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PLANNING AND DEVELOPING RESILIENT INFRASTRUCTURE WITH INDIAN KNOWLEDGE SYSTEM (IKS) MODELS TO ADDRESS CLIMATE CHANGE

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ABSTRACT

Environmental sustainability has become a pressing concern due to the significant impact of climate change, which has caused considerable trouble, and there is an obvious need for integrating infrastructure resilience against climate change. This study focuses on exploring the phenomenon of the Indian Knowledge System (IKS) as a key factor in enhancing infrastructure resilience against climate change. The study implemented a mixed-method research design for the purpose of accumulating empirical data from quantitative and primary information that was later contextualised with the help of qualitative and thematic analysis from secondary sources. The findings strongly associate the inclinations of traditional and indigenous knowledge capacities, such as the Indian knowledge system, contributing immensely toward the development and growth of environmental sustainability and ecological responsibility, along with social and communal harmony, as essential teachings that also fall in relation to building infrastructural resilience to climate change.

KEYWORDS: Indian Knowledge System, IKS, infrastructural resilience, sustainability, climate change

1. INTRODUCTION

1.1. Overview and Rationale

Environmental sustainability and infrastructure resilience against climate change have become an imperative global issue in the 21st century, with the advent and glaring integration of interventions on a global and regional basis. Sustainable development and its adoption internationally have given rise to the conceptualisation of building environmental and socially inclusive development and development models, in addition to being economical. However, the indigenous knowledge system has become rather overlooked rather than being prioritised, yet it is noted that such indigenous systems are focused on sustainability. Indian Knowledge System (IKS) has been strongly ingrained into deep philosophical, religious, and cultural conventions, all the while providing holistic solutions that are radical and sustainable in nature for environmental management and show strong reflection with SDG (Shroff, 2025). The integration, as indicated, indicates the use of indigenous knowledge, such as IKS, holding an influential part in building a sustainable development for infrastructure development, such as in the case of conservation and development.

Indian Knowledge System (IKS) is a diverse and deep amalgamation of selected knowledge and practices that have been built throughout thousands of years within the Indian subcontinent and is based on Vedic texts, Upanishads and Puranas evolving throughout civilisation and cultural contribution. It is a knowledge system focus on elaborating upon it investing regarding culture and global communication as well as practices on inspiring individual and community skill while reporting on maintenance of a blockers sustainable life had become essential perfect of such a knowledge system is a holistic focus towards life and life quality nearby, and integrates interconnection of individual the society and its reflection upon ancient Indian practical s that focus on health and welfare (Timane & Wadhe, 2024). The integral traditional IKS contributes towards an ecological and environmentally harmonious relationship through promotion and intends upon sustainable living and understanding interconnectedness for nature and all.

The Indian knowledge system is a critical development of ideas and concepts in terms of disseminating sustainable development. IKS is identified to contribute towards building a learning to off different kinds of vital lessons regarding sustainable development at involves “fostering environmental stewardship" and prioritisation of community and social fairness, along with focusing on support of holistic welfare and harmonious living with nature along with self-reliance being encouraged as an exceptionally relevant integration into modern environmental social and economic factors (Sharma, Trivedi and Chaudhary, 2025). Integration of IKS has been considered as an infrastructure resilience development integration for boosting sustainability that can be accessed in building infrastructure resilience against climate change. This brings up the subject of exploration regarding the implications of IKS as a climate resilience model within the instance of infrastructure resilience being instilled.

1.2. Research Aim and Objectives

The research aim is to explore the phenomenon of the Indian Knowledge System (IKS) as an influence on infrastructural resilience, particularly in the context of climate change and resistance. The research objectives are outlined as follows.

- To investigate and assess the interrelation of infrastructure resilience in the concept of climate change development and integration of the Indian knowledge system as part of climate resilience.
- To expand the understanding of IKS integrating into education, healthcare and agricultural aspects of social infrastructure.
- To explore probable implications provided by IKS for improving welfare, agricultural, educational, health and cultural forms of infrastructural resilience.
- To explore the practices and conventions of the Indian knowledge system in the context of climate resistance.

2. LITERATURE REVIEW

There has been a myriad of recent literature about infrastructural resilience to climate change and integration of the Indian knowledge system as a mode for climate resilience in the context of indigenous knowledge systems and their drive for sustainable living and infrastructure. According to Jadon et al. (2025), the Indian knowledge system is identified as an indigenous system and a house of knowledge that imposes multiple disciplines, including health and education, as well as architecture and agriculture, along with handicrafts. The study, which was conducted under the perception of skill development in the SME sector, identified the use of traditional knowledge as highly useful for skill shortage breeding by enhancing existing professional frameworks and contributing towards community-based learning in SMEs by pushing for sustainability and inclusivity.

As per the findings of Das (2025), IKS was noted to be an integration focused on geographical evaluation and understanding of the framework of sustainable and culturally rooted traditional indigenous and

orally transmitted forms of knowledge developed over several centuries within Indian citizens. The study noted in focus of IKS with geospatial technology is a methodological advancement in building indigenous knowledge from multiple sources, such as Vastu Shastra, Vedas, Purana, Upanishad, and others, which have offered a wide and diverse legacy within subjects of astronomy and geography, along with agriculture, ecology and integrating traditional practices into infrastructure assessments.

Sharma et al. (2025) had mentioned that Indian knowledge systems have contributed towards the development of economic, social, and environmental factors as of now and play an important role in maintaining a good impact progression of the same. IKS has been identified as holding a critical part in the growth of the state through valuable techniques that protect the natural ecosystem and benefit society. The study had also noted anthropogenic activities resulting in environmental changes, causing international attention due to the impact on human health and climate, where IKS had been noted for its holistic welfare capacity that contributed towards ecological balance and building upon a sustainable environment and use of traditional knowledge as an essential driver for the development process.

As noted by Ferreira et al. (2021), infrastructure resilience in climate change has been observed through the existence of severe environmental issues and risks that urban areas face in relation to water management, including floods and degradation of water quality that increase vulnerability of the population and threaten sustainability in landscapes. The study identified urbanisation and climate change as major issues and stressed the challenge of building flood-resilient cities. The study had noted nature waste solutions in urban areas regarding the contribution of flood mitigation as a way of enhancing water quality and damage control.

Research by Lewin et al. (2023) identified strategic thinking regarding infrastructure resilience and adaptation as an essential integration of resilience, being a complex expectation that is essential for management in case anything goes wrong. The study had noted the role of the national government in improving resilience as fighters and identified interdependent infrastructure systems. The study had also insinuated the existence of infrastructure for the provision of service to end users and capacities with resistance, focusing on making sure the service continues despite situations and obstructions to performance that include climate change and natural disasters such as floods and earthquakes as factors of impact.

Medland et al. (2024) noted that the resilience of infrastructure in context to climate change is focused on providing sustenance of title living conditions and has an important part in climate change resilience and working towards sustainable development under the SDG goals. The study had noted integration of mitigation adaptation as a part of reliable interest structure development and resilience, which also showcases that in climate change, desert infrastructure development and operation are terribly affected. Interdependencies of different categories of infrastructure make it essential for resilience to be identified as the ability of infrastructures to adapt.

Under the observations by Sultana (2025), the Indian knowledge system, as a philosophy, is seen to promote a code of sustainable living in the community and human beings that puts a strong emphasis on holistic awareness and building a strong and positive relationship with the environment and society, which is strongly established in the classic literature of India. The researcher mentioned IKS as essentially related to the contemporary perception of sustainable development, including issues of climate change, making it an important instrument in dealing with climate change. IKS was identified to hold an important part in providing access and dissemination towards information and promoting reason and sustainability as a prospect.

3. METHODS

The following study has implemented its research methods as a method and has conducted a primary and secondary accumulation and evaluation of data for the process of investigating and accumulating empirical information in both statistical and contextual manner. Pragmatism is considered a proposal of the idea that knowledge does not surely belong to the function of the world, all of humanity and operates as an introduction between the given and the world (Gillespie et al. 2023). Since the study has implemented a mixed method of research, it has been identified that it is applicable to integrate pragmatism as a paradigm of research philosophy.

The study in particular contests the integration of a mixed-methods research approach and research design, emphasising the importance of integrating research approaches and research designs in particular contexts and alignment to the target of research and its imposition of empirical findings as essential. The study has implemented the inductive approach to be inductive in nature for its methodical strategy that assists in empirical studies to generate insight into observations and data, and this is an exploratory form of research approach due to a focus on expanding investigation on phenomena of interest (Gamage, 2025). The research design that has been selected for the study is a mixed method and involves the accumulation of data from both primary and

secondary means, and has integrated the use of exploratory means of research design as components associated with the research study.

The study, in its prospect of data generation, whether it be primary quantitative or secondary qualitative data, has implemented the purposive sampling method as a method for selecting data and data sources. Sampling procedures are implemented for their capacity to ensure quality samples are collected without worry for building reliability and trustworthiness of the data (Nyimbili & Nyimbili, 2024). Sampling for primary data involved selection from participants who fit the demographic criteria. In the case of secondary data, sampling involved the selection of openly accessible and recent information regarding the research objectives.

The research implemented purposive sampling for the selection of 101 participants, including proponent stakeholders such as government officials, academicians and researchers, local community associations, and non-state actors such as NGOs in the integration of the Indian knowledge system and climate change in the context of infrastructure resilience in welfare and agriculture. Out of the 101 respondents, 50 participants were academicians and researchers, government officials, including bureaucrats and policymakers as well as public sector and NGO workers, such as healthcare service providers and educators from both public sector and NGO establishments. 20 of these participants had been selected for the second survey on the focus of sustainability, education and healthcare as other social infrastructural elements of concern.

The data collection that has been selected for this study is a missed message data collection procedure that involves the accumulation of both primary and secondary data in quantitative and qualitative forms. This has involved assimilation of data in primary quantitative and secondary qualitative manners. Quantitative approach of accumulating data has involved conducting a service for accumulating data through the application of a questionnaire based on research questions, evaluating the data collected, and interpreting the results (Taherdoost, 2022). This followed the implementation of an approach for the accumulation and interpretation of content in the case of secondary data.

By finding the data, which was collected in the case of primary quantitative data accumulation and secondary qualitative data collection, a statistical data analysis has been integrated as a form of quantitative data analysis, while a thematic data analysis has been integrated for the qualitative data analysis. Thematic data analysis has been selected as a qualitative form of data analysis as it has become increasingly influential in qualitative and mixed-method research (Braun & Clarke, 2023). The statistical data analysis involved quantitative data of the study having been accumulated and evaluated in the form of quantitative analysis involving the statistical methodology of evaluating numerical data accumulated through the survey and analysing the findings to be generalised throughout multiple groups, which explains the phenomenon (Rahman & Muktadir, 2021). Statistical evaluation was hence contextually backed up with thematic analysis.

4. FINDINGS

4.1. Primary Quantitative Findings: Statistical Analysis

4.2. Social Infrastructural Resilience: Welfare and Agriculture

4.2.1. Demographic Statistics

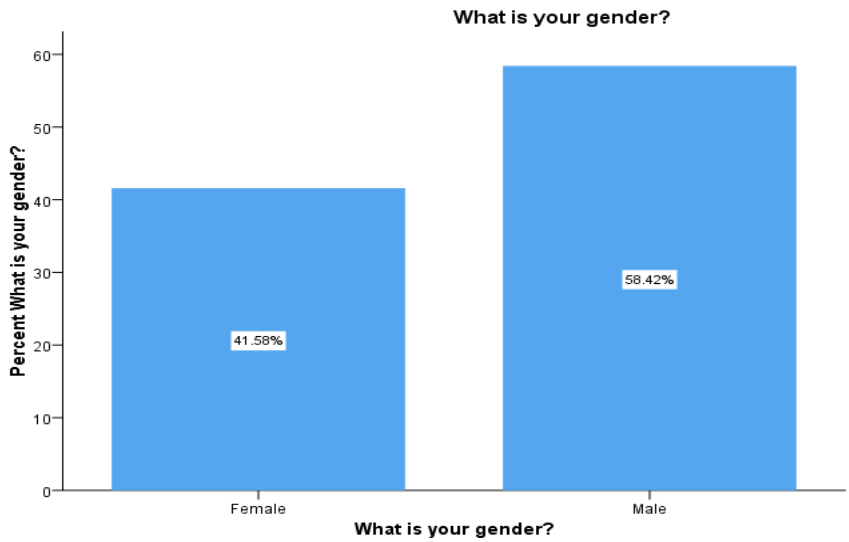

Figure 1: Gender Demographics
(Source: IBM SPSS)

The gender demographic of the evaluation, as per Figure 1, outlined that there were almost 58.42% male participants, while 41.58% participants had identified themselves as female. This indicated a rather equal yet disproportionate distribution of gender demographics within the sample population.

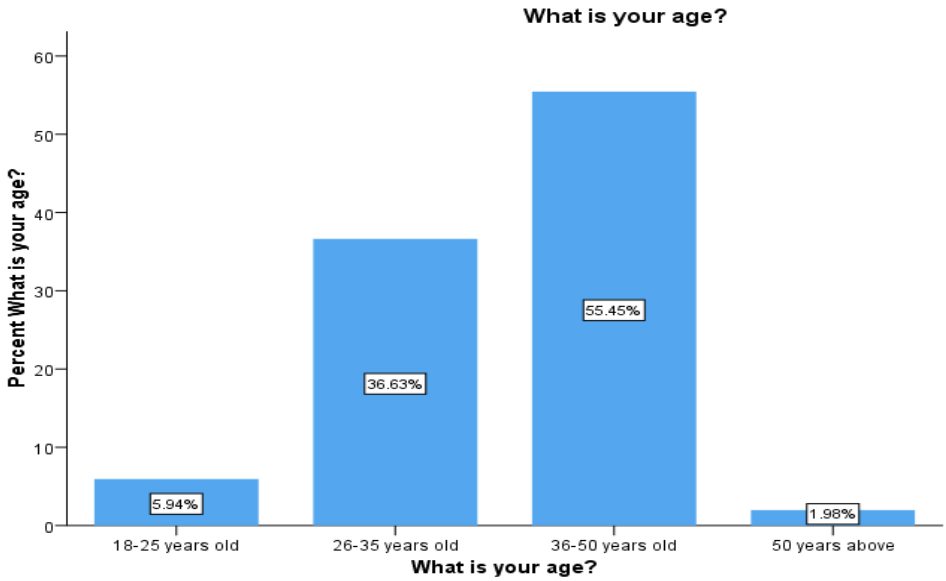

Figure 2: Age Demographics
(Source: IBM SPSS)

The age demographics, as per Figure 2, noted that most of the group that the participants fell under was within mid-twenties to late forties and 50 years old. This was because it has been noted that the age group of 36 to 50 years old constituted almost more than half of the entire sample population at 55.45%. Meanwhile, participants aged 26 to 35 years old make up almost 36.63% of the sample population. Only 5.94% of the sample population was made up of 18- to 25-year-old participants, while 1.98% of participants had been identified as 50 years old and above.

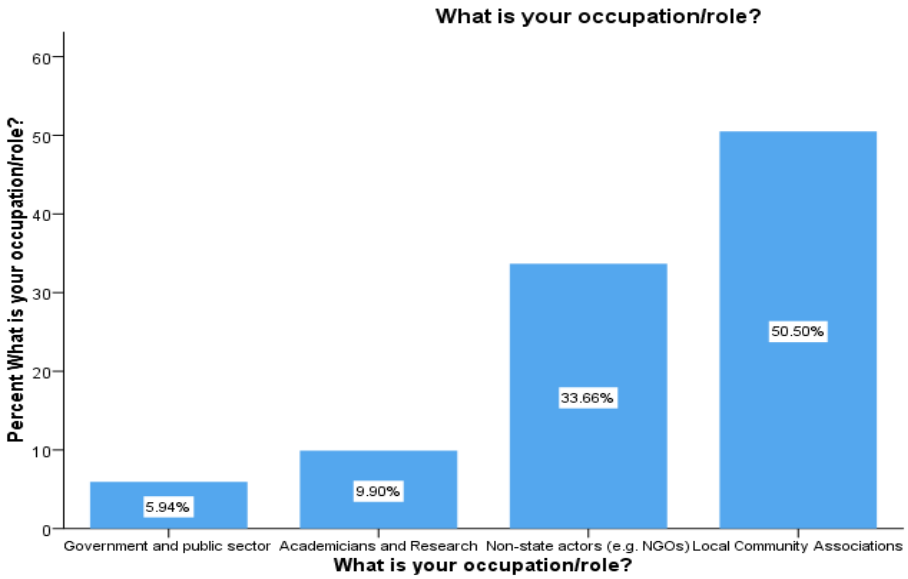

Figure 3: Occupational Distribution Demographics
(Source: IBM SPSS)

In observation of the occupation distribution in demographics, as per the graphical illustration observed in Figure 3, almost half of the participants had been constituents of local community associations. This was observed since almost 50.50% of participants were from local community associations, while the second most popular occupation among the participants had been their involvement with non-state actors such as NGOs, with almost 33.66% of the participants admittedly noting working for NGOs and other non-state actor organisations. 9.90% participants had been identified to have been involved with the field of academics and research, while only 5.94% had been government or

public sector employees. This progressive envisioning of the probability in awareness regarding Indian knowledge systems and infrastructure resilience against climate change as an interconnected phenomenon that the study explores.

4.2.2.Descriptive Statistics

Table 1: Descriptive Statistics

Descriptive Statistics	Mean	Std. Deviation
Climate change has made it necessary to maintain efficient resilience in infrastructure to be adaptable to climate change.	4.37	1.056
The Indian knowledge system can be applied as a focus to achieve sustainability in infrastructure like water management and irrigation.	4.38	1.085
Holistic practices like traditional agriculture such as mixed cropping and conservation agriculture can benefit including sustainability into agricultural practices.	4.38	1.085
Implementing focus on ecosystem and resource management by collaborating with local and Indigenous communities can be used for making ecosystems sustainable.	4.38	1.076
Conservative practices that promote sustainable cropping and infrastructure are essential to reduce emission and waste.	4.43	.983
Climate action needs to be maintained through grassroot infrastructures such as ecosystem and water management.	4.41	1.022
Climate change action by planning and development focused on conservative and sustainable practices.	4.41	1.002
Valid N (listwise)	101	

As per the descriptive statistics that have been observed in Table 1, it is noted that the mean and standard deviation outline the central tendency and the data scattering distribution and variance of the data. Descriptive statistics show a mostly clustered central tendency and standard deviation, showing variance of the data points. It is noted that the mean value ranges between 4.37 and 4.41. The standard deviation values range between 0.983 and 1.085. These value ranges specifically outline probable implications of the data balance being rather closely clustered with a strong and closely associated central tendency among the components and variables.

4.2.3.Correlation

Table 2: Correlation Analysis

DV	Climate change has made it necessary to maintain efficient resilience in infrastructure to be adaptable to climate change.	Pearson's Correlation
IV 1	The Indian knowledge system can be applied as a focus to achieve sustainability in infrastructure like water management and irrigation.	.952**
	Holistic practices like traditional agriculture such as mixed cropping and conservation agriculture can benefit including sustainability into agricultural practices.	.935**
	Implementing focus on ecosystem and resource management by collaborating with local and Indigenous communities can be used for making ecosystems sustainable.	.934**
IV 2	Conservative practices that promote sustainable cropping and infrastructure are essential to reduce emission and waste.	.908**
	Climate action needs to be maintained through grassroot infrastructures such as ecosystem and water management.	.899**
	Climate change action by planning and development focused on conservative and sustainable practices.	.917**
**. Correlation is significant at the 0.01 level (2-tailed).		

The correlation analysis of the study indicates that there is a rather positive form of linear correlation between the variables set that are outlined as the dependent and independent variables of the study. The dependent variable infrastructure resilience outlines itself through the statement regarding climate change, making it essential for maintaining efficient resilience in infrastructure for adaptability to climate change, as a probable mention of the correlation between the two variables. It is additionally noted that the independent variables of the Indian knowledge system and climate change have also been identified through three statements, respectively, that indicate their correlation with the dependent variable in association with the variables' linear relationships. The implications of the findings in particular show that there is a very strong linear correlation between both dependent variables and the first independent variable, as well as between the dependent variable and the second independent variable.

The correlation value in this case had been identified in a particular context between the variables. It had been seen that the correlational values were within the range of 0.899 and up to 0.952. In assessment correlation values correlation coefficient values less than 0.20 is considered very weak or negligible while 0.30 and 0.40 fall under fair or mind relationship and 0.40 and 0.70 outline moderate linear relationships while 0.70 and 0.90 so a strong or high relationship however more than 0.90 indicate existence of a very high relationship between the variables observed weather having a deduct positive or inverse as a negative relationship (Alsar, 2021). The findings in the Pearson correlation analysis indicate a very high and strong positive correlation in the case of both independent variables being

associated with the dependent variable in a linear relationship. Moreover, the correlation significance stands at p-value < 0.001.

Correlation for the observation of a linear relationship between the dependent variable of infrastructure resilience and the independent variable of the Indian knowledge system, the Pearson correlation values have ranged from 0.934 to 0.952, all showing a highly significant p-value in the correlation coefficient. In the assessment of the correlation relationship between the dependent variable, interest structure resilience and the independent variable of climate change, the values had reached between 0.899 and 0.917. The correlation values, hence, indicate a strong linear relationship between each of the independent variables and the dependent variable.

4.2.4.Regression

Table 3: Model Summary

Model Summary				
Model	**R**	**R Square**	**Adjusted R-Square**	**Std. Error of the Estimate**
1	.960[a]	.922	.918	.303
a. Predictors: (Constant), Indian Knowledge Systems, Climate Change				

Table 4: ANOVA analysis

ANOVA[a]						
Model		**Sum of Squares**	**df**	**Mean Square**	**F**	**Sig.**
1	Regression	102.804	6	17.134	186.377	.000[b]
	Residual	8.642	94	.092		
	Total	111.446	100			
a. Dependent Variable: Infrastructure Resilience						
b. Predictors: (Constant), Indian Knowledge Systems, Climate Change						

The regression analysis in this case involves evaluation of both model summary and ANOVA evaluations of the findings, which have been identified with impactful elaboration on the variance of data of the dependent variable, which can be explained by the independent variables through our square value, while the significance between the dependent variable in direct linear relationship to the independent Independence variables through the p value. The R-squared value as observed in the model summary stands at 0.922, which accounts for almost 92.2% of the explanatory variables between the dependent and independent variables to be present. R-squared values are often also demarcated in percentage to show the percentage of explanatory variation.

R-squared values resulting in the range of 0.51 and 0.99 are highly "acceptable in social science research, particularly due to their explanatory variables being statistically significant in nature and with probability of not causing multicollinearity among the explanatory variables (Ozili, 2023). This indicates that the dependent variable of infrastructure resilience does hold a strong linear relationship with the independent variables of the Indian knowledge system and climate change as explanatory variables for its data variance. Additionally, the three values as observed in the ANOVA analysis stand at p = 0.000; p < 0.001. This indicates that the significance of the linear relationship between both the independent variables in association with the dependent variable is highly significant.

4.3.Social Infrastructural Resilience: Education, Healthcare and Sustainability Culture

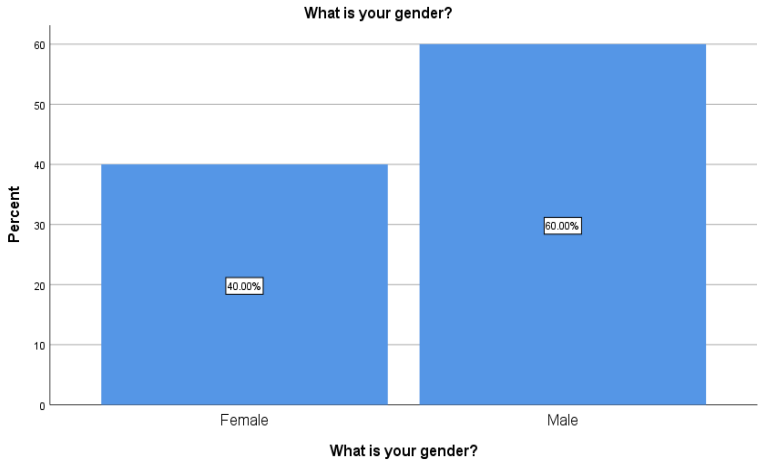

Figure 4: Gender Demographics
(Source: IBM SPSS)

Illustration of the statistical analytics, as per Figure 4, presents the gender demographics of the second population. This outlines that 40% of the population were female, while 60% of the respondents were male. Marginally higher population concentration of male participants was evident for the second evaluation.

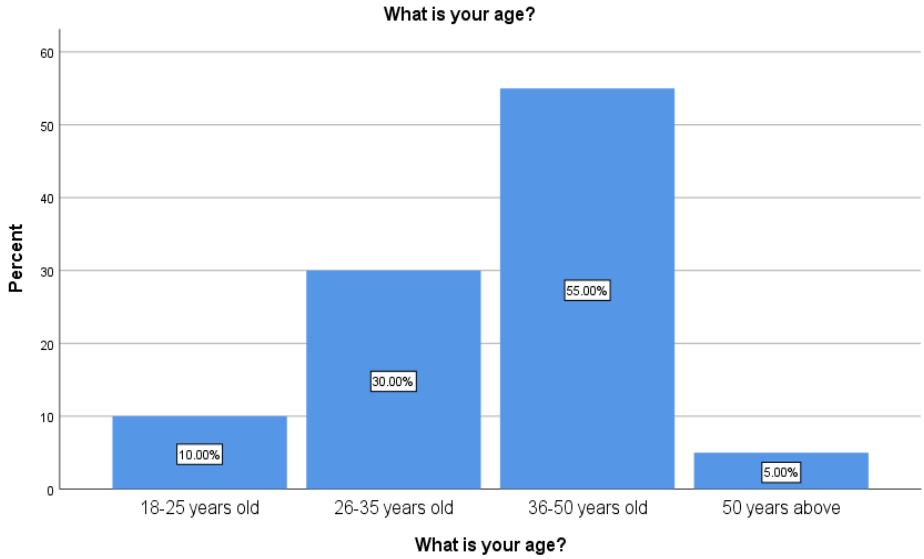

Figure 5: Age Demographics
(Source: IBM SPSS)

Age demographics identify that there is a higher concentration of population in the middle age group rather than the younger age range. The age group of 18 to 25 year olds was only 10% of the population, while 26 to 35 year olds fell within 30% percentiles of the age group demographics and only 5% of the population was 50 years and above. This is followed by the fact that the age group of 36 to 50-year-olds fell under the majority, with 55% of the participants falling under this age group.

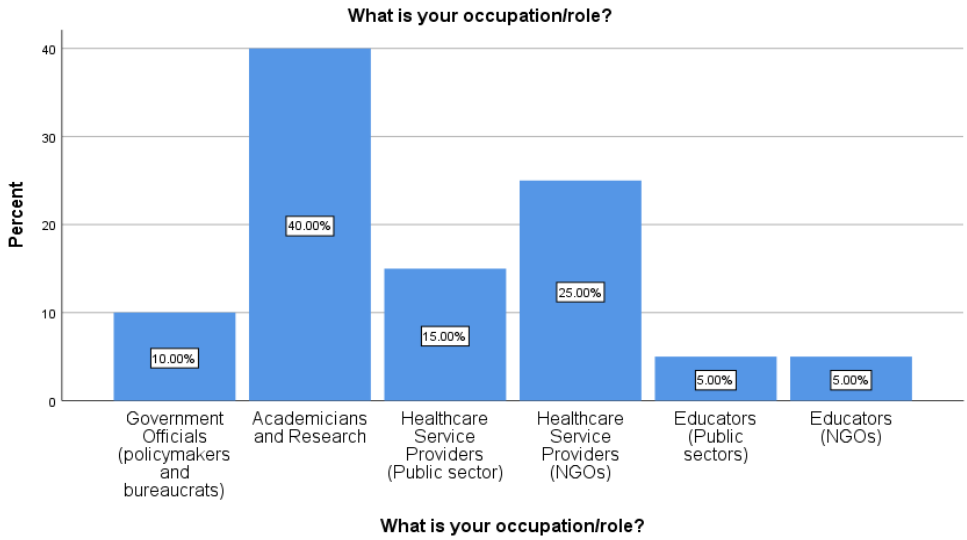

Figure 6: Occupational Distribution Demographics
(Source: IBM SPSS)

Evaluation of the occupation distribution of demographics highlighted that a majority of participants had been academicians and researchers, with a prominence of health care and educators being mostly from NGO organisations rather than from public sector organisations. This is because 10% of the participants were government officials who either work as policy makers or bureaucrats. Only 5% of educators are from public sector institutions, while 5% of educators work for NGO educational organisations. Healthcare service providers were marginally higher than educators, with 15% of participants identifying as working for the public sector, while 25% of them stated that they work for NGOs as healthcare service providers. 40% of the entire occupational demographics of participants that agreed to respond were academicians and researchers.

4.3.1. Descriptive Statistics

Table 5: Descriptive Statistics

Descriptive Statistics	Mean	Std. Deviation
Infrastructural resilience is essential to be ensured within healthcare, education and social infrastructure for integrating sustainability.	3.85	1.137
The Indian knowledge system (IKS) is capable of guiding infrastructural resilience through guiding sustainability in policies and decisions for social infrastructure like education and healthcare.	3.90	1.021
Current policy integrations, such as New Education Policy 2020 present a promising future for IKS being implemented in educational development for achieving sustainability within future infrastructure.	4.30	1.218
Traditional medicine is a part of IKS that promotes sustainable design of medical care and builds affordability and accessibility through holistic approaches.	3.95	1.099
Valid N (listwise)	20	

Descriptive statistics identify clustered conditions between the variables as represented by the items of the survey results. The mean value ranged between 3.85 and 4.30, while the standard deviation ranged between 1.099 and 1.218. This indicates a rather clustered condition between the variable values in terms of variance between the variables that are represented by the survey items.

4.3.2. Correlation

Table 6: Correlation Analysis

DV	Infrastructural resilience is essential to be ensured within healthcare, education and social infrastructure for integrating sustainability.	Pearson's Correlation
IV 1	Indian knowledge system (IKS) is capable of guiding infrastructural resilience through guiding sustainability in policies and decisions for social infrastructure like education and healthcare.	.122
IV 2	Current policy integrations such as New Education Policy 2020 present a promising future for IKS being implemented in educational development for achieving sustainability within future infrastructure.	.148
IV 3	Traditional medicine is a part of IKS that promotes sustainable design of medical care and builds affordability and accessibility through holistic approaches.	.120
**. Correlation is significant at the 0.01 level (2-tailed).		

In the evaluation of the correlation between the dependent variable, infrastructure resilience and in assessment to Indian knowledge systems as the first independent variable, educational development as the third independent variable and the fourth independent variable of healthcare integrations, the findings observed a rather weak correlation between the variables. The correlation values range between 0.120 and 0.148, all being values closer to zero than to positive one. This identified that the correlation between infrastructure resilience in association with the Indian knowledge system, particularly in connection to education and healthcare, has social infrastructure resilience to be rather weak in nature, with educational development as the third independent variable standing at 0.148 being better off in comparison to healthcare integrations as the fourth variable standing at 0.120.

4.3.4.Regression

Table 7: Model Summary

Model Summary				
Model	**R**	**R Square**	**Adjusted R-Square**	**Std. Error of the Estimate**
1	.177	.031	-.150	1.219
a. Predictors: (Constant), Indian Knowledge Systems, Education Development, Healthcare Integrations				

Table 8: ANOVA analysis

ANOVA[a]						
Model		**Sum of Squares**	**df**	**Mean Square**	**F**	**Sig.**
1	Regression	.766	3	.255	.172	.914
	Residual	23.784	16	1.486		
	Total	24.550	19			
a. Dependent Variable: Infrastructure Resilience						
b. Predictors: (Constant), Indian Knowledge Systems, Education Development, Healthcare Integrations						

The R-squared value is marginally very poor in comparison to evaluations since the R-squared value

only stands at 0.031, with the R value standing at 0.117. This only indicates the prominence of a very weak capacity of independent variables of education and healthcare, along with Indian knowledge systems, in a particular context, to these variables as against the dependent variable of infrastructure resilience to be very weak in terms of explainability. And as observed in the annual evaluations, the significance value is 0.914. This indicates the p- value to be far greater than the 0.001 threshold, which shows the insignificance of infrastructure resilience in terms of its urgent linear relationship with Indian knowledge systems, with education and healthcare as independent variables representing social infrastructure elements.

4.4. Primary Data Analysis: Qualitative Analysis from Respondent Insights

Table 9: Thematic Coding

Variables	Keywords	Themes
Indian Knowledge Systems	Sustainability, social, educational, infrastructure, possibility, resilient, education, healthcare	The Indian knowledge system contributes towards strand sustainable social infrastructure resilience development.
Educational Development	Contribute, stress, concentration, building, management, resilient, education, environment, structure, environmental, consciousness, sustainable, infrastructure,	Indian knowledge systems provide educational development opportunities through environmental consciousness integrations.
Healthcare Integrations	Ayurveda, traditional medicine, holistic, preventive care, infrastructure sustainability	Holistic and traditional approaches, such as Ayurveda, contribute to building sustainable preventive care and infrastructure resilience in healthcare.

4.5. Thematic Analysis

Theme 1: The Indian knowledge system contributes towards hair sustainable social infrastructure resilience development

The primary findings of the survey, however, presented that Indian knowledge systems do have an agreeable role as a sustainability enforcer and the development of infrastructure resilience in the social structure of the nation. This was identified in association with the fact that the participants had agreed that the Indian knowledge system is applicable as an instrument for supporting the promotion of sustainability and the construction of a resilient educational system. In addition to this, the findings also supported the fact that respondents mentioned the possibility and capacity of the Indian knowledge system, particularly in the context of resilience development in the education system of India. Further on, this has been presented and there is a possibility for sustainable culture under the integration of Indian knowledge systems for boosting the opportunity of implementing self into a resilient education system as a way of establishing social resilience of infrastructure for young minds. Only one response was against the possibility of the Indian knowledge system being enough for resilient system development of infrastructure in education.

In comparison, practically all respondents agreed on the fact that the Indian knowledge system is applicable as a form of infrastructure guideline for building sustainability within healthcare systems in India. This is because the findings, as per the indication of the respondents, had aligned with the fact that sustainability in the Healthcare system is achievable through the implementation of the Indian knowledge system's traditional values. Despite one respondent not showing agreement, it was noted that the Indian knowledge system was considered to be an applicable format. The finding indicated that the Indian knowledge system was applicable for refining the healthcare system infrastructure and building a resilient and sustainable healthcare system in India.

Theme 2: Indian knowledge systems provide educational development opportunities through environmental consciousness integrations

As per the findings of the surface, it was identified that the participants had all agreed on the fact that the Indian knowledge system is capable of building an educational environment that is interaction resilient to support stress management and concentration development within students. These indications and their support support the opportunistic development of the educational environment to be Resilient and efficient to support development and concentration building within students. These statements of the respondents had progressively established that the Indian knowledge system contributes significantly to stress management development and it is capable of assisting in education to focus on stress management of students, supporting the fact that stress management can be helpful to the application of the Indian knowledge system, while some the implications also stood for the fact that it is applicable for concentration building. The findings hence established the fact that students can be helped using the Indian knowledge system to approach building their concentration capacity and stress management habits holistically.

The findings have also established that the infrastructure and resilience of the Indian knowledge system are capable of boosting the opportunistic growth of sustainable interest structure and

promotion of environmental consciousness among students, which can build resilience in the education system. The implications of being positive in establishing sustainable infrastructure are capable of promoting environmental consciousness within the educational system through the implementation of Indian knowledge systems. It is applicable for the purpose of achieving environmental consciousness promotion within the educational structure and outlines and guides students to absorb practices related to sustainability and environmental consciousness that can further help climate action. The findings had been supportive regarding sustainable infrastructure being applicable as a form of environmental consciousness-driven resilience in the education system. This establishes that the Indian knowledge system is capable of refining the education system as an element of social infrastructure and making it resilient under a sustainability culture.

Theme 3: Holistic and traditional approaches, such as Ayurveda, contribute to building sustainable preventive care and infrastructure resilience in healthcare

The findings of the respondents indicated that Ayurveda and traditional Holistic medicine are capable of achieving a resident preventive care infrastructure within the healthcare system of India. The finding had further implied the fact that Ayurveda and related traditional Holistic medicinal practices are elements of the Indian knowledge system that can benefit organisations that are dedicated towards health care and medical treatments for Indian citizens to benefit through preventive care in a natural and conventional manner that is sustainable. The indications had identified that Ayurveda is capable of contributing towards building resilient preventive care and building opportunistic growth of enforcing better options for Health Care in order to avail and integrate into its systems. Ayurveda was identified as a sustainable preventive medication and applicable for preventive care resilience to be developed within the healthcare infrastructure. The health care infrastructure development and enforcement of resilience were identified to benefit from Ayurveda and traditional medicine.

The Indian knowledge system was supported by the correspondence through their statements and full knowledge of the fact that sustainable and resilient Healthcare facilities can be built under traditional architectural focuses, such as infrastructure resilience. The findings had noted that the Indian knowledge system is capable of building better opportunities for health care facilities and had supported that it can contribute to the improvement of facility infrastructure to be recent and efficient for better and resilient sustainable care. The implications identified that sustainable resilience is capable of being provided to contribute to sustainability through traditional architecture within the systems. It was also agreed upon by almost all participants that the Indian knowledge system is capable of being an available option for Healthcare facilities interested in being made resilient as a part of social infrastructure elements, as a practised integration of sustainability culture-induced infrastructure resilience.

4.6. Secondary Qualitative Findings: Thematic Analysis

Theme 1: Traditions and Practices of Indian Knowledge Systems and Climate Resilience

IKS was noted in the study to show that a diversity of disciplines has its integration of knowledge and holistic understanding. In the study by Majhi (2025), the Indian knowledge system was noted for its impactful representation of being "one of humanity's most profound and ancient intellectual traditions. The study also noted that all have presented a strong arrangement of values within the lives of the local community by presenting a sustainable worldview reflected under its "principles such as "Sarve Bhavantu Sukhinah" (May all be happy) and "Vasudhaiva Kutumbakam" (The whole world is one family)" prospective emphasis upon ecological balance and collective welfare (Majhi, 2025). These also outline a wide range of comprehensive systems that present for integrating indigenous knowledge into a sustainability focus.

Traditions and practices of IKS and infrastructure resilience for climate, as a part of the traditional practices, have built on different types of ecological resilient infrastructure practices, such as step wells, as ancient water management systems were built for earlier round water access in added regions such as Gujarat represent resilient infrastructure built for combating extreme climate resilience (Thaker & Pathak, 2025). Traditional agriculture and practices in Arunachal Pradesh, as conventional methods of cultivation among certain tribes such as " Monpa, Sherdukpens, Apatani and Khampti" maintain ecological and sustainable practices such as refraining from polluting cropping practices like jhoom cultivation and gathering oak tree leaves, helping with water retention and production of agriculture, as well as working on paddy fish farming (Deb, 2025). IKS has been a notable repository for indigenous knowledge and traditional practices that contribute to the achievement of inclusive

development and environmental system ability through innovation and tradition, such as through traditional water management techniques providing sustainable water use models, and Indigenous farming practices boosting organic cultivation methods (Xess & Saroj Nayyar, 2025).

Theme 2: Efficiency of IKS models as instruments of Infrastructure Resilience against Climate Change

The implications of climate change on the marginalised populations, such as indigenous communities, people, and hence on indigenous education systems. In the opinion of Tashi Dorji et al. (2024), climate change is one of the major challenges faced by the globe recently and has been threatening the existence and future of people. The study had focused on Indian knowledge being heavily relied upon by indigenous communities as a way of adaptation towards changing environment and noted the climate change adaptation and resilience being vital for indigenous community survival with climate change being a major threat. Use of indigenous knowledge holds an important part in the institution of enhancing climate adaptation and resilience through sustainable development that is driven by tradition.

The efficiency of IKS models as instruments of infrastructure resilience has been noted to be rather prominent among multiple communities throughout several centuries. The farming practices water systems and traditional rituals are identified as contributing implementation of indigenous wisdom for shaping climate action solutions where it is noted that farming practice say such as revival of millets as a climate adaptive grain while use of traditional water storage and harvesting system build for resilience and focus on protected biodiversity community protected forests have contributed in infrastructure resilience against climate extremes (Karunanidhi, 2025). Climate change as an existential threat to ecosystems has been noted that integration of IKS into modern frameworks for sustainable development can nurture resilience and promote a culturally appropriate climate action (Singh & Ahmad, 2025). Henceforth findings also supplemented that IKS provides a strong, sustainable development holistic approach focusing on social equity and environmental stewardship by including elements such as sustainable husbandry, biodiversity conservation, and traditional water management, presenting a "deep respect for nature" (Suthar, 2025).

Theme 3: Community Engagement and Benefits of IKS for Climate Resistance in Infrastructure

The findings indicate that the use of oils contributes towards enhancing an awareness in India regarding environmental and cultural history because it is based on implicit knowledge and assists in developing skills that can be used by upcoming generations, such as students, to handle issues of climate change and food security in regular life (Mandavkar, 2025). Additionally, findings indicate the use of the Indian knowledge system has been a foundation for the construction of initiatives for the realisation of the target of Viksit Bharat, with integration of holistic and sustainability-focused practices into national policy for making economically strong and culturally enriched developments (Yadav, 2024). Finding also not climate change as a global issue, indicating that the use and integration of IKS in policies such as the National Education Policy (NEP) 2020, had noted the relevance of conventional and ecological knowledge systems that promote sustainable development (Sharma, 2024).

The researchers also noted the culture of preserving the interconnectivity of moral responsibility of the community acts to be going about acting in the interest of being custodians of nature and maintaining a harmonious balance between human activity and the environmental presentation system. In a research by Verma (2025), communal responsibility was identified as the concept of the Indian knowledge system that presented a holistic view and perception of the world, showing humans are not separate from nature and ecological order, yet are a singular unit and part of it. The teachings in the principles, such as Vasudhaiva Kutumbakam, indicate a strong development of principle and ethos of communal responsibility that involves maintaining a strong responsibility towards ecological order.

5. DISCUSSIONS

The findings of the study indicated through the quantitative empirical data that there is a strong association of infrastructure with integration of the Indian knowledge system as a resolution to build climate change resilience within infrastructure, such as integration of water management and agriculture practices, along with communal harmony and economic development. The quantitative finding had been justified thoroughly with the implications presented by the thematic analysis, which are also compatible with the insinuations as observed in the literature review.

6. CONCLUSION

The implications of the study, in conclusion, indicate that infrastructure resilience is an unignorable necessity with the increasing climate

change issues. However, the study had identified that IKS not only contributes to the enhancement of infrastructure resilience but also enhances climate change resilience using conventional information that deals with sustainable practices and environmental responsibility as a core. It is essential for expanding research on the same subject for sustainability enhancement.

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