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Review Article

Maslow's Hierarchy of Needs Theory in Environmental Sociology: Systematic Literature Review on The Use of a Theory

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Abstract: As part of humanities study, environmental sociology research should be based on humanities theories. Various theories have been used in environmental sociology research, including Maslow's Hierarchy of Needs (HON) theory. A literature review is needed to determine the popularity and application of HON. From the online databases Scopus and Web of Science, 26 relevant and eligible research articles were found to be studied. Although HON was found in environmental sociology articles published in 2005, the increase has only been seen since 2020. This article contains a table describing how HON has been used in the 26 articles found. In conclusion, the environmental sociology research articles that mostly use HON were published in 2023 and were written by researchers from China. The 26 articles can be grouped into several fields of study, including environmental behaviour, urban development, community adaptation, green technology, resource management, and eco-friendly transportation. Most studies still rely on secondary data source and use statistical analysis.

Keywords: Hierarchy of needs; Maslow's hierarchy; Maslow's theory; theory in environmental sociology; use of Maslow theory

Introduction

Long before Samuel used the term Environmental Sociology in On Man in His Environment, (1971), previous sociologists had implicitly shown high concern for the environment. Weber in Economy and Society (1921) stated that the current increase in scientific knowledge tends to only support capitalists to exploit nature. Durkheim also predicted the scarcity of natural resources that would occur due to an increase in population that was not balanced by an increase in society's ability to manage the environment (The Division of Labor in Society, 1893). Even Karl Max, in the first volume of Das Kapital (1867), discussed agricultural fields that were no longer fertile and polluted when talking about capitalist agriculture. It would be surprising if sociology was reluctant to talk about nature and environment because Comte as "father of Sociology", in Course de Philosophie Positive (1830), brought together social sciences and natural sciences in the last three volumes so that social sciences could be studied positively through social statistics and social dynamics as a natural phenomenon.

Dunlap and Catton's paper entitled Environmental Sociology (1979), published in the journal Annual Review of Sociology, marked the birth of a new subfield in sociology, which is now called Environmental Sociology (ES). This is not only because the paper can clearly describe the development and scope of ESS studies, but more because this paper functions as a conclusion of their previous paper entitled Paradigm,

Theories, and Primary of HEP-NEP Distinction (Catton & Dunlap 1978). In this paper, Catton and Dunlap first explain the perspective of classical sociologists who are too anthropocentric and call it the Human Exceptional Paradigm (HEP). After that, they compare it with recent studies that show that humans are also influenced by their environment, which is then called the New Environmental Paradigm (NEP). Fortunately, HEP and NEP are not tied to certain theories so that sociological theories before and after can be used in both paradigms.

Many theories have been used in environmental studies, such as the Theory of Planned Behavior (Ajzen, 1991), the Theory of Protection Motivation (Roger, 1975), and the Theory of Hierarchy of Needs (Maslow, 1943). The Theory of Planned Behavior (TPB) is an evolution of the Theory of Reasoned Action (Ajzen 1980), which was pioneered by Ajzen since 1985 in his article entitled From Intention to Action: A Theory of Planned Behavior. However, the addition of one independent variable in that article (Perceived Behavioral Control) is more felt as a complement to the shortcomings of the Theory of Reasoned Action. TPB was only considered to be independent after Ajzen explained about Belief that underlies the three variables in his writing entitled Organizational Behavior and Human Decision Process in 1991. Until 2020, there were at least 126 environmental studies that used the Theory of Planned Behavior (Yuriev 2020).

The Protection Motivation Theory (PMT) was first proposed by Rogers in 1975 and then revised in 1983 (Maddux & Roger, 1983) when discussing the Effect of Fear Appeal and Attitude Change. PMT states that people's motivation to protect something is influenced by two things: Threat Appraisal and Coping Appraisal. Threat Appraisal consists of Vulnerability, Severity and Reward while Coping Appraisal consists of Response Efficacy, Self Efficacy and Cost. These factors will influence people to make an adaptive response or a maladaptive response. Until 2019, there were at least 22 environmental studies that used this protection motivation theory (Kothe et. Al. 2019)

The Hierarchy of Needs Theory (HON) was proposed by Abraham Maslow in his writing entitled A Theory of Human Motivation (1943). He arranged human needs into 5 levels, namely physiological needs, safety, belonging/social relationships, esteem, and self-actualization. Unfortunately, HON is often understood only as stating that humans will fulfill basic needs before fulfilling needs at the next level (Koltko Rivera 2006), even though Maslow also explains on page 375—with the example of the need for bread—that the fulfillment of a need will open the way for the presence of other needs without standardizing the order of these needs. Responding to the X & Y theory popularized by McGregor since 1960, Maslow complemented THK by adding one more level on HON, namely Self-Transcendence in his writing entitled The Farther Reaches of Human Nature (1971) after he studied Peak Experience (Maslow 1962) and B-Cognition (Maslow 1964).

Despite the lack of empirical data support and the many criticisms from subsequent expert research, HON is very popular in various fields to this day. In the health sector, HON is used to examine the needs of informal caregivers of chronic non-communicable disease patients (Yang et. Al., 2023) and the needs of patients undergoing hemodialysis (Asaduddin and Arofiati, 2023). In the education research, HON has been found on the impact of COVID-19 on student needs and outcomes (Gardner, 2024) and teacher job satisfaction in Malaysian Technical and Vocational Education and Training (TVET) institutions (Rokeman et al., 2023). In the humanitarian research, HON has also been used to determine life satisfaction in 48 countries (Pawsey et al., 2023), the technology needs of vulnerable communities (Oghenemaro Anuyah et al., 2023), and the needs of pedestrians in urban morphology (Elzeni et al., 2022).

Unfortunately, there has not been a systematic review of research using Maslow's Hierarchy of Needs Theory in articles related to Environmental Sociology. This study has three objectives: (1) to explore the spatial and temporal pattern of the research in Environmental Sociology that uses Maslow's Hierarchy of Needs, (2) to find out the data collection and analysis methods used by previous researchers and (3) to find out the interest of research and the function of Maslow's Hierarchy of Needs in Environmental Sociology

Methodology

1. Prisma Statement

The PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) Statement was

followed to conduct this study. Because of its stringent guidelines for reporting randomized trial assessment reviews—which can also serve as a foundation for publishing thorough reviews of other kinds of studies, such as intervention evaluations, the PRISMA statement (Moher et. Al., 2009) was selected for this particular study (PRISMA 2021).

2. Research Questions

This study has included three key components in the review: public awareness (issue), coastal conservation (interest), and research focus (context). Thus, this study poses the following questions. First, what is the spatial and temporal pattern of the research in Environmental Sociology that uses Maslow's Hierarchy of Needs? Second, what are the data collection and analysis methods used by previous researchers? Third, what is the interest of research and the function of Maslow's Hierarchy of Needs in Environmental Sociology?

3. Research Strategy

Identification

Identification is the process of determining the keywords that will be used to search for research articles in Scopus and Web of Science. The keywords used in this investigation are and. The word "ecology" was deliberately not included to eliminate possible bias with disciplines that are too far from "environmental sociology" such as "biology". The use of the word "environment" alone has resulted in so many searches that it requires filtering to separate "environmental sociology" articles from other articles that are quite dominant, such as "environmental science" or "work environment". 255 papers were found with "Maslow" and "Environment" written on them.

Screening

First, each of the 255 articles was screened to remove duplicate records. A total of 49 publications were removed from the database due to duplication, leaving 206 articles. To verify the quality of the review, the remaining 206 papers underwent another screening process. Only 35 journals related to Environmental Sociology were retrieved. To further reduce ambiguity, only research publications published in English with open access were included in the review. 170 articles were removed from consideration because they did not meet the inclusion criteria. The third procedure involved determining eligibility, and this is where the remaining 35 articles were used.

Eligibility

The third stage was eligibility, where the authors manually sorted all the articles they had retrieved to ensure that, after going through the screening process, each remaining article met the standards. A total of 9 articles were excluded because they did not focus on public awareness of coastal protection. Thus, only 26 articles passed to the next stage.

Quality Appraisal

The 26 articles were selected because they were considered to be good enough, and there were no references to assess the quality of research in this field.

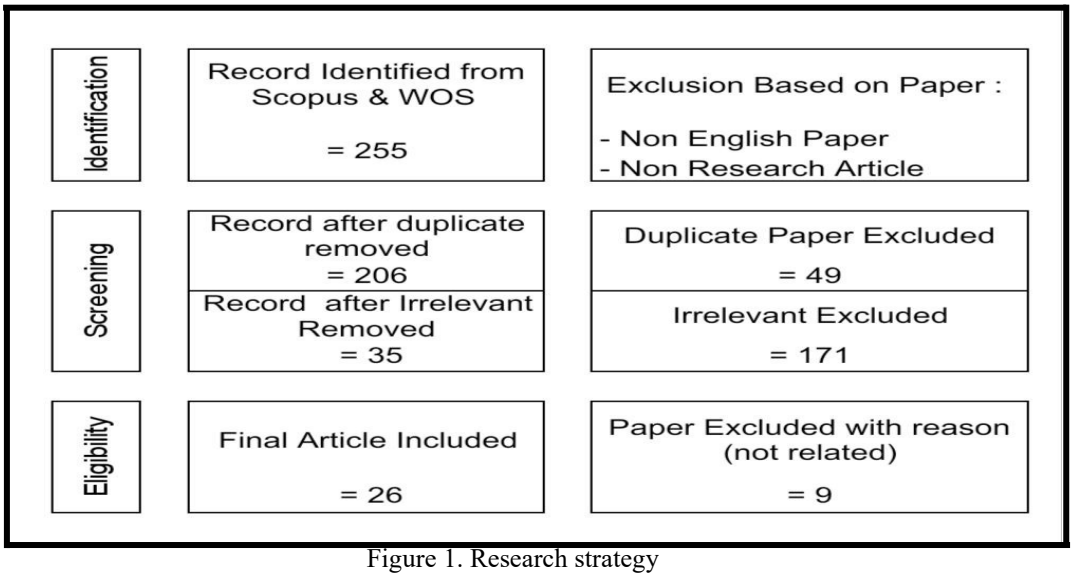

Figure 1. Research strategy

Tabel 1. Keyword search string

Database	Search String
Web of Science	TOPIC : maslow (All Fields) and Environment (Search within all fields)
Scopus	(TITLE-ABS-KEY (maslow) AND (Environment))

Data Abstraction and Analysis

All comparable or related abstracted data was gathered together. After a careful examination, this study's four main topics were identified related to HON in Environmental Sociology. First, spatial and temporal of article distribution. Second, type of data collection and analysis. Third, theme of research. Fourth, HON uses in research

The Findings

1. Spatial and Temporal Distribution Of Selected Articles

There are 26 articles ranging from 2005 to 2024. However, it is only since 2020 that there has been significant consistency and growth. It can also be said that the increase after the COVID-19 pandemic is significantly greater than the growth after the 2017 SDGs. Chinese researchers have shown great interest in the use of HON in environmental sociology, publishing 15 works. Malaysia (three articles) and the United States (two articles) are far behind. Jordan, Finland, Mexico, the Netherlands, Sweden, and Canada have only published one article each. China's dominance in "HON-Environmental Research" is in line with its current industrial and economic dominance.

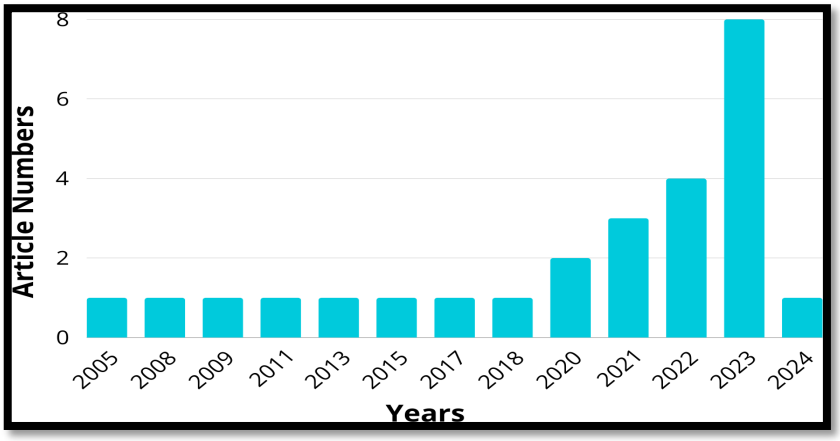

Figure 2. Number of articles / years

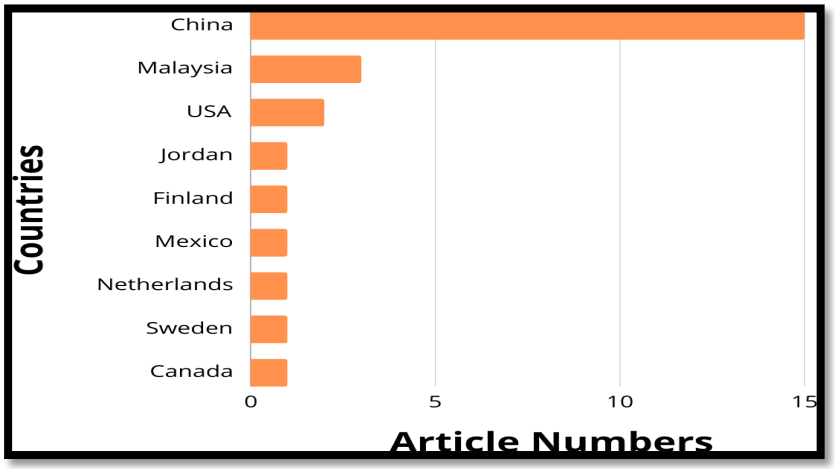

Figure 3. Numbe of articles / Countries (put below the figure)

2. Maslow's Hierarchy of Needs (HON) Theory in Environmental Sociology—Contextual Issues

This study found 3 main contextual issues: 1) the use of data collection methods and 2) the use of data analysis methods in selected articles. Then this study will 3) summarize the use of HON in each article. Most articles use secondary data (46.7%) and surveys (33.3%) in data collection. Followed by interviews (6.7%), case studies (6.7%), experiments, and observations (each 3.3%). The data obtained were also analyzed statistically (46.2%), simply classified (33.6%), or processed with the Structural Equation Model (11.5%). Some were even analyzed with the "try and error" system (3.8%) and algorithms

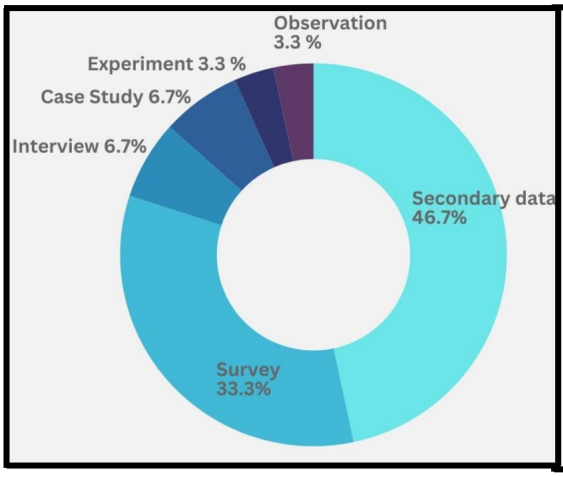

Figure 3. Data collections methods

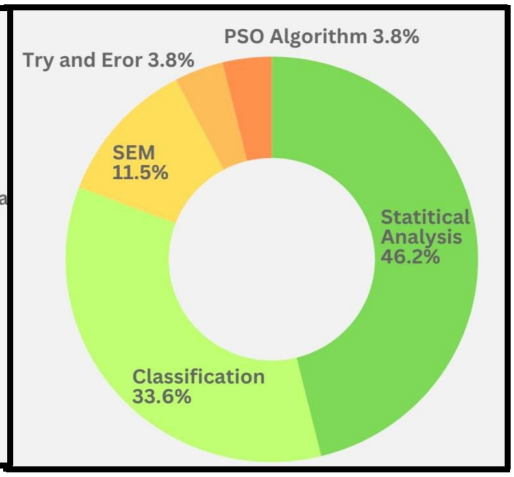

Figure 4. Data analysis method

Table 2. Related Finding to HON in environmental sociology

No	Author	Title	Finding related to Hierarchy of Need (HON)
1	Lam S.; Li H.; Yu A.T.W.	A demand-side approach for linking the past to future urban – rural development	Classical HON has transformed into indicator-based HON.
2	Ren Y.; Shen L.; Wei X.; Wang J.; Cheng G.	A guiding index framework for examining urban carrying Capacity	HON is used to provide an index that measures social carrying capacity.
3	Walsh P.R.	A policy framework for sustainability in developing countries: Applying value chain theory to a society's hierarchy of needs	HON integrated with Rogers' Value Chain Theory

4	Niu C.; Chang J.; Wang Y.; Shi X.; Wang X.; Guo A.; Jin W.; Zhou S.	A Water Resource Equilibrium Regulation Model Under Water Resource Utilization Conflict: A Case Study in the Yellow River Basin	HON and the Gini coefficient are used as a basis for building a model for regulating the balance of water resources from the demand side and applied
5	Brink M.; van Bronswijk J.E.M.H.	Addressing maslow's deficiency needs in smart homes	HON can be used as a guideline for urban development.
6	Lin H.; Wang W.; Zou Y.; Chen H.	An evaluation model for smart grids in support of smart cities based on the Hierarchy of Needs Theory	HON is used as the basis for smart city development needs.
7	Chan K.H.; Chong L.L.; Ng T.H.	Are Malaysian companies ready for environmental practices? An extension of theory of planned behavior	The actualization needs in HON and the corporate norm are positively related to the intention among companies to be environmentally friendly.
8	Udo V.E.; Jansson P.M.	Bridging the gaps for global sustainable development: A quantitative analysis	HON is used to conclude that struggling nations care less about environmental sustainability than advanced and stable ones.
9	Pan W.; Hou B.; Yang R.; Zhan X.; Tian W.; Li B.; Xiao W.; Wang J.; ZhouY.; Zhao Y.	Conceptual framework and computational research of hierarchical residential household water demand	HON is used to categorize and analyze household water demand.
10	Pennington D.D.	Cross-disciplinary collaboration and learning.	HON became one of three perspectives that show the need for cross-disciplinary collaborative study and thinking.
11	Yuan C.; Sun Y.; Lv J.; Lusk A.C.	Cycle tracks and parking environments in China: Learning from college studentsat peking university.	HON evolved into Maslow's Transportation Level of Service.
12	Soikkeli A.	Exploring Arctic housing and village planning based on Maslow's hierarchy of needs.	HON is used to examine how local communities' social and cultural needs have been implemented in village relocation.
13	Bakar A.A.	Exploring The Nexus Of Nature-Interaction And Human Needs Maturity	HON is used to classify types of needs for the home (physiological, safety, and social needs)
14	Bakar A.A.	From Maslow To The Environment: Investigating The Influence Of Human Needs In Shaping Eco-Personality	HON is one of three concepts that explore the relationship between twenty-four human needs and interactions with nature.
15	Ju Q.; Liu C.; Jiang S.	Integrated Evaluation of Rivers Based upon the River Happiness Index (RHI): Happy Rivers in China	HON was used to evaluate River Happines Index.
16	Zhai T.; Chang M.; Li Y.; Huang L.; Chen Y.; Ding G.; Zhao C.; Li L.; Chen W.; Zhang P.; Cai E.; Lei C.; Wang J.	Integrating Maslow's Hierarchy of Needs and Ecosystem Services into Spatial Optimization of Urban Functions	HON is used to produce the Maslow scenario of ecosystem service supply and demand.
17	Chen Y.; Yang W.; Hu Y.	Internet Development, Consumption Upgrading and CarbonEmissions—An Empirical Study from China	HON theory and consumer behavior are used to analyze increasing consumption, internet development, and carbon emissions in an integrated research framework.
18	Wu Z.; Liu L.; Li S.; Wang H.	Investigating the crucial aspects of developing a healthy dormitory based on maslow's hierarchy of needs—A case study of Shenzhen	HON can be used to identify three influencing aspects, which include 17 measurement indicators.
19	Huang J.; Jiang W.; Cao D.; Zhan Y.	Just Transition in Response to Climate Change: A Case Study of Trans-Altitude Migrant Resettlement on the Qinghai-Xizang Plateau	HON serves as a theoretical framework for studying justice transitions in migrant resettlement.

20	Pan Z.; Luo T.; Zhang M.; Cai N.; Li Y.; Miao J.; Li Z.; Pan Z.; Shen Y.; Lu J.	MagicChem: a MR system based on needs theory for chemical experiments	HON provides a way to design a comfortable and stimulating virtual experiment system with realistic visual presentation and interaction.
21	Arias Schreiber M.; Gillette M.B.	Neither Fish Nor Fowl : Navigating Motivations for Fisheries Participation and Exit in Sweden	Three categories of HON were used as co-existing needs to investigate Swedish fishers' motivations for considering fisheries exit
22	Wu J.; Gao G.; Zhang B.; Yang Z.	Relationships between economic development and resident environmental behavior and participation in areas with different economic and similar natural and cultural conditions.	HON or 'Affluence hypothesis'and 'Challenge-response Model' alone cannot explain the Economic development level (EDL) and environmental behavior participation (EBP) relationships
23	Al-Habaibeh A.; Al-haj Moh'd B.; Massoud H.; Nweke O.B.; Al Takrouri M.; Badr, B.E.A.	Solar energy in Jordan: Investigating challenges and opportunities of using domestic solar energy systems	nd self-determination theory show that the motive for solar energy installations is cost reduction (extrinsic), not environmental protection (intrinsic).
24	Liu H.; Xing L.; Wang C.; Zhang H.	Sustainability assessment of coupled human and natural systems from the perspective of the supply and demand of ecosystem services	HON is used as the basis for creating an ecosystem service supply index.
25	Waliczek T.M.; Zajicek J.M.; Lineberger R.D.	The influence of gardening activities on consumer perceptions of life satisfaction	Gardening is a hobby that allows the participant to produce food to meet physiological lower-level needs on HON and create self-actualization to meet the top HON needs.
26	Fang Z.; Li Q.; Shaw S.-L.	What about people in pedestrian navigation?	HON is used to categorize pedestrian navigation needs.

3.The Themes in Maslow's Hierarchy Of Needs (HON) Theory In Environmental Sociology Research - Thematic Analysis

This study discovered 6 main themes for hierarchy of needs in environmental sociology which were, Environmental Behavior, Urban Development, Communities Adaptation, Green Technology, Resource Management and Eco-Friendly Transportation.

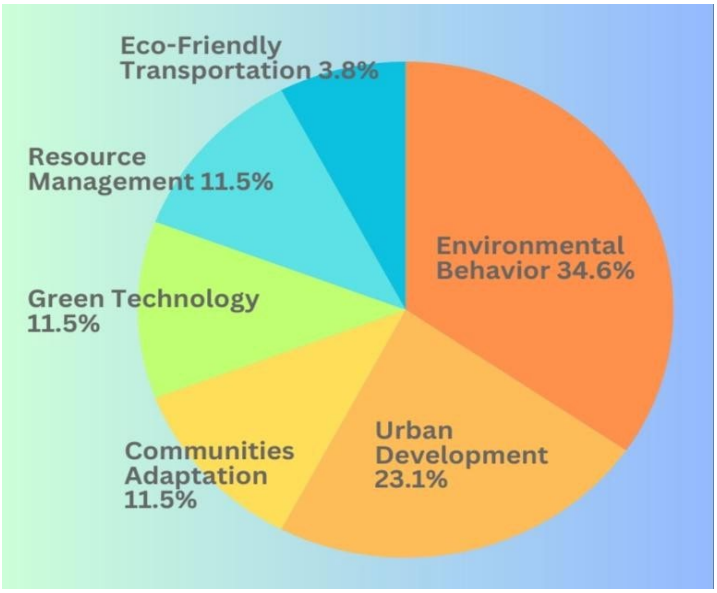

Figure 6. Research themes

Environmental Behavior

In the studies of environmental behavior HON has been widely used. The self-actualization variable in HON was shown to influence the environmentally friendly behavior of 107 companies in Malaysia (Chan et al., 2020). The Performance Index of 132 countries implementing SDGs is directly proportional to HON if the 132 countries are categorized into 5 classes (Udo et al., 2009). Based on HON, human needs are broken down into 24 types, not all of which affect the environmental concerns (bakar et al 2023a) and ecological lifestyles (Bakar et al., 2023b) of 4315 Malaysian people. HON has also been used to explain motivation in "Individual Process" that influences collaborative research and learning to solve complex problems (Pennington et al 2008).

HON-based surveys have shown that fishermen in Sweden are motivated to stop because of conflicts with seals, environmental regulations, and the role of government agencies (Arias et al., 2021). Critics of HON suggest that the relationship between Environmental Behavior and Protection (EBP) and Economic Development Level (EDL) is not linear but is specific to behavior and region (Wu et al., 2023). HON is used together with the concept of ecosystem services to produce the Ecosystem Service Supply Index (ESSI) and the Human Demand Index (HMDI). From 2010 to 2020, ESSI decreased and HMDI increased in 338 prefectural cities in China. (Liu et al 2023). Based on HON, gardening has been shown to fulfill 2 levels of needs, namely producing food to meet basic physical needs and producing life satisfaction to meet self-actualization needs. (Waliczek et al., 2005)

Urban Development

Classical HON evolved into indicator-based HON and was tested using the Structural Equation Model (SEM). urban-rural development framework can fulfill contemporary HON physio-psychological needs almost instantaneously (Lam et al., 2021). HON is used as a framework to build an index that tests Social Carrying Capacity, which is one of the pillars of Urban Carrying Capacity (UCC). The other two pillars of UCC are Economic Carrying Capacity and Environmental Carrying Capacity (Ren et al., 2021) Hon is used with Value Chain Theory to conduct a framework for prioritizing policy-related sustainable development. The model generated from the framework was tested using regression analysis using data from 45 countries. The results showed that people's psychological satisfaction is related to environmental and social sustainability. (walsh., 2011).

HON was used to investigate 28 smart home prototypes in the Netherlands. HON can also be used as a guide by developers and marketers (Brink et al., 2013). HON is integrated with ecosystem services to optimize the function of urban space in Zengzhou, China. The results show that the urban center is the area with the best service ecosystem. The western and southern regions are the areas that provide the most general ecological services and goods (Zhai et al., 2023). HON is used as the basis for identifying three factors that influence the development of healthy dormitories at Shenzhen University, including 17 measurement indicators. The results show that the three factors (building performance, bodily sensation, and humanistic environment) have a positive impact on the development of healthy dormitories. (Wu et al., 2020)

Communities Adaptation

HON was used to examine the social and cultural needs of local communities that were taken into account in village relocations carried out in the 1950s. For housing needs, researchers emphasize the need for an additional 3 levels in HON, namely cognitive needs, aesthetic needs, and transcendence needs. All three are above-esteem needs (Soikkeli et al., 2024). HON is used with customer behavior theory to analyze consumption upgrading, internet development, and carbon emissions. Internet development will contribute to carbon emission increasement and consumption upgrading (Chen et al., 2022). HON is used as a theoretical framework to examine just transitions in migrant resettlement on the Qinghai-Xizang Plateau. The local community has achieved significant progress in material security, spiritual needs, and self-development (Huang et al., 2023).

Green Technology

HON and Self-Determination Theory were able to explain the finding of 366 Jordanian solar energy consumer behavior. Consumers will invest in solar energy because they consider it a basic daily physiological need (Al-Habaibeh et al., 2023). HON is used as a base for smart city development needs and creates an evaluation index system of smart grids (Lin et al., 2023). HON was used to design a comfortable and stimulant mixed reality system for a virtual chemical experiment. This system called MagicChem E4 has proven to satisfy users (Pan et al., 2022)

Resource Management

HON and the Gini coefficient were utilized to create a water resource equilibrium control model for the Yellow River Basin (YRB), and the findings reveal that the model achieves spatial and temporal equilibrium (Niu et al., 2022). HON was used to establish a level and grade of household water demand. The result contributes to the prediction on water demand (Pan et al., 2018). HON, World Happiness Report, and 2030 SDGs were combined to produce the River Happiness Index (RHI) and its indicator system. The result shows that China's RHl is at medium level (Ju et al., 2022).

Eco-Friendly Transportation

In the study of eco-friendly transportation, Maslow's HON has evolved into Maslow's Transportation Level of Service (LOS), with safety and security as basic needs. Comfort and convenience are higher-level needs. LOS is the basis of a survey conducted on 410 students at Peking University in Beijing. The survey results showed that the campus parking area was still lacking order (Yuan et al., 2017). HON has also become a guide for creating pedestrian applications in 3 layers: physical sense layer, physiological safety layer, and mental satisfaction layer (Fang et al., 2015).

Discussion

Technically, avoiding the use of the term "ecology" is intended to reduce unrelated search results. However, behind that, there is concern about the unclear boundaries between "environmental sociology," which is under the social sciences, and "human ecology," which is under the natural sciences. More efforts are needed to clarify the boundaries of the two, such as the efforts made by Durkheim when separating "sociology" from "psychology". It is well known that several countries other than China may also have many similar studies that use the term "human ecology." However, since China is very close to the socialist and communist systems, it is not surprising that they tend to lean more towards "environmental sociology."

Another thing that is not yet certain is the motive for the drastic increase in the number of studies above 2020. Awareness of the need for a good environment could have been triggered by the achievement of the SDGs or Covid19 which taught the world that a good nature is much more needed than an advanced industry. There is also the possibility that what actually increased was the ability of researchers to apply Maslow's theory to research methodology because in the screening process, many studies were found to use HON only as a reference but did not reach the methodology stage.

In terms of thematics, it is very natural that the use of Maslow's theory is dominated by the fields of Environmental Behavior and Communities Adaptation because HON actually comes from the field of psychology. In Sociology, the use of Maslow's theory tends to be in studies with the paradigm of Social Behavior, not Social Facts or Social Meaning. It is also encouraging that HON is also widely used in the fields of management and technology. The dominance of the use of secondary data and statistical analysis is predictable because the fields of technology and management tend to be quantitative research. The fields of Psychology and Social Behavior themselves usually combine qualitative and quantitative research. This may explain why interviews are in third place.

Conclusion

The increase in the number of articles using HON began in 2020. This may be due to the awareness of the need for a good environment after the COVID-19 pandemic. Alternatively, it could be attributed to the delayed

outcomes of the SDGs nature awareness campaign. China is the largest producer of articles. This is clearly related to its vast area, diverse nature, and dense population, as well as the increase in industry and hegemony on a global scale. Studies related to Maslow's theory still rely on secondary data and surveys. This shows that studies are still dominated by quantitative approaches and are in line with the majority of data analysis carried out through statistical processing. The classification system that also dominates is widely used to process qualitative data. The majority of HON is used by environmental sociology in the themes of Environmental Behavior and Participation, Urban development, and Community Adaptation. This is understandable because HON itself comes from a theory that focuses on human behavior and motivation. Most articles use HON to build theoretical frameworks, determine index standards, and function as indicators for creating survey questions.

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***Conflicts of Interest**:* The authors declare no conflict of interest.

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