</li> <li>• Social objectives</li> <li>• Job creation</li> <li>• Quality of working life</li> </ul>	Current State Action and Implement
Feedback Mechanisms	It will be important to put in place processes allowing information to cascade upwards and downwards. This is important to the cyclical nature of the process through which improvements can be made.	Current State Action and Implement Monitor and Measure

Maturity Levels	Maturity levels may be incorporated to allowing for investigation and measurement of the current state and impact of implemented changes. This will act as a benchmarking tool against which what 'good' looks like can be defined also highlighting opportunities for improvement.	Current State Action and Implement Monitor and Measure
Levels	Factors will potentially be organised into specific categories to allow the framework to be easier to use. These could cover organisation, social environment, individual and systems. The granularity of this requirement will be defined within later stages.	All

In relation to tables 1 and 2, there will be specific people related factors that will be categorised. The identified factors have so far been categorised into 'organisation', 'individual', 'system' and 'social'. It should be noted that this is grouping is provisional; how these should be operationally defined will be explored further, along with the required granularity.

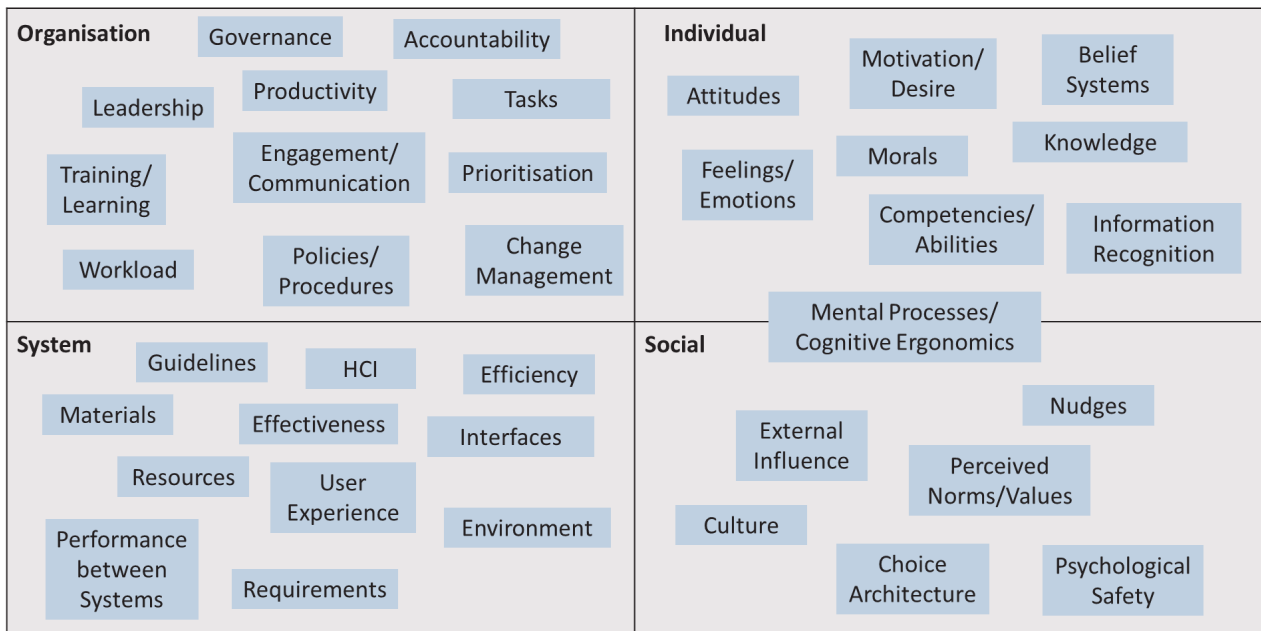


Figure 1: Grouped Factors

**Future Work**

This is a significant ongoing piece of work and is considered to be an important area requiring focus within HF and Behavioural Science, as well as sustainability practice going forward. The above findings will be consolidated into a people-centric framework, which will eventually be integrated into a more expansive framework covering the full range of sociotechnical aspects relating to sustainability. Further questions such as whether it can be carried out as a self-assessment or requires an external independent entity will also be addressed during the future work.

Once developed, the draft framework will be subjected to evaluation by FNC HF, Behavioural Science, and Sustainability and Environmental Assurance practitioners and iteratively refined through use on internal and external projects.

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