



Novel integrated holistic healthy human framework: A special lens on the minerals industry

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Dates:

Received: 24 Mar. 2025

Revised: 27 Jul. 2025

Accepted: 29 Aug. 2025

Published: September 2025

How to cite:

Morar, V., Govender, U., Genc, B., Smith, G.L. 2025. Novel integrated holistic healthy human framework: A Special lens on the minerals industry. *Journal of the Southern African Institute of Mining and Metallurgy*, vol. 125, no. 9, pp. 517–532

DOI ID:

<https://doi.org/10.17159/2411-9717/3701/2025>

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Abstract

This paper presents a novel holistic healthy human framework for C-suite executives and senior leaders in the minerals industry. The value-add of the framework centres around the integration of inner holistic health and interpersonal holistic health to support and enhance environment, social, and governance transformation, with a focus on the social enterprise. The framework unpacks key components of holistic health and their interlinkages to environment, social, governance, and stakeholder engagement. Insights were gleaned from interviews with 10 C-suite executives, each with over twenty years of experience in mining or business leadership. By applying the holistic healthy human framework, industry leaders can strengthen the social licence to operate and positively transform the industry's public image. Broader application to other sectors is underway.

Keywords

holistic health, human transformation, social enterprise, environment, social and governance transformation, systemic approach, minerals industry

Introduction

In today's interconnected world, businesses are increasingly adopting environmental, social, and governance (ESG) principles to achieve sustainability (World Economic Forum, 2022a). Influenced by various stakeholders, organisations are aligning their strategies to operate with a higher purpose beyond financial gains (NJCPA, 2021; World Economic Forum, 2022a).

Significant advancements in ESG have been made, but a systemic approach is essential in order to deliver a robust transformational impact on broader organisations, homes, societies, and the environment at large due to interconnected societal and economic systems (Jackson, 2022). The environmental (E) and governance (G) components have gained traction and are considered critical by organisations in ensuring regulatory compliance and delivering tangible positive impact around managing environmental risks on organisations and economies worldwide (HSBC, 2023). However, the social (S) component has lagged, posing risks not only at the organisational level, but equally at the individual, family, community, and environmental levels (Jackson, 2022; Hunt, 2022; Pelosi, Adamson, 2016; Becchetti et al., 2022; Dewhurst, 2022; Morar, 2023). This is vital, as, for individuals to thrive in their context, they need to foster interconnectedness within their wider ecosystem, which includes their family, organisation, community, and ultimately, the planet. The 'S' component in ESG focuses on social conscience and enterprise, including wellbeing, justice, human rights, diversity, equity, inclusion, belonging (DEIB), and community engagement with a view to forging healthy, sustainable, equitable, and trusting relations with key stakeholders for the wellbeing of people and the planet (Hunt, 2022; World Economic Forum, 2022a). Establishing such strong, healthy and trusting relationships with multiple stakeholders does not happen in a vacuum (Sornett, Wu, 2023). The development of such healthy relationships to effect sustainable transformation at the family, organisational, community, and environmental levels begins at the individual human level, hence the focus on the human being as the conduit to transformation becomes vital (Morar, 2023; Sornette, Wu, 2023; Boaz, Fox, 2014). The World Health Organisation (WHO) defines health as a state of complete physical, mental, and social wellbeing and not merely the absence of disease or infirmity (WHO, 1948). A healthy human, with holistic physical, mental, and spiritual health coupled with dimensions of health and wellbeing that enable healthy, trusting, authentic, and equitable relationships is the foundation of the 'social' in ESG that underpins sustainable stakeholder engagement (Morar, 2023). Moreover, the key areas that encompass the social component of ESG signal a movement towards the whole and away from the single unit, thus raising the profile on a need for a holistic healthy human (HHH) (Morar, 2022; 2023). As such, elevating

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the social enterprise and integrating the 'S' in ESG strengthens the social licence to operate through a holistic healthy human (HHH) at the individual human level and fosters healthy, trusting, and equitable stakeholder relationships (Morar, 2022; Dikgwatlhe, Mulenga, 2023).

The research proposes an integrated framework to understand the holistic elements of a healthy human and the resulting ESG value-add, aiming to help industry leaders build healthy, trusting, and equitable stakeholder relations.

Based on two research questions: "What are the components of a novel integrated HHH framework?" and "What is the value-add of this framework to the minerals industry?", the objectives of this research are to:

1. *Define a healthy human*: Identify the key elements that embody a holistic healthy human (HHH).
2. *Explore linkages*: Understand the systemic interconnections between an HHH at the individual level, and the family, organisation, community, and planetary levels.
3. *Propose a framework*: Develop a novel integrated HHH framework.
4. *Recommend actions*: Provide a call to action with special considerations for the minerals industry.

Unlocking the social enterprise: A movement towards an HHH

The need to balance human aspects with technology, coupled with the impact of the COVID-19 pandemic, along with trends like The Great Resignation, quiet quitting, burnout and the rise and recent scrutiny around diversity, equity, inclusion, and belonging (DEIB), highlights the need for an elevated, integrated, and comprehensive approach to the holistic health and sustainability of human beings (Dewhurst, 2022; Ferrazi, Clementi, 2022; Huffington, Coe, 2022; Morar, 2022; World Economic Forum, 2022a; Morar, 2023). Compartmentalising health aspects is no longer viable (Brassey et al., 2023; Carvalho, 2023; Morar, 2023; Yam et al., 2024).

The movement towards holistic health and wellness in the minerals industry is gaining momentum (Yam et al., 2024). Yam and others (2024), highlighted the mining industry's shift from revenue and safety to include human wellbeing, considering

mental health, bullying, and harassment. Sustainable solutions must support holistic health behaviours, positioning the minerals industry to manage opportunities and threats effectively. As such, while the industry may have had a greater focus on the physical side of health and safety, based on the literature, there is an argument that one should look at more dimensions of health, inclusive of the emotional and spiritual elements. The 'S' elements of the holistic human, such as psychological safety, DEIB, authenticity, social health and justice as well as physical, mental and spiritual health, are foundational to sustainability. This is because they cultivate trusting, inclusive, resilient, and ethically grounded human systems that foster long-term wellbeing, social cohesion, and collaborative action across families, organisations, communities, and the planet (Bechetti et al., 2022; Morar, 2023). In 2022, the top 40 global mining companies reported revenue of USD943 billion (Statista, 2024). By 2029, a 78% increase in market value for sustainable solutions for mineral products is projected (Statista, 2024). As such, by integrating sustainable solutions thinking and practices, companies stand to increase their market value significantly, based on these projections.

Inner holistic health, safety, and wellbeing

Safety is the top value in the minerals industry (Govender et al., 2022). Organisations have embedded safety, health, and wellbeing through initiatives, campaigns, and training (Govender et al., 2022). Post-COVID-19, the focus has expanded to a holistic approach, including mental health, psychological safety, and DEIB, addressing bullying and harassment (Yam et al., 2024).

The COVID-19 pandemic highlighted the importance of mental and emotional health, which remain a top priority (Greenwood, Anas, 2021; Dewhurst, 2022; Morar, 2022; World Economic Forum, 2022a; Morar, 2023; Wong, Greenwood, 2023). The WHO (2023), defines mental health as the state of wellbeing in which an individual realises his or her abilities, can cope with the normal stressors of life, can work productively and fruitfully, and can contribute to his or her community. Furthermore, the NIH defines emotional wellness as handling stress and adapting to change (Carvalho, 2023). Stressors like burnout and depression, exacerbated by toxic workplace behaviours, demand a holistic health approach (Carvalho, 2023).

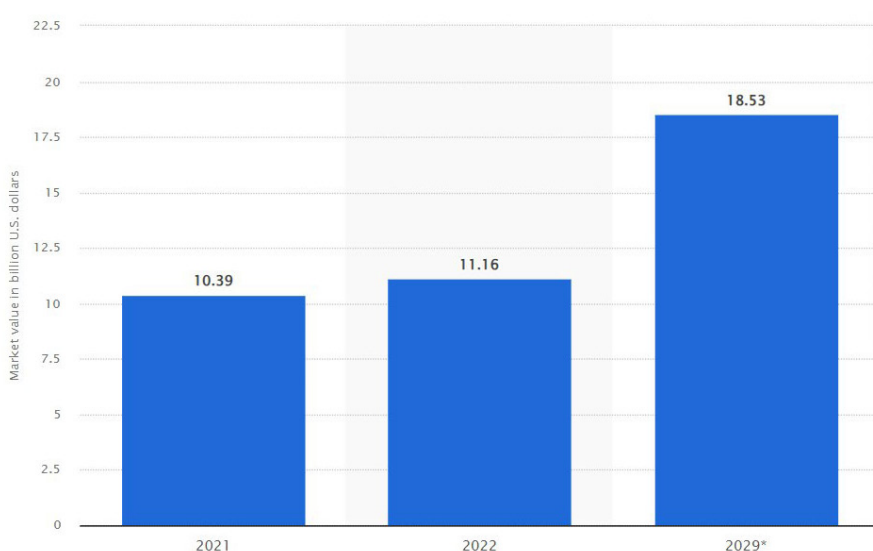


Figure 1—Predicted increase in investment in sustainable solutions for mineral products (Statista, 2024)

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A 2023 McKinsey survey identified job demands and lack of DEIB as key stressors. Enablers of holistic health include psychological safety, meaningful work, self-efficacy, adaptability, belonging, and authenticity, supporting positive development and the need to transform to a new world of work (Burns, Coe, 2022; Dewhurst, 2022; Allamano, 2023; Brassey et al., 2023).

The pandemic and The Great Resignation heightened the focus on spiritual health, as many individuals experienced an epiphany and sought meaning and purpose (Coleman, 2022; Morar, 2022, 2023; Brassey et al., 2023). Spiritual health, encompassing integrating meaning and purpose in life and work and connecting to something greater, reduces burnout by fostering hope, honesty, trust, organisational commitment, creativity, and productivity (Akbari, Hossaini, 2018). Moreover, it supports mental, physical, and social health, and helps regulate emotions (Akbari, Hossaini, 2018, Coppola et al., 2021; Coleman, 2022; Morar, 2022, 2023; Brassey et al., 2023).

Trust and sustainable relationships

Sustainable transformation through the 'S' component of ESG relies on trust, built on transparency, honesty, ethics, and integrity. Trustworthiness and a good reputation are earned by treating stakeholders well, delivering quality products or services, and engaging authentically with stakeholders (Deloitte, 2020b). This is essential for healthy, strong, and equitable relationships (Deloitte, 2020a).

Reference to the 'trust deficit' in the mining industry has been made by Rohitash Dhawan, CEO and President of the International Council on Mining and Metals (ICMM) in an online podcast (Dhawan, Sutton, 2025). This reference is being made in relation to a survey and report carried out on business and society across 32 markets by GlobeScan in 2023, which included customised questions for the ICMM. The survey sought to glean insights into how people feel about the contributions of mining and metals and whether they believe the industry fulfils its responsibility to society. Functioning as a close proxy to perceptions of trust in the sector, the research highlighted that, while there is year-on-year improvement and progress of these perceptions in mining over the past few years, this progress is not fast enough, with the mining industry still at the bottom of the 18 sectors that were assessed on this metric. This highlights that poor perceptions of the mining industry insofar as fulfilling its responsibilities to society still prevail (GlobeScan, 2023).

Interpersonal holistic health, safety, and wellbeing

An individual's social health and wellbeing is crucial for building trusting relationships with others and supports better mental and emotional health (Sinclair, 2021; Brassey et al., 2023). It also enhances connection, collaboration, and co-creation at the organisational, societal, and community levels (Sinclair, 2021). In the minerals industry, building transparent, authentic, equitable, and trusting relationships with stakeholders, especially indigenous communities, is key to social health and gaining a social license to operate, a material ESG risk (Leonida, 2022). The COVID-19 pandemic highlighted social inequalities, pressuring organisations to drive social equality. Trusting relationships are built on reciprocity, teamwork, collaboration, and bridging (Sinclair, 2021; Brassey et al., 2023; Leonida, 2022; Becchetti et al., 2022).

An HHH fosters strong, healthy and equitable relationships based on trust and integrity when one feels comfortable and secure to be one's authentic self (Collard, 2022; Zivkovic, 2022; Morar,

2023). Authenticity nurtures psychological safety, encouraging vulnerability and open communication (Edmondson, 2022; Cecchi-Dimeglio, 2023; Gallo, 2023). This positively impacts stakeholder perceptions of sustainability and corporate social responsibility (CSR) initiatives, enhancing emotional commitment, trust, employer attractiveness, and employee engagement (Kim, Lee, 2022).

Psychological safety, as defined by Edmondson (1999), is the belief that one can speak up without fear of punishment or humiliation. It fosters an environment of low interpersonal fear, encouraging candour and vulnerability, especially when admitting mistakes (Edmondson, 2022). This promotes learning, innovation, and inclusion (Edmondson, 2022). Coetzee et al. (2023) add that psychological safety allows individuals to share improvement ideas without fear of negative repercussions. In healthcare, it influences patient safety, collaboration, and quality improvement (Ito et al., 2022). Overall, psychological safety enhances holistic health and wellbeing through open communication, trust, inclusion, engagement, and stress reduction.

Embracing diversity, equity, inclusion, and belonging (DEIB) moves beyond valuing uniform ideas and demographics (Dillon, Bourke, 2016; Bourke, Dillon, 2018). DEIB enables families, organisations, communities, and environments to embrace diverse, equitable, and inclusive perspectives, talents, markets, and customers (Dillon, Bourke, 2016; Bourke, Dillon, 2018; Korn Ferry, 2021). At the core of DEIB is promoting respectful, fair, and ethical practices and protecting individual rights (Financial Times, 2022; Livingston et al., 2022). Studies show the link between DEIB and holistic health, where discrimination, exclusion, bullying, and harassment lead to stress and illness (Livingston et al., 2022; Davis, 2024; Kocher et al., 2024). Integrating DEIB with health strategies can unlock holistic health, enhancing wellbeing and performance (Livingston et al., 2022; Maese, Lloyd, 2022; Kocher et al., 2024).

The systemic relationship between holistic healthy humans (HHH) and a healthy family, organisation, community, and planet

Fundamental shifts in sustainability at all levels require an appreciation of the systemic interconnectedness of components at an individual level (Mato-Juhas et al., 2016; Jackson, 2022; Allamano, 2023; Sornette, Wu, 2023). Deeper insight into the interconnectedness of HHH at the organisational and societal level ('S') and the health of the environment ('E') with governance principles ('G') is needed.

Coetzee et al. (2023) proposed a Safety Framework for the Namibian Mining Industry that integrates critical building blocks such as leadership commitment, worker participation, risk management, communication, continuous improvement, and training. While this framework is designed primarily for industrial safety, its principles align well with the concept of an HHH, particularly in small group conversations where personal wellbeing, interpersonal dynamics, and group cohesion are at play.

The holistic health of humans and the planet is inseparable – humans cannot be healthy on an unhealthy planet (Allamano, 2023; Morar, 2023; Sornette, Wu, 2023). A salutogenic approach views health as a result of interactions with various stressors (Allamano, 2023). Antonovsky's (1979) salutogenic model shifts the focus from preventing disease to promoting resilience and wellbeing through a strong sense of coherence, including comprehensibility, manageability, and meaningfulness. Applied to ESG, it reinforces that sustainable human and planetary health are co-dependent,

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where individuals who find meaning and agency are more likely to engage in regenerative, socially just, and environmentally responsible actions. The positive impact of HHH in an economic system that acknowledges that systemic interdependence is crucial (Dewhurst, 2022; Allamano, 2023).

The concept of HHH has neither been sufficiently explored in general nor its role in enhancing ESG transformation. Identified gaps include:

- The need for change at the individual level;
- The absence of an integrated HHH framework;
- Specific focus on the minerals industry;
- Links to authentic human elements, DEIB, psychological safety, and spiritual and social health;
- Interface and value-add of ESG;
- Connection between HHH and multiple stakeholders' health.

Table 1 highlights various dimensions of holistic health. The table shows that there is a lack of a systemic, integrated framework articulating what constitutes an HHH and the inter-linkages between HHH components with family, organisation, community, and planet. Specific research on the benefits and value-add of HHH in the mining industry is also missing. These gaps support the need for a novel integrated HHH framework to advance systemic ESG transformation. The building blocks towards this framework are shown in Table 1.

Methodology

The research employed a targeted sampling method, also known as purposive or judgemental sampling (Merriam, 2009). Data were gathered via semi-structured individual interviews (Box 1),

exploring participants' understanding of an HHH. The WHO's definition of health guided questions on physical, mental, and social health, expanded to include spiritual health. Participants were also queried on the relationship between an HHH and social health, psychological safety, authenticity, and DEIB. Interviews were recorded, and narratives were captured, forming the basis for qualitative data analysis.

The data were analysed using thematic analysis. Merriam (2009) recommended that credibility in qualitative research requires two researchers to read and evaluate interview outcomes. Two researchers conducted and analysed the interviews for emerging themes. Validity (trustworthiness) was ensured through member checking (Merriam, 2009). Themes were reviewed by a third researcher, confirming that the data interpretation reflected the interviewees' shared perspective.

Specific individuals with relevant characteristics or knowledge were selected, focusing on those with over 20 years of experience in director, executive (C-Suite), or senior leadership roles in the minerals industry. Out of 20 invited participants, 10 were interviewed (Table 2). The cohort included 50% men and 50% women, with a mean age of 54 years, ranging from 43 to 64 years, and tenure in the minerals industry from 21 to 43 years. Interviews took place between 15 April 2024 and 6 June 2024.

Given the exploratory nature of this research and the limited prior integration of the HHH construct within ESG discourse, particularly in the minerals industry, no rigid conceptualised hypotheses were imposed. However, the study was guided by an *informed expectation* that elements such as authenticity, psychological safety, DEIB, and spiritual health would emerge as

Box 1: Research interview guide comprising semi-structured interview questions

The following semi-structured interview questions were used to facilitate one-on-one individual interviews with each C-Suite and Senior leader:

Questions related to inner holistic health:

- 1.1.1 What in your view constitutes a healthy human from the perspective of physical health and safety?
- 1.1.2 What in your view constitutes a healthy human from the perspective of mental health?
- 1.1.3 What in your view constitutes a healthy human from the perspective of spiritual health?

Questions related to interpersonal holistic health

- 1.1 What in your view constitutes a healthy human from the perspective of social health?
- 1.2 How does showing up at your authentic and real self contribute (if at all) to being a holistically healthy human?
- 1.3 What in your view constitutes a healthy human from the perspective of psychological safety?
- 1.4 How does showing up as your diverse (race, gender, people with disability, cultural ethnicity, sexual orientation, age, generation, etc.), equitable (human rights and justice), and inclusive self, contribute (if at all) to being a holistic healthy human?

Questions related to a holistic healthy human (HHH), trust and the ESG interface

2. What is your view around the relationship between a holistic healthy human and the ESG interface?
3. Within ESG, the 'social' component focuses on establishing trust through healthy, sustainable, and equitable relations with multiple stakeholders for the wellbeing of people and the planet. What in your view are the key ingredients to establishing and maintaining trust with these multiple stakeholders?

Questions related to a holistic healthy human (HHH) and the health and resilience of the family, organisation, community and planet

- 4.1 Describe your views around the link between a holistic healthy human and the health of the family?
- 4.2 Describe your views around the link between a holistic healthy human and the health of the organisation?
- 4.3 Describe your views around the link between a holistic healthy human and the health of the community?
- 4.4 Describe your views around the link between a holistic healthy human and the health of the planet?

Questions related to a holistic healthy human (HHH) and the minerals industry

- 5.1 In your view, what are the unique benefits to being a holistic healthy human within the context of the minerals industry?
- 5.2 In your view, what are the unique challenges to being a holistic healthy human within the context of the minerals industry?

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Table 1

Building blocks that informed the novel integrated HHH framework

Name of Article	Novel or supported by other literature	Contributions to the re-search on HHH	Alignment and value-add to the novel integrated HHH framework	Gaps in current literature
<p>1) Accelerating the rise of the Holistic Human. Morar (2023).</p>	Novel	<ul style="list-style-type: none"> - Concept of the holistic human - Positioning within the 'social' of ESG coupled with its value proposition to the health of the community, organisation and planetary levels. - <i>Article utilised as the key foundation upon which the current research is based.</i> 	<ul style="list-style-type: none"> - Concept of HHH. - Positioning within the 'social' component of ESG as 'S' lags behind 'E' and 'G'. - Change begins at the individual human level through a holistic human and supports systemic ESG transformation. - Building blocks of HHH include physical health and safety, psychological safety, mental health, social health, spiritual health, authenticity and DEIB. - HHH supports the health and establishment of trusting, equitable relations at the community, organisation and planetary levels. 	<ul style="list-style-type: none"> - Integrated novel HHH framework. - Lens on the minerals industry.
<p>2) Coupled system approach to healthy earth environments and individual human resilience. (Sornette et al., 2023). Key Words: COVID-19, resilience, system, public health, holistic system approach, individual responsibility.</p>	Novel	<ul style="list-style-type: none"> - Global decay in individual health resilience making populations susceptible to COVID-19. - Global system view of stressors impacting earth health. - <i>Diagram of key pillars of human-environment health and resilience.</i> 	<ul style="list-style-type: none"> - Link between human well-being and earth health. - Individual health resilience, decay and build up. - Need for holistic medical systems thinking versus a reductionist approach. 	<ul style="list-style-type: none"> - Change begins at the individual human level through an HHH. - Link to mental health, spiritual health, social health, authenticity, psychological safety and DEIB. - Integrated novel HHH Framework. - Lens on the minerals industry.
<p>3) Holistic health model of sustainable development. (Mato-Juhás et al., 2016). Key Words: sustainable development, health consciousness, holistic health, corporate social responsibility.</p>	Supported by article: Accelerating the rise of the Holistic Human. Morar (2023).	<ul style="list-style-type: none"> - Impact of holistic health on multiple stakeholders re: Family, State, NGO's, Media, Church, Local authority, Civil sphere. - <i>Modified model of holistic health consciousness.</i> 	<ul style="list-style-type: none"> - Focus on holistic health and wellbeing (physical, psychological, spiritual health). - Holistic health consciousness starting point of sustainable development. - Link to holistic health and improved ESG. - link between individual holistic health and impact on family, society/community. 	<ul style="list-style-type: none"> - Link to authenticity, DEIB. - Link to holistic health and development of healthy trusting, equitable relations with multiple stakeholders. - Lens on the minerals industry.
<p>4) Going deeper into the S of ESG: a relational approach to the definition of sustainability. (Becchetti et al., 2022). Keywords: corporate social responsibility, ESG, social capital, gift exchange, multidimensional well-being, sustainable development.</p>	Supported by article: Managing the "S" in ESG: the case of indigenous peoples and extractive industries. Pelosi and Adamson (2016). Supported by article: Building better mining companies through ESG Leonida (2022). - 'S' in ESG integrated in business slower than 'E' and 'G' and important in minerals industry re: social licence to operate. - 'Old school' (compliance and regulation) versus 'new school' (engagement and relationship building) in shaping mining culture	<ul style="list-style-type: none"> - Focus on social metrics (governance) and self-evaluation of ESG scores - Identifies gap value of relationships re: relational goods produced through meetings/encounters, friendships and associations - Link between healthy trusting relationships & overall improved well-being of multiple stakeholders. 	<ul style="list-style-type: none"> - Context of 'S' of ESG (macro-economic context 4 crises incl. pandemic). - Social pillar less advanced and lagging. - Relational and systemic rather than 'minimalist'. - Link between individual health and organisational health - Development of trusting relationships based on reciprocity, gift-giving, collaboration, cooperation, teamwork and bonding versus competing - Link to DEIB - Link healthy trusting relations on health of the organisation, community and environment. 	<ul style="list-style-type: none"> - Change begins at the individual level through an HHH. - Link to physical health and safety, mental health, spiritual health, psychological safety and authenticity. - Integrated novel HHH framework. - Lens on the minerals industry.

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Table 1 (continued)

Name of Article	Novel or supported by other literature	Contributions to the re- search on HHH	Alignment and value-add to the novel integrated HHH framework	Gaps in current literature
<p>5) Employee perception of corporate social responsibility authenticity: a multilevel approach. (Kim, Lee, 2022).</p> <p>Keywords: corporate social responsibility, CSR authenticity, employee perception, multilevel approach, organisational commitment, construal level theory.</p>	<p>Supported by article: Sustainability leadership and boards: a conceptual framework. Zivkovic (2022).</p> <ul style="list-style-type: none"> - Alignment of individual and organisational purpose is a reflection of leader's authenticity. - Sustainability offers an opportunity for authentic leadership. - Authentic and responsible leadership builds and cultivates ethically sound relationships with multiple stakeholders based on justice and care and commitment to accomplishing positive social and environmental impact. 	<ul style="list-style-type: none"> - Multiple stakeholders (especially employees) judge / perceive the authenticity of an organisation's 'S' or external CSR initiatives through observation or participation. - When external CSR increases, employee perceptions of CSR authenticity and sincerity increase, improving emotional commitment, attachment, and employee experience. - Negative perceptions of CSR authenticity re: perception of greenwashing negatively influences the employee's emotional commitment and impact of the CSR initiative. - <i>Model showing link between external CRS authenticity and employee emotional commitment.</i> 	<ul style="list-style-type: none"> - When individuals bring their 'whole' authentic selves to work, they engage with others in the social enterprise in a more sincere and real manner, and this influences stakeholder perceptions of CSR (social) initiatives positively strengthening emotional commitment and the development of healthy, trusting relationships with multiple stakeholders. 	<ul style="list-style-type: none"> - Change begins at the individual level through a HHH - Link to physical health and safety, mental health, spiritual health, social health, psychological safety and DEIB - Integrated novel HHH Framework - Lens on the minerals industry.
<p>6) The relationship of spiritual health with quality of life, mental health, and burnout: the mediating role of emotional regulation. (Akbari, Hossaini, 2018).</p> <p>Keywords: burnout, emotional regulation, mental health, Quality of life, spiritual health.</p>	<p>Novel</p>	<ul style="list-style-type: none"> - Strong link between spiritual health and emotional regulation vital for quality of life, mental health and job burnout. - Religious, spiritual beliefs and activities are supporting and mediating agents that can reduce life stress and promote quality of life by giving hope and making life meaningful. - Spiritual health was more effective on mental health (through emotional regulation) than physical health. - Strong correlation and mediating effect of spiritual health on burnout, i.e., spiritual health decreases job burnout by creating hope, honesty and trust, promotes org. commitment, increases creativity and productivity. 	<ul style="list-style-type: none"> - Spiritual health and wellbeing (purpose, meaning, spiritual and religious beliefs) is a key component of an HHH. - Spiritual health supports mental, physical and social health. - Those with spiritual health will experience better mental health, adapt to stress more successfully, mitigate burnout and develop healthy, trusting relationships with multiple stakeholders. 	<ul style="list-style-type: none"> - Change begins at the individual level through an HHH. - Link to physical health and safety, authenticity, psychological safety and DEIB. - Integrated novel HHH framework. - Lens on the minerals industry. - HHH supports the health and establishment of trusting, equitable relations at the community, organisation, and planetary levels.
<p>7) Social, cultural, and economic determinants of well-being. (Livingston et al., 2022).</p> <p>Keywords: wellbeing, racial trauma, discrimination, social relationships, socioeconomic status, mental and physical health, poverty.</p>	<p>Novel</p>	<ul style="list-style-type: none"> - Individual, physical, mental and social health influenced by economic diversity of countries - Poverty and low SES linked to adverse health outcomes and concerns. - Gender discrimination key social justice issue for woman, woman of colour, and woman in low wage roles, and negatively impacts their health and wellbeing. - Women who choose to challenge such norms may be exposed to social disapproval impacting their health and wellbeing negatively. 	<ul style="list-style-type: none"> - Lack of DEIB causing trauma and negatively affecting holistic health re: activating physiological, social and psychological stress responses through mental and physical bodily harm. - COVID-19 led to global GDP shrinking impacted mental health. Increase in depression, anxiety, loneliness, suicide due to employees losing jobs, losing loved ones, searching for purpose and meaning. - Negative impacts on employee satisfaction, leadership styles, sense of purpose and discrimination. 	<ul style="list-style-type: none"> - Change begins at the individual level through an HHH. - Link to spiritual health, authenticity, psychological safety. - Integrated novel HHH Framework. - Lens on the minerals industry. - HHH supports the health and establishment of trusting, equitable relations at the community, organisation and planetary levels.

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Table 2

Demographics of research participants

Participant	Leadership level	Tenure in minerals industry	Gender
Participant 1	CEO	> 30 years	Male
Participant 2	C-Suite	> 30 years	Female
Participant 3	COO	> 20 years	Male
Participant 4	CEO	> 25 years	Female
Participant 5	CEO	> 40 years	Male
Participant 6	Board advisor and adjunct professor	> 40 years	Female
Participant 7	Board advisor	> 25 years	Female
Participant 8	CEO	> 20 years	Female
Participant 9	Executive	> 20 years	Male
Participant 10	Executive	> 20 years	Male

important contributors to holistic health and stakeholder trust. The research aimed to explore *how* senior leaders conceptualise an HHH and its value in advancing ESG outcomes, allowing themes to emerge inductively while being theoretically sensitised by existing literature.

Results and discussion

Through a thematic synopsis of collective participant responses, this section outlines the key results and findings obtained from the research.

Change begins at the individual human level

The majority of participants (80%) commented that change begins at the individual human level, “all humans are an integral part of environment and societies that we live in” and “company culture with the human first”. In support of Boaz and Fox (2014) and Sornette and Wu (2023), participants stress that this change is enabled through the ‘social’ component of ESG, “we all come together as humans and good stuff happens when ‘S’ is in place”.

Inner holistic health

Participants emphasised the elements of a physically healthy and safe human, a mentally healthy human, and a spiritually healthy human as key components constituting the inner holistic health of a holistic healthy human.

Physically healthy and safe human (1.1.1 in Figure 2)

Of the participants, 80% highlighted regular physical exercise, and 70% mentioned a balanced diet and drinking eight glasses of water as vital for a healthy lifestyle. Only 20% identified regular sleep (6–8 hours) as important, indicating that it may not be a priority for senior leaders in the industry. While various studies cite inadequate sleep in the mining sector and the impact of this on multiple dimensions of health (Maisey et. al, 2021a; Maisey et. al, 2021b), specific studies around sleep deprivation experienced by senior leaders in the mining sector is sparse, highlighting that effective and targeted fatigue management plans at this level are vital insofar as supporting the overall wellbeing of such leaders. Only 60% mentioned physical safety and working in safe conditions, despite safety being a primary value in the industry. This may be attributed to the heavier focus of the interview on various dimensions of

health, which may have led some interviewees to focus more on physical health in their response.

Mentally healthy human (1.1.2 in Figure 2)

All participants highlighted the elevation of mental health post COVID-19: “COVID-19 allowed for a mental reset.” This is in support of previous findings by Greenwood and Anas (2021), Dewhurst (2022), Morar (2022), World Economic Forum (2022), Morar (2023), and Wong and Greenwood (2023).

Reaching out to family, social, and professional networks during stressful times, was raised by all participants. While this is positive, 30% still cited compartmentalising stressors as a coping mechanism, with only 30% engaging in physical activity to cope mentally, and only 40% using breathing and mindfulness exercises, journaling, and spending time in nature to manage stress and promote balance. The implications of these findings are in support of a gradual movement towards salutogenesis with greater room for improvement in this area as regards healthier mechanisms of coping (Antonovsky, 1979).

Participants also share that: “most people are in denial when it comes to mental health – courage is often required” and “based on our backgrounds, we don’t talk to mental health issues – still a stigma that needs to be overcome”. In support of Yam et al. (2024), breaking the stigma of mental health in the minerals industry and the usage of healthy coping mechanisms for both genders at the senior leadership levels emerged as key findings that require systemic intervention. Further insights are noted in the research findings around DEIB.

Spiritually healthy human (1.1.3 in Figure 2)

In support of Akbari and Hossaini (2018), Coleman, (2022), Brassey et al. (2023), and Morar (2022; 2023), as many as 90% of participants saw spiritual health as pivotal to an HHH, anchoring meaning and purpose amidst challenging times. Participants shared: “a holistic healthy human cares for his/her soul and the souls of others, has an anchor in life and is active in his/her spiritual community.” Belief in a higher force and religious practices were highlighted by 90% of participants: “there is something greater than yourself that you are a part of” and “when we decide that this is not our making alone”.

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Cited as an underrated health dimension, more effort is needed in inclusively elevating spiritual health in all contexts: “one needs more of this than there currently is”. This is in support of Akbari and Hossaini’s (2018) research underscoring spiritual health as a key mediating agent in emotional regulation, by reducing stress and burnout as well as promoting quality of life through trust, hope, meaning, and productivity. The interface between spiritual health and DEIB is highlighted: “spiritual practices may be exclusive and sometimes disrespectful falling into the trap of only a Christian Way. There should be an appreciation for different cultural beliefs”.

Interpersonal holistic health

Participants emphasised the elements of a socially healthy human; an authentic human; a diverse, equitable, inclusive and belonging human; and a psychologically safe human as key components constituting the interpersonal holistic health of a holistic healthy human.

Socially healthy human (1.1.4 in Figure 2)

In support of Sinclair (2021) and Brassey et al. (2023), 90% of participants see social health as the ability to form and maintain trusting, equitable relationships through connection, collaboration and teamwork: “good social health builds trust with others” and “no man is an island - people want to connect”.

Participants described social health most often in the context of community relationships where mines are remote, followed by a description of trusting and engaging relationships with colleagues, and lastly, family relationships. This is in support of previous research by Leonida (2022) who closely aligns social health in the minerals industry as being contextualised within community relationships as well as through gaining and maintaining one’s social licence to operate.

The link between social health and DEIB was elucidated: “people need to have a sense of acceptance to have social health. When people feel a sense of belonging, it leads to a healthy and fulfilling life”. Only 50% of participants described reciprocity to be important for social health highlighting that ‘giving back’ is a key gap that requires deeper intervention, especially at the community level where healthy, trusting, and equitable relationships are necessary versus those that are one-sided.

Authentic human (1.2 in Figure 2)

All participants highlighted authenticity as central to being an HHH by strengthening healthy relationships: “being myself adds to being healthy and feeling safe, it takes away inner stress and makes me feel good - everything is aligned”. This is in support of Collard (2022), Zivkovic (2022), and Morar (2023).

Participants associated authenticity with showing up without a mask: “wearing different masks all the time is exhausting”, and “it is important for me to be sincere in my dealings with others, you don’t need a mask”. At least 40% of participants highlight the need to be measured in displaying authenticity in order to align with prescribed social norms: “need to have self-editing and be careful of the dissenting voice. Power dynamics limit how much of yourself you can bring to the job”. Such findings highlight the intricate link between showing up authentically and feeling psychologically safe to do so, in support of Edmondson (2022), Cecchi-Dimeglio (2023), and Gallo (2023).

Diversity, equity, inclusion and belonging (DEIB) human (1.3 in Figure 2)

DEIB emerged as a foundational component of an HHH,

influencing other components of holistic health (Livingston et al., 2022; Maese, Lloyd, 2022; Davis, 2024; Kocher et al., 2024). Of the participants 90% associated holistic health with fairness, dignity, respect, inclusion, belonging, and feeling valued: “I respect and value others and expect them to respect and value me - if we respect each other’s view, we will all be holistic healthy humans”, and “D&I contributes significantly to being a holistic healthy human”.

The findings show that the absence of DEIB, (namely the experience of discrimination, unfair treatment, exclusion, and the absence of belonging, and when human, social, and economic rights were infringed upon) negatively impacted mental health, physical health and safety, spiritual health, psychological safety, authenticity, and social health. Only 60% mentioned upholding basic human, social, and economic rights, with few discussing bullying, harassment, and gender-based violence. Diversity of thinking and its role in driving innovation was highlighted by only 60%, with 30% linking it to a growth and lifelong learning mindset.

Women’s holistic health and wellbeing

In support of Livingston et al. (2022), participants shared that discrimination, exclusion, and unfair practices negatively impacted women’s holistic health, leading to stress, burnout, and exiting the industry. Managing self-limiting beliefs shaped by societal narratives emerged as core to supporting their mental health: “as women, we have self-limiting beliefs – it is a tall wall to climb to overcome this and reach a point of acceptance”.

Men’s holistic health and wellbeing

A key barrier to men’s holistic health was the display of vulnerability, negatively impacting mental health and psychological safety (Sherwani, Syed, 2024). Emotional release through crying and high suicide rates among men were highlighted, in support of Flood (2021) and Peter (2023). Participants shared: “with 90% males in the room, men are not used to sharing their vulnerability. That is the measure, getting men to open up”.

Psychologically safe human (1.4 in Figure 2)

Psychological safety is a foundational enabler of the HHH framework. Participants highlighted its critical role: “feel free to deliver bad news and know that your job is not on the line” and “stopping unsafe work”. In support of Edmondson (2022) and Yam et al. (2024), 40% highlighted its link to mental health by reducing anxiety: “need to have psychological safety to address any mental health issue”.

While psychological safety was seen as an enabler of innovation: “psychological safety enables innovation, encourages creativity, and leads to better outcomes”, only 50% felt safe to make mistakes and fail, and 40% felt safe admitting they did not know all the answers. Participants noted that role modelling psychological safety is challenging, as barriers still exist preventing failure from being viewed as a learning opportunity. Intentional leader-led interventions are needed to unlock a growth and lifelong learning mindset.

Unique challenges of an HHH to the minerals industry

Half (50%) of the participants (comprising 80% women) did not feel that mining was ready for the integration of HHH with mining practices. The reasons relate to the propensity of the minerals industry to resist change, especially when this change requires its onset at the individual human level. This lack of readiness may also relate to retaining the status quo with a focus solely on the bottom

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line versus operating with a higher purpose: “mining in its entirety will never be ready” and “lots of ignorance - happy with status quo and don't want change”.

On matters relating to silo versus holistic and systemic approaches, as many as 40% of participants believe that this resistance may be attributed to the minerals industry being ‘rough and tough’ with an ‘old school mentality’ where holistic and systemic approaches are not well regarded. This is supported by the following sentiments: “people are old school and don't believe in the holistic view on the world...lots of scepticism around mindful meditation” and “I think it's a hard area to get around - our disciplines are very divided. We rarely have multi-disciplinary groups working on thing”.

While 30% of participants cited that while they supported the idea of the HHH, time, resources, and productivity pressures are possible obstacles that would need to be overcome in order to adopt and embed HHH. They further state that in order for the value-add of HHH to be felt at the family, organisation, community, and environmental levels, a strong value proposition, value-add quantification, and education are necessary.

Participants discussed the importance of bold, leader-led approaches in sponsoring the HHH. They emphasised the need for leaders to “think holistically about mining, not just focusing on the bottom line” and to be “more human leaders”.

Unique benefits of HHH to the minerals industry

Participants highlighted that despite the challenges associated with adopting and embedding HHH, the benefits it offers to the minerals industry outweighed these obstacles. This is qualified in the following.

The benefits of HHH to improved ESG transformation and performance

As many as 90% of participants commented on the value-add of HHH to improved ESG performance (2. in Figure 3): “unless you are an HHH and value all the components, you won't be able to manage the ESG interfaces” and “HHH will support the organisation's reputation, risk and policies and how these are implemented”. All participants commented that an HHH is most closely linked to the ‘social’ component of ESG.

Efforts to integrate HHH into ESG interventions were seen as crucial, highlighting the need for multidisciplinary collaboration to foster systemic ESG transformation. Participants emphasised deeper engagement, noting: “there is a big relationship between HHH and ESG but requires deeper thinking of the working environment, a lot of it is limited and superficial” and “there is a limit of fear from corporate to dig deeper...too much for comfort”.

Participants welcomed discussions on HHH, sharing: “it gives people an opportunity to have deep conversations, and deep thinking around the environmental impact of mines, honest discussion of what this means going forward”. Half (50%) of the participants highlighted HHH's role in improving physical health, fitness, and safe mining practices, which is in support of the work of Govender et al. (2022) on organisation safety maturity that highlighted the social benefits to the family, community, and organisational levels.

The benefits of an HHH to improved holistic health and healthy, trusting, and equitable relationships at the family, organisational, community and planetary levels (3. in Figure 4)

Participants highlighted the positive impact of HHH on the holistic

health of multiple stakeholders and the establishment of healthy, trusting, and equitable relationships. Trust was seen as central to these relationships, involving dignity, respect, transparency, honesty, ethics, and integrity. As many as 70% of participants noted that trust was strengthened by consistent and reliable behaviour, with quotes like: “people believe you more when you have the right intention...when you are sincere” and “trust is not there when there is a disconnect between expectations, communication, and action”. Only 10% mentioned accountability as a key component of trust.

Family (4.1 in Figure 4)

In support of Mato-Juhas et al. (2016), all participants noted that being an HHH helps build and maintain strong family bonds through care, love, and support. They stated: “holistic healthy humans contribute to every family member being healthier and feeling safer. Holistic healthy humans support, teach, learn from, care for, love, protect, and respect each other”. As many as 90% of participants, highlighted the positive effects of HHH on family health and resilience, such as: “If you are not in a good place mentally and spiritually, it impacts your family dynamics... If you are an HHH, you show up better for your family”. HHH's can also mitigate criminality and gender-based violence, creating psychological safety at home.

Organisation (4.2 in Figure 4)

Participants emphasised the importance of HHH in organisational ecosystems, stating: “the synchronised energy that flows from the drivers of holistic healthy human is undeniable” and “organisation ecosystem - organisation is nothing without holistic healthy humans”. HHHs positively affect organisational culture by creating a caring, supportive environment where people can be authentic, make mistakes, and learn. This is in support of Becchetti et al. (2022), Kim and Lee (2022), Leonida (2022), Morar (2023), and Deloitte (2024). Participants noted that: “moving towards an HHH means moving towards a human that cares”, and that authenticity and psychological safety are crucial, with quotes like “authentic self leads to authentic culture”.

As many as 90% of participants spoke about HHH enabling a health, safety, and wellbeing culture integrated into work. They stressed the need for intentional integration of HHH components with ESG values, stating: “once we work on a holistic healthy human, we get the culture right...it will become the way we do work”. The role of leaders in promoting HHH was highlighted, with participants saying: “leaders (what they say) must be in congruence with what they do (actions)”. In support of Leonida (2022) and Deloitte (2024), 70% of participants linked HHH to improved organisational performance, stakeholder engagement, and decision-making.

Community (4.3 in Figure 4)

All participants acknowledged the positive effect of HHH on social cohesion, collaboration, and bonding at the community level, in support of Becchetti et al. (2022), Leonida (2022), and Morar (2023). They shared that: “when we embrace a holistic healthy human, we have healthy communities and social cohesion” and “holistic healthy humans...you have a role to play to uplift others and create a better society”. However, only 40% mentioned HHH's role in community health and resilience, and just 10% noted its contribution to environmental stewardship.

Planet (4.4 in Figure 4)

In support of Allamano (2023), Morar (2023), and Sornette and Wu

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(2023), 90% of participants said HHHs care for the environment and collaborate to transform the planet for good. They commented that: “a healthy planet/environment is critical for healthy and safe individuals, families, and communities” and “our holistic healthy human behaviours help to preserve and protect the planet”. The reciprocal relationship between a healthy planet and healthy humans was emphasised, with participants noting that change begins at the individual human level through HHH efforts to reduce the carbon footprint, improve water quality, reduce food wastage, recycle, and reduce air pollution. This is particularly relevant in the minerals industry, where there are increasing expectations for responsible practices.

Novel integrated HHH framework

Based on the building blocks of an HHH as shown in Table 1, coupled with the insights gleaned from the aforementioned interview findings of this research, a key output of the research is the co-creation and development of a novel integrated framework,

which supports the conceptualisation and understanding of an HHH. The novel integrated HHH framework constitutes two key components influencing an HHH response, based on the principle that change begins at the individual human level. These components are inner holistic health (health components that are internal to the individual) and interpersonal holistic health (health components relating to an individual’s engagement with others). The interplay of these components is fluid and dynamic, as illustrated in Figure 2.

The relationship between HHH and the ESG interface highlighting the ‘S’ (social component) is shown in Figure 3. Figure 4 represents the novel integrated HHH framework, highlighting the positive effect of HHH on healthy, trusting relationships with multiple stakeholders in the context of the minerals industry.

Conclusion and recommendations

Rich insights that were gleaned from the research interviews through deep thematic analysis are summarised in Table 3. Most of the participants, i.e., greater than 80% were aligned on the key dimension that constituted an HHH.

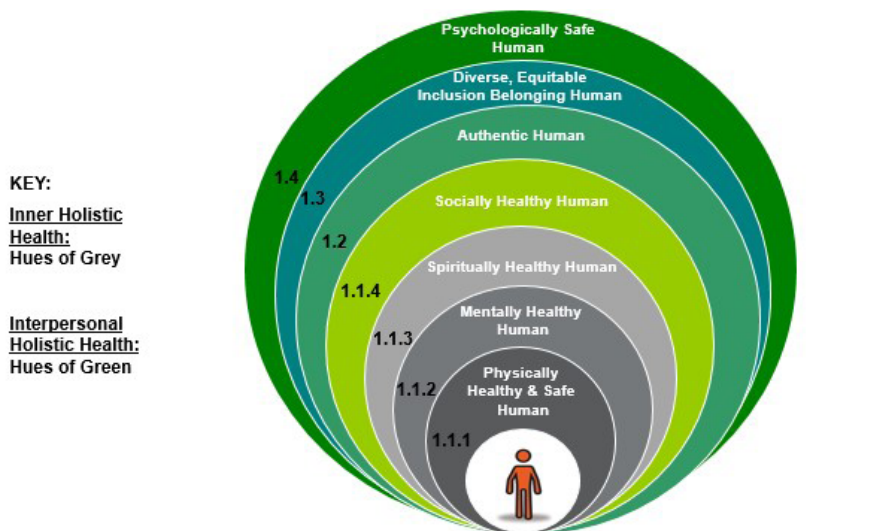


Figure 2—Building blocks to the novel integrated HHH framework – holistic healthy human

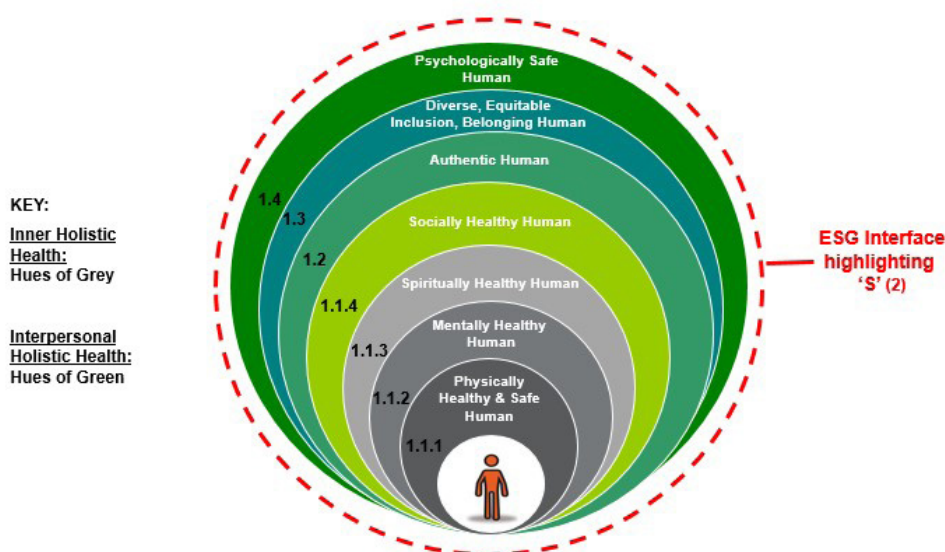


Figure 3—Building blocks to the novel integrated HHH framework – holistic healthy human and the ESG interface

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Table 3

Summary of thematic findings and participant responses

Thematic category	Key finding	% of Participants
Change begins at the individual human level	Emphasised personal responsibility as the catalyst for systemic change.	80%
Physical health and safety	Identified exercise and diet as core; sleep and workplace safety were less prioritised.	Exercise: 80% Diet: 70% Sleep: 20% Safety: 60
Mental health	Acknowledged increased awareness post-COVID-19 and use of healthy coping mechanisms.	100%
Spiritual health	Recognised meaning, purpose, and faith as under-addressed but vital.	90%
Social health (relationships and community)	Valued building trust, connection, and collaboration with all stakeholders, especially with remote communities. Giving back through reciprocity requires greater focus.	General importance: 90%. Reciprocal relationships importance: 50%.
Authenticity	Valued authenticity but highlighted the need for balance due to power dynamics.	100% (with 40% noting self-editing is necessary).
Diversity, equity, inclusion and belonging	Viewed as foundational to holistic health and human dignity and respect. Link between diversity of thought and innovation and growth mindset requires greater focus.	DEIB importance to holistic health and dignity: 90%. Link diversity of thought to innovation: 60%, to growth mindset: 30%.
Psychological safety	Seen as essential for innovation, mental health, and mistake tolerance.	General importance: 100%. Feel safe to fail: 50%. Feel safe to admit not knowing: 40%.
Trust	Seen as central to stakeholder relationships; linked to sincerity, reliability, and respect.	70%
Family health link	Healthy humans strengthen family resilience and safety.	100%
Organisation health link	HHHs contribute to caring culture, alignment, and safe performance environments.	90%
Community health link	HHHs foster cohesion and upliftment; giving back noted as underdeveloped.	Community benefit: 100%. Giving back: 50%.
Planetary health link	Recognised interdependence between planetary and human health.	90%
Readiness of minerals industry for HHH	Expressed scepticism and cultural resistance to adopting HHH fully.	Not ready: 50% (80% of this subgroup were women).
Barriers to HHH	Maintaining industry status quo ('old school', 'rough and tough'), silo thinking, resource constraints, and time pressure.	Maintaining status quo and silo thinking: 40%. Resource constraints, time and productivity pressure: 30%.
Link between HHH and ESG interface (highlighting 'S')	Viewed as critical to improving ESG integration, particularly in the 'social' component.	90%
Gendered differences	Women cited stress from discrimination; men highlighted barriers to vulnerability.	Not quantified, but highlighted as significant.
Call for leadership action	Need for bold and courageous, human-centric leadership to adopt and embed HHH principles.	Qualitative emphasis across interviews.

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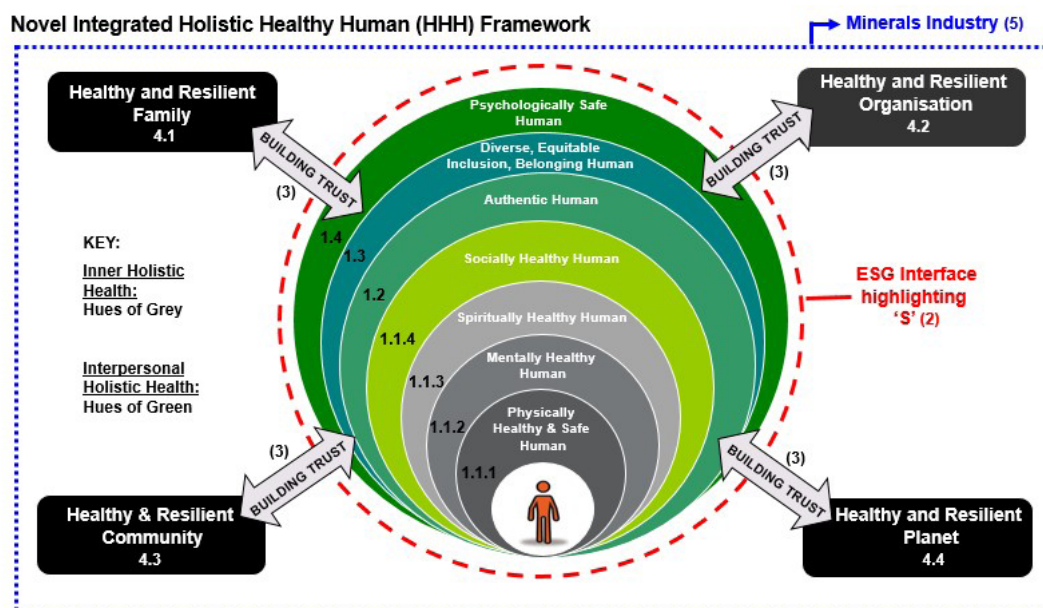


Figure 4—Building blocks to the novel integrated HHH framework – positive effect of holistic healthy human (HHH) on healthy, trusting relationships with family, organisation, community and planet in the minerals industry

Advancements in ESG transformation are most impactful when the components transition systemically and in unison. Currently, the ‘E’ and ‘G’ components are progressing faster than the ‘S’ component, which may limit the full potential of ESG transformation in bringing a part solution to how sustainability is enhanced. This is significant for the minerals industry in its quest to address the current ‘trust deficit’ and in securing and maintaining a social licence to operate through the development of healthy, trusting, and equitable relationships with multiple stakeholders.

In closing this gap, this study introduces a novel integrated framework for industry leaders, with a focus on change beginning at the individual human level through a holistic healthy human (HHH). The framework is a co-creation of the building blocks of an HHH as noted in Table 1, coupled with the rich insights gleaned from this study. Through the focus on inner and interpersonal holistic health components, the framework aims to enable holistic health at the family, organisation, community, and ultimately planetary levels as well as support the social cohesion and establishment of healthy, trusting, and equitable stakeholder relationships, thereby enhancing ESG transformation.

Despite some participants raising challenges around the readiness of the minerals industry in embracing an HHH, the majority expressed positive sentiments about its value. Challenges related to the minerals industry’s perceived ‘rough and tough’ and ‘old school’ nature are natural outcomes of the dissonance individuals may experience when faced with revolutionary change. However, the excitement among participants about the value-add of HHH indicates leaders’ resilience and courage to overcome this discomfort in favour of holistic health for the benefit of people and the planet. The value-add includes:

- **Leaders of multidisciplinary functions** should display systemic thinking and systemic action by connecting, collaborating, and co-creating strategic culture pillars of behaviours, mindsets, and practices that elevate the social component and lead to systemic and integrated ESG transformation with an HHH framework at the helm. At the organisational level, these functions may include business,

people and human capital, ESG, sustainability, environment, safety and health (ESH), commercial, financial, corporate social transformation, exploration, and corporate affairs. At the family, community, and planetary levels, this involves building awareness through education and practices around embracing all components of HHH and monitoring their impact on overall health.

- **Showing up authentically** is not only central to an HHH - the holistic health, safety and wellbeing of an individual, but crucial to the establishment of healthy, trusting, and equitable social relationships with multiple stakeholders. This underscores the importance of sincerity and being genuine in one’s dealing with others, despite the need to at times be measured in showing up authentically. Moreover, such authenticity will go a long way in positively impacting stakeholder perceptions of sustainability initiatives, thus building trust, employee emotional commitment, engagement, and employer attractiveness.
- ▢➤ **DEIB** has emerged as a foundational component of the HHH framework, impacting multiple dimensions of holistic health, including mental, physical, psychological, spiritual, and social health. The research findings encourage accelerating DEIB transformation despite the latent resistance to the history of mankind and the current backlash around the relevance and progress of DEIB in parts of the world. Linking the value-add of DEIB with holistic health efforts as well as to a growth lifelong learning mindset and culture across multiple contexts also need to be considered in alignment with the future of work. The minerals industry should continue to uphold fair, equitable practices and integrate basic human, social, and economic rights into the value chain of business, communities, and environments.
- **Regarding gender diversity, equity, and inclusion**, intentional efforts and policy changes are needed beyond creating awareness of holistic health. Interventions should foster deeper conversations about systemic ramifications and re-authoring traditional gender narratives. These

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conversations should be supported by a strong value proposition around the benefits of men and women displaying vulnerability and opening up, experiencing psychological safety in speaking up and empowerment, and showing up as their authentic selves.

- **Holistic, inclusive, and innovative methods** should raise the profile of mental and spiritual health, promoting quality of life, reducing stress and burnout, and anchoring greater purpose and meaning. These methods should be integrated into organisational culture and engagement at the family, community, and environmental levels.

Applying this novel integrated HHH framework can strengthen the social licence to operate and positively transform the minerals industry's image and reputation.

Limitations of the research

Due to the small sample size and the purposive sampling technique used in this qualitative study, the findings cannot be generalised to a broad population of C-suite and senior leaders in mining.

The researchers acknowledge that there may be other dimensions of health that could be included in the novel integrated HHH framework. Example: the inclusion of financial health, management of debt and garnishee orders as applied specifically within the South African context was raised by at least 20% of participants. In addition, targeted fatigue management plans need to feature in executive wellbeing programmes. These components can form part of future studies on holistic healthy humans.

While the focus of this research has been on the minerals industry, and while it cannot therefore be generalised to other industries, the novel integrated holistic healthy human framework does provide a robust framework and rich insights that future studies may take up and further investigate.

Data availability

The authors do not have permission to share the data.

Acknowledgements

Acknowledgements are given with gratitude to the participants of this research for their valuable insights and contributions. VMHC Advisory is acknowledged for the time availed in leading the work presented in this paper. The work presented in this paper is part of a postdoctoral research study in the School of Mining Engineering at the University of Witwatersrand, Johannesburg, South Africa.

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