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EXPLORING THE NEXUS OF NATURE-INTERACTION AND HUMAN NEEDS MATURITY

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Abstract

This paper empirically explored the relationship between Interaction with Nature [IN] with three concepts, namely under Human Interdependence [HI], Subjective Well-being [SWB], and Maslow's Hierarchy of Needs [HON]. *Research Questions:* Does the fulfilment of human needs elevate IN? Is it possible for IN to increase despite unfulfilled needs, and if so, which human needs have a trivial impact on IN? *Purpose:* This paper aimed to examine the variations of IN in relation to the difficulty and convenience of fulfilling human needs. *Approach:* Mann-Whitney U Test was conducted to determine the mean variation of IN across the difficulty and convenience of fulfilling 24 human needs. *Findings:* The convenience with which 10 of the human needs could be met significantly increased IN. Meanwhile, IN did not differ significantly across the convenience and difficulty of meeting the other 12 human needs, signifying their unlikeliness to influence IN. Furthermore, an intriguing statistical result was observed where fulfilling five of the human needs and fostering IN developed along independent trajectories. Additionally, the difficulties in meeting two of the human needs, namely (i) clean water and (ii) artistic and cultural freedom, significantly elevated nature-interaction.

Keywords: interaction with nature, human interdependence with the environment, subjective well-being, Maslow's hierarchy of needs

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INTRODUCTION

This paper examined the statistical interaction between meeting human needs and meaningful nature-interaction. It offers a significant contribution to the ongoing research on Human Interdependence with the Environment [HIE] by building upon previously published studies. The research also serves as an extension of the ongoing exploration in the field of positive psychology with particular emphasis on Human Interdependence [HI], Subjective Well-being [SWB], and Maslow's Hierarchy of Needs [HON].

HUMAN INTERDEPENDENCE

An increasing body of research has brought to light a novel perspective on a critical factor that influences long-term Subjective Well-being [SWB], known as Human Interdependence [HI]. SWB encompasses an individual's subjective evaluation of happiness, well-being, and life satisfaction by highlighting on the emotional, judgmental, and psychological aspects of well-being. While SWB centres on the current assessment of well-being, HI is oriented toward the future. HI focuses on the idea that changes in one's well-being are reciprocally linked to changes in the well-being of those around them due to their contributions. Consequently, the contributions one imparts to others have a positive impact on their SWB. Several authors firmly assert that HI plays a vital role in fostering sustainable well-being (Garcia et al., 2015; Kjell, 2011).

The characteristics of HI encompass both internal emotions and external circumstances. These features include belief systems, learned experiences, daily routines, involuntary actions, and intentional behaviours that instigate changes in the surrounding environments and, in turn, impact individuals' sustainable SWB. There are two recognized contexts of HI, namely Human Interdependence with Other Humans [HIH] and Human Interdependence with the Environment [HIE]. The two contexts can be expanded into four dimensions, as shown in Figure 1.

As part of a greater scientific investigation (Abu Bakar et al., 2020a; Abu Bakar et al., 2020b; Abu Bakar et al., 2018; Abu Bakar et al., 2017a; Abu Bakar et al., 2017b), this paper focuses on the second dimension of HIE, namely Interaction with Nature [IN].

INTERACTION WITH NATURE

Interaction with Nature [IN] is the second dimension of HIE that focuses on emotional empathy, closeness, familiarity, and both voluntary and involuntary interactions with the natural world. Among the numerous traits of IN are the desire to be closer to the natural environment, understanding of and empathy toward the natural environment, and health-related implications associated with one's natural surroundings (Abu Bakar et al., 2021; Abu Bakar et al., 2020c).

HI DIMENSIONS	Human Interdependence with other Humans (HIH)	Human Interdependence with the Environment (HIE)
DIMENSION 1	Personal Empowerment (PE)	Eco-Personality & Lifestyle (PL)
Lifestyles, personality, inner-strength, willpower, wisdom, awareness, and life prospects.	Focus And Resilience, Sense of Control, Self-Determination, Goal Orientation and Self-Improvement	Ecological Mindset, Collectivistic Cultures, Modesty and Moderation in Material Pursuits, and Environmental Mindfulness.
DIMENSION 2	Positive Relationship (PR)	Interaction With Nature (IN)
Intimacy, closeness, familiarity, empathy, affection, voluntary and involuntary interactions.	Affection, Compassion, Forgiveness, Ability to Tolerate Others, Sense of Inclusion and Self-Regulation.	Closeness to Nature, Knowledge of and Empathy Towards Nature, And Health Associated Attributes in Relation to Surroundings.
DIMENSION 3	Organizational Opportunity (OO)	Environmental Behaviour (EB)
Engaging with the surrounding, executing roles or tasks, proving skills and responsibility.	Articulatory and Versatility, Initiatives of Positive Interactions and Cooperative Engagements towards Professional Growth.	Careful and Conscious Decision-Making, Smart Consumerism, Recycling, Energy-Saving Initiatives, and Waste Handling.
DIMENSION 4	Community Movement (CM)	External Condition (EC)
Attitude towards circumstances, interpersonal behaviours with the larger public, etc.	Proactivity, Public Participation, Friendliness, Openness, Respect for Diversity and Sense of Belonging.	Attitudes towards Surroundings Convenience and Encouragements to be Environmentally Responsible

Figure 1: Dimensions of HIH and HIE
 Source: Abu Bakar et al., 2017

IN emphasizes a sense of dependability on nature, resulting in HIE. Through these encounters, humans acquire greater awareness of their impact on the ecosystem and the interconnectedness of all living species. Such recognition develops a sense of duty for the ecosystem's and other species' well-being, supporting conservation initiatives and sustainable practices. IN also triggers the feelings of awe and amazement in the presence of natural environment. As a result, individuals will become attached to nature, ultimately discovering a profound sense of meaning and importance within the broader ecological web of life. IN also prompts individuals to develop a sense of compassion for the environment and other living beings. This altruistic perspective aligns with the transcendent value of recognizing and contributing to something beyond oneself. The construction of IN indicators based on insights from numerous literature (Abu Bakar et al., 2018; Abu Bakar et al., 2017a; Abu Bakar et al., 2017b), can be observed in Table 1.

Table 1: Definition, Factors and Indicators of Interaction with Nature (IN)

Definition	Factor	Code	Indicators
Internal and external emotions and aptitudes towards the natural environment expressed through contact with nature	Nature Attachment	IN01	outdoor environment determining own health and wellness
		IN02	being able to recall experiences in the natural environment
	Knowledge and Capability towards Nature	IN03	being able to adapt to various outdoor surroundings
		IN04	being able to see and hear what others usually miss in nature
		IN05	being able to notice scientific details of nature
		IN06	being able to cope with the outdoor environment
		IN07	feeling the urge to spend time in the natural environment
		IN08	tending to lose concentration without contact with nature
		IN09	tending to have objects from the outdoors in personal space
		IN10	spending time planting at home

HUMAN NEEDS FULFILLMENT AND WELLBEING

Maslow's Hierarchy of Needs [HON] was originally a five-level hierarchy outlining the stages of human motivation (Maslow, 1943). The hierarchy was split into two sets: Deficiency Needs and Growth Needs. The four Deficiency Needs were Physiological Needs, Safety Needs, Love and Belonging Needs, and Esteem Needs, arranged in the order of urgency. The Growth Needs, on the other hand, was linked to self-actualization. In the 1960s and 1970s, the initial five stages of HON evolved to eight where Maslow (1962) classed Cognitive Needs and Aesthetic Needs as part of the Growth Needs. Maslow (1970) later included Transcendence Needs as the eighth and final stage of HON (see Figure 2).

Deficiency Needs are the basic needs that ensue from deprivation. When these needs are neglected, the urge to meet them intensifies with time. Persistent hunger, for example, worsens hunger. On the contrary, Growth Needs are psychological and can be fulfilled by taking part in cerebral and creative commitments. It stems from the inner desire to improve and develop as an individual. As the pinnacle of HON, Transcendence Needs can be pursued when the remaining growth needs are met. However, life challenges, such as divorce or unemployment, may cause oscillation across the different stages of HON. In reality, individuals are unlikely to progress through HON in a single direction, but they do fluctuate between the different levels.

According to Maslow (1943), individuals must first fulfil the low-level needs before progressing to the next stage of HON. For instance, meeting Esteem Needs is a prerequisite for meeting Cognitive Needs, and the same criteria apply across other HON stages. Maslow (1987) later clarified that satisfying a need is not a definitive, binary choice event. He confirmed that his earlier remarks could have created a misleading belief that a need must be entirely met before individuals can move to the next one. Needs that are lower on the HON tend to be the ones individuals have made the most progress toward, and the majority of people seem to have partially met these needs. Since human needs are adaptable and fluid, individuals can address several needs at once (Abu Bakar, 2022).

Two contrasting viewpoints are presented in the literature. First, human needs must first be met before SWB can be achieved. This means that SWB is impossible without unmet needs. Second, excessively compensating for certain needs could render individuals' ill-being. For instance, material wealth leading to unhappiness is an illustration of how addressing certain needs can be superficial. Some contend that conquering hardships, such as unfulfilled needs, enables individuals to be profoundly invested in the meanings and purposes of their lives. It is intriguing how, in certain cases, having needs that are only partially satisfied or unmet can offer life more purpose and improve SWB. Through extensive literature searches and surveys, this investigation discovered 24 indicators that outline human needs under each of the eight HON stages (see Figure 3).

	HON	UNDERSTANDING
DEFICIENCY NEEDS	1	Physiological Needs The body's need for balance and consistent levels in different bodily systems is called homeostasis. It is driven by survival instincts like seeking shelter, water, food, warmth, rest, and good health. Until this need is met, all other needs are secondary.
	2	Safety and Security Needs The need for safety and security in one's life and surroundings involve seeking protection from violence, health threats, sickness, and economic pressures in order to thrive in modern societies.
	3	Belonging and Love Needs The need for love and a sense of belonging is fulfilled through supportive and communicative friendships, family, and intimate relationships. Deprivation of these needs can lead to feelings of guilt, loneliness, depression, or low extraversion values.
	4	Esteem Needs The need for self-confidence and recognition is fulfilled through positive feelings of self-worth achieved via accomplishments, appreciation, and recognition. Without meeting this need, one may experience feelings of inferiority.
GROWTH NEEDS	5	Cognitive Needs The need for knowledge and understanding is fulfilled by yearning for learning, exploration, discovery, and creation to better understand the world. Failure to fulfil this need may result in confusion and identity crisis.
	6	Aesthetic Needs The need to appreciate and connect with nature's beauty which involves taking time to immerse oneself in natural surroundings, allowing the sights, sounds, and sensations of the environment to refresh and rejuvenate the mind and body.
	7	Self-Actualization The instinctual need to maximize one's abilities and strive to be the best leading to a feeling of generativity –the desire to vote, contribute, volunteer, nurture and guide others to the well-being and growth of future generations or to outlast oneself.
	8	Transcendence Needs The need to surpass self-centeredness, and assist others in self-fulfilment and unlocking potential, also known as spiritual needs – when fulfilled, results in a sense of integrity, elevating one's existence to a higher plane.

Figure 2: Understanding of the Stages in the Hierarchy of Human Needs

Source: Abu Bakar et al., 2022

STAGES OF HUMAN NEEDS	HON	#	HUMAN NEEDS INDICATORS
Essential Requirements <i>In the absence of them, the living system of mankind is obstructed.</i>	Physiological Needs	HN01	Nutritional and Wholesome Food
		HN02	Access to Medical Care
		HN03	Clean Water (for Drinking and Washing)
		HN04	Clean and Fresh Air
		HN05	Functional and Well-Maintained Lavatory
	Safety & Security Needs	HN06	Sufficient Electrical Supply
		HN07	Affordable Housing and Conveniences
		HN08	Financial Security and Stability
		HN09	Personal Safety and Security
		HN10	Health Insurance
Supplementary Requisites <i>In the absence of them, the living system is not obstructed but lives would be challenging</i>	Belonging & Love Needs	HN11	Work-Life Balance
		HN12	Social Acceptance and Cultural Inclusivity
		HN13	Reliable Communication Network
		HN14	Access to Internet with Reliable Connectivity
	Esteem Needs	HN15	Primary Education Attainment
		HN16	Secondary Education Attainment
Aspired Prospects <i>In the absence of them, the living system is not obstructed and lives would not be too challenging</i>	Cognitive Needs	HN17	Tertiary Education Attainment
		HN18	Employment Prospects and Opportunities
	Aesthetic Needs	HN19	Well-Kept Areas for Recreational Activities
		HN20	Rich Biodiversity of Flora and Fauna
		HN21	Rights to Participate in Leadership Selection
	Self-Actualization	HN22	Freedom of Expression
		HN23	Opportunities Free from Corruption
		HN24	Artistic and Cultural Freedom

Figure 3: Human Needs Indicators

Source: Abu Bakar et al., 2022

TRANSCENDENCE AND INTERACTION WITH NATURE

Researchers believe that HON delivers a valuable take on the factors influencing SWB. This suggests that SWB can be enhanced by paying attention and tending to human needs, which can be prioritized and experienced differently according to individuals' personalities and circumstances. Both HON and SWB pursuits are heavily individualized; there are no set procedures for pursuing them. Some people may attain SWB through artistic activities, while others achieve SWB through relationships or by engaging in altruistic activities for the greater good. Maslow (1970) further asserted that relatively few people in the world have experienced transcendence since it is the apex of HON and requires immense personal development and introspection. Those who achieve transcendence relish a tremendous sense of contentment and inner peace by improving the lives of others and serving the common good.

Transcendence is the desire and ability of individuals to become one with something larger or beyond their individual selves. Individuals reach selflessness and discover significant meaning and purpose in a broader cause by transcending their own identities alongside personal concerns (Koltko-rivera, 2015). Conversely, transcendence can mean pursuing a sense of oneness with the universe, nature, or a higher power, depending on one's views and ideals.

Nature has long served as a source of inspiration for artists, philosophers, and spiritual seekers. Engaging with nature elicit feelings of awe, amazement, and contemplation, ultimately offering a context for deep reflection and transcendence. In this regard, IN enriches focus as well as being entirely present in the moment. This state of mind corresponds to the essence of transcendence since both require heightened awareness of the present moment and a sensation of pushing beyond regular limitations (Abu Bakar et al., 2021; Abu Bakar et al., 2020c). Experiencing transcendence through IN cultivates a sense of tranquillity, profound introspection, and interconnectedness with the environment.

RESEARCH QUESTIONS

In light of this knowledge, the following questions were investigated in the paper: Does the fulfilment of human needs elevate IN? If yes, which human needs do this? Alternatively, is it possible for IN to increase despite unfulfilled needs, and if so, which human needs have a trivial impact on IN?

METHOD

An examination of 4,315 samples of Malaysian respondents was undertaken ensuing the data screening process. The respondents approached online and were required to respond to 10 self-reported IN items via an 11-point Likert scale. The Kolmogorov-Smirnova test revealed that the data was not normally distributed. Therefore, Mann-Whitney U Test was employed to calculate the variations of IN across the convenience and difficulty in satisfying 24 human needs.

FINDINGS

The following tabulations show the (i) mean distribution of IN items, (ii) Mann-Whitney U Test results, and (iii) Mann-Whitney U Test results' interpretation.

Table 2: Mean Distribution of IN Items

Indicators	Code	\bar{x}	$\bar{x}IN$
My health and wellbeing depend on the outdoor environment that I live in	IN01	8.27	
I can recall old and pleasant experience when I was in the natural environment	IN02	8.19	
I can easily adapt to various types of outdoor temperature and surroundings	IN03	7.82	
I can see and hear what others usually miss in the natural environment	IN04	7.75	
I easily notice scientific details of the natural environment when I am outdoor	IN05	7.38	7.81
I can cope the outdoor environment physically, emotionally, and intellectually	IN06	7.74	
I feel the urge to spend time with nature after a long week being indoor	IN07	7.91	
I tend to lose concentration without sufficient contact with nature	IN08	7.77	
I tend to have objects from the natural environment in my personal space	IN09	7.66	
I spend some time planting at home	IN10	7.60	

Note. Mean Distribution of IN Items (\bar{x}) and Overall Mean of IN ($\bar{x}IN$)

Table 3: Mann Whitney U-Test Results

HON STAGES	HUMAN NEEDS	Difficult			Convenient			U	z	p
		N	$\bar{x}R$	\tilde{x}	N	$\bar{x}R$	\tilde{x}			
Physiological Needs	HN1	336	2137.64	7.9	3979	2159.72	8.0	661632.5	-3.12	.755
	HN2	423	2076.00	7.8	3892	2166.91	8.0	788473.5	-1.426	.154
	HN3	392	2348.89	8.2	3923	2138.93	7.9	694079.0	-3.183	.001
	HN4	1330	2002.27	7.8	2985	2227.39	8.0	1777905.0	-5.483	.000
	HN5	805	2098.78	7.9	3510	2171.58	8.0	1365100.5	-1.496	.135
	HN6	428	2087.98	7.9	3887	2165.71	8.0	801849.0	-1.225	.220
Safety & Security Needs	HN7	1114	2179.42	8.0	3201	2150.54	8.0	1759090.5	-.667	.505
	HN8	1861	2083.48	7.9	2454	2214.51	8.0	2144770.5	-3.423	.001
	HN9	1578	2010.32	7.8	2737	2243.14	8.0	1926460.0	-5.914	.000
	HN10	1325	2041.66	7.8	2990	2209.55	8.0	1826728.5	-4.085	.000
Belonging & Love Needs	HN11	1582	1991.20	7.7	2733	2254.55	8.1	1897920.0	-6.693	.000
	HN12	1310	2023.32	7.8	3005	2216.71	8.0	1791840.5	-4.690	.000
	HN13	328	2171.30	8.0	3987	2156.91	8.0	649505.0	-.201	.841
Esteem Needs	HN14	923	2173.37	8.0	3392	2153.82	8.0	1551218.0	-4.23	.672
	HN15	313	2284.32	8.1	4002	2148.12	7.9	586775.0	-1.863	.062
Cognitive Needs	HN16	390	2148.64	7.9	3925	2158.93	8.0	761726.5	-.156	.876
	HN17	836	2107.19	7.9	3479	2170.21	8.0	1411744.0	-1.314	.189
Aesthetic Needs	HN18	1678	2091.32	7.9	2637	2200.43	8.0	2100553.0	-2.805	.005
	HN19	1430	1993.60	7.8	2885	2239.49	8.1	1827686.5	-6.105	.000
	HN20	1453	1929.85	7.7	2862	2273.83	8.1	1747747.5	-8.574	.000
	HN21	1823	2041.64	7.8	2492	2243.12	8.1	2059330.0	-5.249	.000
Self-Actualization	HN22	336	2137.64	7.9	3979	2159.72	8.0	661632.5	-3.12	.755
	HN23	423	2076.00	7.8	3892	2166.91	8.0	788473.5	-1.426	.154
	HN24	392	2348.89	8.2	3923	2138.93	7.9	694079.0	-3.183	.001

*Note. Mean Rank of $\bar{x}\Sigma IN$ across Difficult and Convenient; **Bold** and highlighted shows higher mean rank.*

The analysis showed that 12 out of 24 test results were statistically significant, therefore suggesting that IN was statistically convenient in fulfilling all of the highlighted human needs (see Table 3).

Table 4: Mann Whitney U-Test Results Interpretation

HON	HUMAN NEEDS	INTERPRETATION
Physiological Needs	Nutritional and Wholesome Food	Respondents who indicated convenient had higher mean rank (N = 3979, $\bar{x}R = 2159.72$) than those who reported difficult (N = 336, $\bar{x}R = 2137.64$), but the difference did not reach statistical significance (U = 661632.5, p = .755).
	Access to Medical Care	Respondents who indicated convenient had higher mean rank (N = 3892, $\bar{x}R = 2166.91$) than those who reported difficult (N = 423, $\bar{x}R = 2076.00$), but the difference did not reach statistical significance (U = 788473.5, p = .154).
	Clean Water (For Drinking and Washing)	Respondents who indicated difficult had higher mean rank (N = 392, $\bar{x}R = 2348.89$) than those who reported convenient (N = 3923, $\bar{x}R = 2138.93$). A significant statistical difference was observed (U = 694079.0, p = .001).
	Clean and Fresh Air	Respondents who indicated convenient had higher mean rank (N = 2985, $\bar{x}R = 2227.39$) than those who reported difficult (N = 1330, $\bar{x}R = 2002.27$). A significant statistical difference was observed (U = 1777905.0, p = .000).
	Functional and Well-Maintained Lavatory	Respondents who indicated convenient had higher mean rank (N = 3510, $\bar{x}R = 2171.58$) than those who reported difficult (N = 805, $\bar{x}R = 2098.78$), but the difference did not reach statistical significance (U = 1365100.5, p = .135).
Safety and Security Needs	Sufficient Electrical Supply	Respondents who indicated convenient had higher mean rank (N = 3887, $\bar{x}R = 2165.71$) than those who reported difficult (N = 428, $\bar{x}R = 2087.98$), but the difference did not reach statistical significance (U = 801849.0, p = .220).
	Affordable Housing and Conveniences	Respondents who indicated difficult had higher mean rank (N = 1114, $\bar{x}R = 2179.42$) than those who reported convenient (N = 3201, $\bar{x}R = 2150.54$), but the difference did not reach statistical significance (U = 1759090.5, p = .505).
	Financial Security and Stability	Respondents who indicated convenient had higher mean rank (N = 2454, $\bar{x}R = 2214.51$) than those who reported difficult (N = 1861, $\bar{x}R = 2083.48$). A significant statistical difference was observed (U = 2144770.5, p = .001).
	Personal Safety and Security	Respondents who indicated convenient had higher mean rank (N = 2737, $\bar{x}R = 2243.14$) than those who reported difficult (N = 1578, $\bar{x}R = 2010.32$). A significant statistical difference was observed (U = 1926460.0, p = .000).
	Health Insurance	Respondents who indicated convenient had higher mean rank (N = 2990, $\bar{x}R = 2209.55$) than those who reported difficult (N = 1325, $\bar{x}R = 2041.66$). A significant statistical difference was observed (U = 1826728.5, p = .000).
Belonging and Love Needs	Work-Life Balance	Respondents who indicated convenient had higher mean rank (N = 2733, $\bar{x}R = 2254.55$) than those who reported difficult (N = 1582, $\bar{x}R = 1991.20$). A significant statistical difference was observed (U = 1897920.0, p = .000).
	Social Acceptance and Cultural Inclusivity	Respondents who indicated convenient had higher mean rank (N = 3005, $\bar{x}R = 2216.71$) than those who reported difficult (N = 1310, $\bar{x}R = 2023.32$). A significant statistical difference was observed (U = 1791840.5, p = .000).
	Effective Communication Network	Respondents who indicated difficult had higher mean rank (N = 328, $\bar{x}R = 2171.30$) than those who reported convenient (N = 3987, $\bar{x}R = 2156.91$), but the difference did not reach statistical significance (U = 649505.0, p = .841).
	Access to Internet with Reliable Connectivity	Respondents who indicated difficult had higher mean rank (N = 923, $\bar{x}R = 2173.37$) than those who reported convenient (N = 3392, $\bar{x}R = 2153.82$), but the difference did not reach statistical significance (U = 1551218.0, p = 672.).
Esteem Needs	Primary Education Attainment	Respondents who indicated difficult had higher mean rank (N = 313, $\bar{x}R = 2284.32$) than those who reported convenient (N = 4002, $\bar{x}R = 2148.12$), but the difference did not reach statistical significance (U = 586775.0, p = .062).
	Secondary Education Attainment	Respondents who indicated convenient had higher mean rank (N = 390, $\bar{x}R = 2158.93$) than those who reported difficult (N = 3925, $\bar{x}R = 2148.64$), but the difference did not reach statistical significance (U = 761726.5, p = .876).
Cognitive Needs	Tertiary Education Attainment	Respondents who indicated convenient had higher mean rank (N = 3479, $\bar{x}R = 2170.21$) than those who reported difficult (N = 836, $\bar{x}R = 2107.19$), but the difference did not reach statistical significance (U = 1411744.0, p = .189).
	Employment Prospects and Opportunities	Respondents who indicated convenient had higher mean rank (N = 2637, $\bar{x}R = 2200.43$) than those who reported difficult (N = 1678, $\bar{x}R = 2091.32$). A significant statistical difference was observed (U = 2100553.0, p = .005).

Note. Result Interpretation of Mann Whitney U Test; Bold & Highlighted shows statistically significant output.

Table 4: Mann Whitney U-Test Results Interpretation (continued)

HON	HUMAN NEEDS	INTERPRETATION
Aesthetic Needs	Well-Kept Areas for Recreational Activities	Respondents who indicated convenient had higher mean rank (N = 2885, $\bar{x}R = 2239.49$) than those who reported difficult (N = 1430, $\bar{x}R = 1993.60$). A significant statistical difference was observed (U = 1827686.5, p = .000).
	Rich Biodiversity of Flora and Fauna	Respondents who indicated convenient had higher mean rank (N = 2862, $\bar{x}R = 2273.83$) than those who reported difficult (N = 1453, $\bar{x}R = 1929.85$). A significant statistical difference was observed (U = 1747747.5, p = .000).
Self-Actualization Needs	Rights to Participate in Leadership Selection	Respondents who indicated convenient had higher mean rank (N = 2492, $\bar{x}R = 2243.12$) than those who reported difficult (N = 1823, $\bar{x}R = 2041.64$). A significant statistical difference was observed (U = 2059330.0, p = .000).
	Freedom of Expression	Respondents who indicated convenient had higher mean rank (N = 3979, $\bar{x}R = 2159.72$) than those who reported difficult (N = 336, $\bar{x}R = 2137.64$), but the difference did not reach statistical significance (U = 661632.5, p = .755).
	Opportunities Free from Corruption	Respondents who indicated convenient had higher mean rank (N = 3892, $\bar{x}R = 2166.91$) than those who reported difficult (N = 423, $\bar{x}R = 2076.00$), but the difference did not reach statistical significance (U = 788473.5, p = .154).
	Artistic and Cultural Freedom	Respondents who indicated difficult had higher mean rank (N = 392, $\bar{x}R = 2348.89$) than those who reported convenient (N = 3923, $\bar{x}R = 2138.93$). A significant statistical difference was observed (U = 694079.0, p = .001).

Note. Result Interpretation of Mann Whitney U Test; Bold & Highlighted shows statistically significant output.

Table 5: Summary of Findings

Statistically Significant Difference Established (p < .000)		Difference Did Not Reach Significance	
Condition 1:	Condition 2:	Condition 3:	
IN Increase with Difficulty	IN Increase with Convenient	Neither Change IN	
The difficulty to meet the human need increases IN, or IN is greater with difficulty to meet the human need.	The convenience to meet the human need increases IN, or IN is greater with convenience to meet the human need.	Neither convenience or difficulty to meet the human need increases IN, or IN does not change with convenience nor difficulty to meet the human need.	
HON	Code Human Needs	Findings/Condition	
DEFICIENCY NEEDS	Physiological Needs	HN01 Nutritional and Wholesome Food	Condition 3
		HN02 Access to Medical Care	Condition 3
		HN03 Clean Water (for Drinking and Washing)	Condition 1
		HN04 Clean and Fresh Air	Condition 2
		HN05 Functional and Well-Maintained Lavatory	Condition 3
	Safety & Security Needs	HN06 Sufficient Electrical Supply	Condition 3
		HN07 Affordable Housing and Conveniences	Condition 3
		HN08 Financial Security and Stability	Condition 2
		HN09 Personal Safety and Security	Condition 2
		HN10 Health Insurance	Condition 2
	Belonging & Love Needs	HN11 Work-Life Balance	Condition 2
		HN12 Social Acceptance and Cultural Inclusivity	Condition 2
		HN13 Reliable Communication Network	Condition 3
		HN14 Access to Internet with Reliable Connectivity	Condition 3
	Esteem Needs	HN15 Primary Education Attainment	Condition 3
		HN16 Secondary Education Attainment	Condition 3
		HN17 Tertiary Education Attainment	Condition 3
GROWTH NEEDS	Cognitive Needs	HN18 Employment Prospects and Opportunities	Condition 2
		HN19 Well-Kept Areas for Recreational Activities	Condition 2
	Aesthetic Needs	HN20 Rich Biodiversity of Flora and Fauna	Condition 2
		HN21 Rights to Participate in Leadership Selection	Condition 2
	Self-Actualization	HN22 Freedom of Expression	Condition 3
		HN23 Opportunities Free from Corruption	Condition 3
		HN24 Artistic and Cultural Freedom	Condition 1

The mean distribution across IN items, varying from 7.38 to 8.27, indicated that the Malaysian respondents had a strong positive sentiment on IN (see Table 2). All of them were asked to indicate whether the human needs were convenient or difficult to meet. Most respondents—between half and three-quarters—claimed it was convenient to meet all of the 24 needs (see Table 3). The Mann-Whitney U Test was then performed using the averaged means of all IN items. The mean variations of IN were compared between two positions (convenient and difficult).

The statistical findings indicated that IN increased when 10 of the human needs were convenient to meet. These needs were (i) clean and fresh air, (ii) financial security and stability, (iii) personal safety and security, (iv) health insurance, (v) work-life balance, (vi) social acceptance and cultural inclusivity, (vii) employment prospects and opportunities, (viii) well-kept areas for recreational activities, (ix) rich biodiversity of flora and fauna, and (x) rights to participate in leadership selection. Interestingly, the difficulty of meeting 2 of the human needs, namely (i) clean water and (ii) artistic and cultural freedom, significantly elevated IN. Nevertheless, IN did not significantly change with convenience nor difficulty to fulfil the remaining 12 human needs (see Table 4 and Table 5).

DISCUSSION AND CONCLUSION

Interestingly, the findings showed that difficulties in meeting clean water and artistic and cultural freedom as well as convenience in meeting the 10 of highlighted human needs fosters nature-interaction. Additionally, meeting human needs and fostering IN can grow along separate paths, as evidenced by the lack of statistical interactions between IN and the remaining 12 human needs.

Difficulties in access to clean water may drive individuals to become ecologically conscious and advocate for water conservation. When individuals are inaccessible to clean water infrastructure, they may turn to nature as the natural source for crucial backup options. A greater connection to nature and its cycles may be fostered through difficulties in getting clean water. As individuals grow more conscious of the need to protect and maintain water supplies, they may interact with nature more to better understand its dynamics and manage water resources.

The concept of compensatory behaviour in psychology may help to explain why there was a significant rise in IN when artistic and cultural freedom were difficult to attain. Individuals may seek solace and fulfilment elsewhere when faced with restrictions in one area of their lives. An opportunity to detach from daily struggles and experience serenity and tranquillity can be found by spending time in nature. This suggests that immersion in nature provides means for unconstrained self-expression. Additionally, a sense of independence and release from restraints can be attained via IN.

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