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CONCEPT OF SMART VILLAGE TO FOSTER SUSTAINABLE BUSINESS PRACTICES IN HILLY REGIONS OF UTTARAKHAND

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Abstract: A smart village is a rural community that leverages technology and data-driven solutions to enhance various aspects of life. This includes the integration of smart infrastructure, efficient use of resources, improved education services, skill development and adoption of digital tools for sustainable business management. Uttarakhand has rich cultural heritage in form of various customs, cuisines, arts & crafts. 27 products in agriculture, food, handicraft & manufactured goods categories have received GI tags in Uttarakhand so far. Uttarakhand's hilly regions thrive on diverse tourism businesses including pilgrimage tourism, eco-tourism, adventure tourism and wellness tourism. Additionally, there is a flourishing market for homestays, promoting a more authentic experience for travellers. This research paper explores the integration of smart village concepts to foster sustainable business practices in the challenging terrain of Uttarakhand's hilly regions. Recognizing the unique geographical and socio-economic characteristics of the region, the study investigates the feasibility and potential impact of implementing smart technologies to enhance economic activities, resource management and inclusive development. The findings contribute valuable insights for policymakers, local communities and businesses seeking to establish a resilient and sustainable economic ecosystem in the hilly landscapes of Uttarakhand.

Keywords: smart village; sustainable business; inclusive development; GI tags; smart homestay; eco-tourism, wellness tourism.

INTRODUCTION

Following economic reforms, urban regions in India have progressed much faster as compared to rural regions, resulting in a substantial urban-rural gap. Large segment of the Indian population still resides in villages. Mahatma Gandhi said “India lives in its villages”, highlighting the significance of villages as the mainstay for the majority in India. Neglecting rural development leads to increased rural-to-urban migration. This migration not only causes emptying of villages but increases problems in cities like unemployment, traffic congestion, pollution & overcrowding of houses (Srivatsa, 2015). Therefore, It is essential to promote the concept of smart villages in rural regions besides smart cities in urban regions. The concept of smart village involves empowering local rural communities to drive sustainable development. This bottom-up approach focuses on grassroots participation, community engagement and collaborative decision-making to ensure that smart solutions are tailored to the specific needs and socio-cultural context of each village. It encourages the active involvement of residents in deploying

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technology, managing resources and promoting eco-friendly business practices for long-term sustainable development (Zavratnik et al., 2018).

Uttarakhand, a northern state in India, is characterized by its diverse topography, rich cultural heritage and strategic geopolitical significance. The state was carved out of the larger state of Uttar Pradesh in 2000, gaining its own administrative and political identity. Uttarakhand contains around 85% mountains and 65% biodiversity-rich forests. Uttatakhand state is divided into 13 districts; out of which 10 districts are in hilly regions. Almost half of the population of Uttarakhand resides in the 10 hill districts (Census of India, 2011). Lack of proper infrastructure, like transportation facilities and basic utilities, makes it challenging for businesses to operate in hilly regions of Uttarakhand. Geographical conditions and infrastructural limitations in hilly regions make it unfavourable for big industries to be established. Therefore, small businesses & entrepreneurship play a crucial role in Uttarakhand's economy, development and sustainability. Businesses in hilly regions of Uttarakhand usually focus on agriculture, handicrafts, tourism, hospitality, food processing and local artistic works. Some of their initiatives have combined traditional practices with some modern approaches, creating unique and enriching cultural experiences for Indian as well as foreigner tourists. Encouraging entrepreneurship in hilly regions is vital for attaining both environmental and socio-economic sustainability. Entrepreneurship stimulates innovation, creates livelihoods, and fosters holistic development. Destination branding of different regions can be used to promote local products by encouraging festival tourism, agro-tourism, food tourism, heritage tourism & education tourism (Chauhan et al., 2022). Local entrepreneurship utilising technology and smart tourism initiatives can drive economic growth while safeguarding the region's natural essence (Arya & Negi 2021).

The hilly regions of Uttarakhand present a unique set of challenges and opportunities for sustainable development, particularly in the context of fostering sustainable business practices. Out-migration from hilly regions to plain urban regions has almost abandoned numerous villages in Uttarakhand which are being called "ghost villages" (Mamgain & Reddy, 2015). People residing in villages of hilly regions wish to enhance the quality of their lives by having access to better healthcare, improved infrastructure, superior education and ample opportunities for employment (Mamgain & Reddy, 2015). Addressing these aspirations in their rural hilly regions could significantly reduce their migration to urban areas, alleviating the strain on already crowded urban plain regions. The government acknowledges these challenges and has introduced numerous programs to uplift rural communities. Simultaneously, villages must initiate efforts to formulate or improve their autonomous strategies to integrate into future urban expansion. Several villages have already initiated measures in this regard. Hilly villages of Uttarakhand, equipped with widespread availability of electricity, internet connectivity and telecommunication services, are poised for a positive transformation.

RESEARCH OBJECTIVES

1. To study the concept of smart village and it's various features.
2. To investigate the feasibility of sustainable business practices in Uttarakhand.
3. To suggest strategies for implementing smart village initiatives in hilly regions of Uttarakhand.

WORLDWIDE SMART VILLAGE INITIATIVES AND PRACTICES

The advancement of industrialization and urbanization led the world to confront issues of economic imbalance, environmental degradation, and unequal accessibility to technology and essential infrastructure. In September 2015, the United Nations General Assembly took a major initiative to

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adress these challenges by adopting the 2030 Agenda for Sustainable Development. The Agenda 2030 comprises of 17 goals referred to as the Sustainable Development Goals or SDGs. The agenda has a holistic approach to sustainable development for people from all categories of life and society based on the principle of “leaving no one behind”. The agenda is also known as #Envision2030. The 17 Sustainable Development Goals, set to be accomplished by year 2030, are - "1. No Poverty; 2. Zero Hunger; 3. Good Health and Well-Being; 4. Quality Education; 5. Gender Equality; 6. Clean Water and Sanitation; 7. Affordable and Clean Energy; 8. Decent Work and Economic Growth; 9. Industry, Innovation and Infrastructure; 10. Reduce Inequalities; 11. Sustainable Cities and Communities; 12. Responsible Consumption and Production; 13. Climate Action; 14. Life below Water; 15. Life on Land; 16. Peace, Justice and Strong Institutions; 17. Partnerships for The Goals" (Envision2030, 2015). These goals laid the foundation for concept of smart villages to accomplish sustainability and inclusive development in rural regions (Mihai & Latu, 2020).

The concept of Smart Villages originated in 2016 at the Cork Declaration 2.0 in Cork, Ireland, focusing on the theme of "A Better Life in Rural Areas". The main issues addressed in the declaration were rural challenges, including depopulation and youth migration from villages to cities. The guiding future policies of the declaration included the agenda of Smart Villages. The ten-point approach emphasized the need for investments in rural regions to foster local identity, recognizing economic potentials of villages, and making villages suitable for people of all agegroups (Cork 2.0 Declaration, 2016). Efforts were focused on narrowing the digital divide between rural and urban areas and harnessing the possibilities of digitalization in rural settings.

In 2017, the European Union (EU) introduced the Smart Village Initiative unveiling the "EU Action for Smart Villages". Additionally, 'Smart Villages' became a subtopic in the European Network for Rural Development (ENRD), emphasizing the development of "smart and competitive rural areas". As outlined by ENRD, Smart Villages denote rural communities employing innovative solutions to bolster their resilience, leveraging local strengths and local opportunities (European Network for Rural Development, n. d.). Strategies for Smart Villages target improved access to services, spanning health, training, and transportation, as well as the augmentation of business prospects, job creation, development of short food supply chains, adoption of sustainable farming practices, promotion of renewable energies, establishment of a circular economy, optimal exploitation of natural resources, climate change adaptation, environmental and biodiversity preservation and enhanced cultural heritage valorisation to increase tourism in villages.

Digital India Programme, launched by India in 2015, represents a comprehensive effort to transition India into a digitally empowered and knowledge-based nation. A pivotal component within this ambitious project is the Digital Village initiative, which seeks to elevate rural areas by enhancing Internet accessibility through the establishment of fiber-optic networks. By prioritizing the expansion of digital infrastructure in rural regions, the initiative aims to bridge the urban-rural digital divide. This strategic move not only facilitates increased internet penetration but also empowers rural communities with the tools and resources required to participate actively in the digital economy (Zavratnik et al., 2018).

In 2019, China introduced the digital village strategy, a forward-looking initiative designed to address the socio-economic gap between urban and rural areas. By leveraging technological advancements and connectivity, the strategy seeks to empower rural communities with the tools and opportunities essential for sustainable growth in China (Zhao et al., 2022).

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Few worldwide examples of successful implementation of concept of smart village:

Germany's project of "Digital Villages"

The Digital Villages project in Germany, spanning from 2015 to 2019, exemplifies an innovative approach to implementing the Smart Village concept. The project's foundation lies in addressing the unique challenges faced by rural areas in Germany, where majority of the population resides. Aligned with Germany's sustainable development goals, the project aimed to enhance the quality of life in rural communities by fostering innovation and collaboration among residents, local authorities, and industries. The goal was to provide sustainable and affordable solutions across various sectors. To achieve this, the Digital Villages project adopted a living-lab approach, identifying specific areas where interventions could make a significant impact. Eminent solutions proposed included the establishment of a local online marketplace named BestellBar, a local news portal, and an all-encompassing rural online platform.

The online marketplace quickly gained popularity, attracting over thirty local vendors and garnering participation from 700 residents within just three months. Similarly, the local news portal became a success, reaching up to 400 weekly users, demonstrating the effectiveness of the project in meeting the community's needs (Digital Villages Germany, n. d.). The success of the Digital Villages project offers valuable insights for similar endeavors. Key success factors include establishing local contacts, building trust within the community, initiating the process by understanding the specific needs of the people, maintaining continuous engagement with villagers, and placing significant importance on creating prototypes for proposed solutions. These success tips highlight the importance of community involvement, trust-building, and a tailored approach in the successful implementation of Smart Village initiatives.

France's "City-village reciprocity" initiative

In 2015, France launched an experimental initiative known as "city-countryside reciprocity contracts" to encourage collaboration between urban and rural areas. The initiative involved the urban areas of Brest and the village areas of Centre-Ouest Bretagne. The collaboration program primarily focussed at encouraging economic growth; advancing social inclusivity; and tackling issues related to health, culture, environment, and the shift to sustainable energy. The overall process involved multiple meetings between officials & citizens from both sides throughout the year. During these sessions, they engaged in discussions and formed mutually beneficial partnerships and collaborative strategies to tackle common issues. The motivations for urban areas to participate in the collaboration program included avoiding the enduring threat of diminishing competitiveness and appeal over an extended period, while rural areas aimed to enhance healthcare services and find new markets for local traditional businesses.

As a result of the reciprocity contract, Brest hospital's healthcare services became accessible to the village areas. Engineering resources from both urban and rural agencies were also shared. One notable outcome was the collaboration in biomass energy production. Trucks loaded with wood chips regularly departed from the village area to provide biomass fuel to a power station in the urban area. This collaboration significantly reduced the city's CO2 emissions, showcasing the tangible environmental benefits of the reciprocity contract (Reciprocity Contracts, France, n. d.). In summary, the city-countryside reciprocity contract proved to be a successful and mutually beneficial strategy, addressing various needs in both urban and rural regions, fostering collaboration, and achieving positive outcomes in healthcare, energy, and economic development.

China's "Fun Taishun" digital program

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In the past, difficult transportation in mountainous areas of China's Taishun County protected it from external wars, preserving many ancient cultures and heritage buildings. Such relics are usually very useful for promotion of tourism. However, the younger generation's fading interest in traditional culture posed a challenge. In order to address this issue, Taishun County embraced digital technology to combine culture with tourism. They started by digitally transforming their rural cultural resources using holographic images and 3D technology. For example, they focused on the Baijia Banquet, a cultural heritage with over hundreds of years of history. They created an interesting & interactive experience for tourists which succeeded in attracting around two lakh tourists in 2020 (Zhao et al., 2022). There were many intangible cultural heritage performance events hosted by Taishun County. Many tourists wanted to visit those events but the timing & venue was not suitable for them. Therefore, a mini digital program was built called "Fun Taishun". This program allowed tourists to customize reservations for diverse cultural performance items like puppet shows, folk dances & traditional craftsmanship presentations. Online bookings were done by clients as per their different demands. Consequently, over five hundred cultural performances were held in Taishun County which were visited by more than 1 lakh tourists in next few months (Zhao et al., 2022).
The digital approach not only promotes rural culture but also boosts various types of tourism through services such as booking Picturesque spots, arranging accommodations in hotels or homestays, and providing recommendations for local food and shopping. By connecting traditional culture with tourism, Taishun County successfully preserves and develops its rich intangible cultural heritage, making the region more appealing to tourists.

The above examples of successful Smart Village initiatives from Germany, France and China offer valuable insights for implementing similar projects in hilly villages of Uttarakhand, India. Drawing inspiration from Germany's Digital Villages, a tailored approach focusing on local needs and building trust within the community in hilly regions of Uttarakhand can be used. France's city-countryside reciprocity contracts highlight the potential for collaboration between urban and rural areas to address healthcare, energy and economic development issues. Similarly, China's "Fun Taishun" digital program demonstrates the effectiveness of combining digital technology with cultural heritage to boost tourism. Implementing a digital transformation in Uttarakhand's hilly villages can help in preserving local culture and heritage. Leveraging technology for tourism promotion can enhance the quality of life, economic opportunities and environmental sustainability in the region.

OPPORTUNITIES & CHALLENGES FOR SUSTAINABLE BUSINESS PRACTICES IN UTTARAKHAND

The hill state of Uttarakhand is endowed with rich natural resources, religious heritage & cultural practices that can put the region on a speedy road to sustainable businesses development (Negi, 2019).

Natural Resources

The state is endowed with abundant natural resources, including water bodies, forests, and minerals, making it valuable in terms of economic development and resource management. Uttarakhand is renowned for its picturesque landscapes, including the Himalayan mountain range with appealing flora & fauna. This makes Uttarakhand a significant destination for eco-tourism attracting worldwide visitors. The state possesses substantial hydro-power potential due to the presence of numerous rivers and mountainous terrain. Uttarakhand's mountainous terrain, pollution-free environment and river sites have also paved the way for adventure tourism and leisure tourism. Rich biodiversity in national parks and wildlife sanctuaries of Uttarakhand attracts numerous nature lovers, ecologists & ornithologists from all over the world (Kukreti, 2021).

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Religious Heritage

The heritage of Uttarakhand is deeply tied to its historical and religious sites. The Char Dham pilgrimage circuit, comprising Yamunotri, Gangotri, Kedarnath, and Badrinath, is a major draw for religious tourists. Uttarakhand hosts the Kumbh Mela at Haridwar, a grand gathering of devotees and sadhus. This massive religious congregation is a unique and spiritually significant event, attracting pilgrims in large numbers. Hemkund Sahib, a Sikh pilgrimage site, is also situated amidst picturesque Himalayan surroundings in Uttarakhand. Historical temples like Jageshwar, Binsar Mahadev, Dhari Devi, Surkanda Devi and Neelkanth Mahadev showcase the region's architectural and religious heritage. Ashrams like Neem Karoli Ashram, Swami Dayananda Ashram and Parmarth Niketan Ashram provide spiritual retreats. The state is a hub for religious tourism, attracting pilgrims to its temples, ashrams, and sacred rivers. Investment in infrastructure, connectivity, and marketing, coupled with smart tourism practices, can enhance Uttarakhand's position as a multifaceted religious tourism destination.

Wellness tourism

The abundance of medicinal herbs and plant species in Uttarakhand has led to the emergence of herbal and organic product businesses. Land resources are also available at reasonable prices. There is huge potential to enhance employability & economic growth in the state by combining wellness components like Yoga, Meditation, Ayurveda & Naturopathy with holy rivers, forests, pilgrimage centres, arts, crafts & cultural festivals of Uttarakhand. Rishikesh in Uttarakhand is known as "yoga capital of world". Numerous tourists visit Rishikesh & nearby hilly areas in Uttarakhand to practice yoga, meditation and other wellness activities. After COVID-19 pandemic, people have become more focused on preventive health & welless. Demand for wellness tourism has increased immensely due to sedentary lifestyle and stressful jobs (Jasrotia & Kour, 2023).

Cultural Practices

Valorisation of following cultural practices using smart village strategies can enhance employability & tourism economy in the state:

Festivals: Uttarakhand is known for its colorful festivals, including Kumbh Mela and the Nanda Devi Raj Jat Yatra. Festivals like Diwali, Holi, and Makar Sankranti are also celebrated with fervor, each having its unique regional touch.

Pahadi Cuisine: The cuisine is rich in flavors, with staple foods like "Red Rice," "Mandua ki Roti," and "Jhangora ki kheer". Local dishes include "Aloo Ke Gutke," "Kafuli", "Arsa", "Bal Mithai" etc.

Traditional Dance Forms: Dance forms like "Langvir Nritya" and "Barada Nati" are performed during festivities, reflecting the cultural vibrancy.

Language and Literature: The state's languages, primarily Kumaoni and Garhwali, contribute to a rich literary tradition with folk songs, poems, and stories passed down through generations.

Pahari Paintings: Uttarakhand is known for its Pahari paintings, depicting scenes from mythology and nature. "Aipan" art form involves creating intricate geometric patterns, usually in white, on a red or ochre background.

Wood Carving: The intricate wood carvings on temples and traditional homes showcase the craftsmanship prevalent in the region.

Rituals and Ceremonies: Rituals like "Jagar", a traditional ritualistic song, are performed during religious ceremonies. "Ramman" involves a unique form of storytelling through the recitation of a sacred narrative accompanied by folk songs and dances.

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Geographical Indications (GI Tags):
Geographical Indications (GI) authenticate the origin and quality of locally produced goods, such as handicrafts, agricultural products and traditional foods. GI tag is closely intertwined with sustainable development, aiming to promote social-cultural and economic progress without compromising the environment (Singh & Bharti, 2023). It helps protect the identity and heritage associated with these products fostering economic and cultural benefits for the producers and the region as a whole (Bowen & Zapata, 2009).

Uttarakhand has received Geographical Indication (GI) tags for 27 products across agriculture, food, handicraft and manufactured goods categories. The recipient items include agricultural goods like mandua, jhangora, white rajma, chaulai, red rice, litchi, malta etc.; handicrafts like bicchubooti fabric, wooden ramman mask etc.; food stuff like buransh sharbat and manufactured goods like Nainital mombatti etc. (Agricultural and Processed Food Products Export Development Authority, 2023).

Receiving GI tags is not sufficient enough to build scalable businesses around such products. In order to commercially exploit GI tags in Uttarakhand, multiple smart initiatives need to be taken including organised production structure, quality control, consumer awareness, brand building, customer engagement, R&D, database management and online/offline marketing to access national/international markets. Connecting local villagers to the market poses a significant challenge (Kano et al., 2022), necessitating collaborative efforts between the government and grassroots level organisations. The successful execution of these efforts is crucial for the social, economic, and cultural impact of protecting and promoting geographical indication products. Smart village initiatives, incorporating digital and social innovations, can play a vital role in fostering GI tags for inclusive development in the hilly regions of Uttarakhand.

Challenges for sustainable business practices in Uttarakhand:
Ecological Vulnerability: Uttarakhand's unique ecosystems are sensitive to development, and maintaining a balance between economic activities and ecological preservation is challenging (Roy & Saxena, 2020).
Natural Disasters: The state is prone to natural disasters like floods and landslides. Sustainable practices must consider resilience and adaptability to such events.
Tourism Impact: Uttarakhand heavily relies on tourism. Balancing economic benefits with responsible tourism practices to prevent environmental degradation and cultural decay is a significant challenge (Kala & Bagri, 2018).
Water Resource Management: There is lack of water for drinking and irrigation purposes in hilly regions of Uttarakhand. Balancing industrial needs with ecological preservation is crucial to ensure responsible water usage and long-term environmental viability in the region.
Energy Generation: The demand for energy often leads to the construction of hydropower projects. Balancing energy needs with the preservation of rivers and ecosystems is essential for sustainability (Surie, 2020).
Agricultural Practices: Due to the prevalence of marginal and small land holding in the hilly regions of Uttarakhand, it’s hard to benefit from cost advantages. Besides, persistent soil erosion caused by steep slopes in the hilly region diminishes fertility of the soil (Rana & Bisht, 2023).
Waste Management: Rapid urbanization can lead to increased waste generation. Implementing effective waste management systems to minimize environmental impact is crucial (Surie, 2020).
Infrastructure Development: As the state develops, there's a need for infrastructure. However, ensuring that this development is sustainable and doesn't harm the environment is a challenge (Roy & Saxena,

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2020).
Community Engagement: Community in hilly regions lacks professional & technological skills. Involving local communities in sustainable practices and ensuring that they benefit from economic activities is vital for long-term success (Komorowski & Stanny, 2020).
Smart villages in Uttarakhand's hilly regions can enhance economic growth through digital and financial inclusion. Introducing technology into rural areas can elevate the entire ecosystem, contributing to the inclusive development and fostering a content, well-rounded society (Adamowicz & Zwolinska, 2020).

SUGGESTIONS FOR IMPLEMENTATION OF SMART VILLAGE CONCEPT IN HILLY REGIONS OF UTTARAKHAND

Succesful implementation of smart villages in hilly regions involves significant transformations in physical, environmental, social and governmental aspects, along with capacity building for authorities and residents (Ghosh, 2021). Beyond enhancing the quality of life through technology, it's crucial to develop smart villages in collaboration with resident citizen groups. It's essential to ensure that comprehensive development is aligned with the specific requirements of people residing in hilly regions of Uttarakhand. Inclusive consultations with local residents should be an integral part of the planning and designing phases for smart villages.
Following strategies for implementing smart village initiatives can be utilised in hilly regions of Uttarakhand-

Technology & Innovation based initiatives

Implementing low-cost & small-scale technology based business models is crucial in hilly regions to address the issues of financial viability and environmental conservation. For example, harnessing renewable energy sources like small-scale hydropower or solar microgrid installations offer affordable and eco-friendly energy solutions (Surie, 2020).
Development of e-commerce websites & apps to facilitate direct farmer-to-consumer connections. Reducing the requirement of middlemen can promote economic growth of local products (Leong et al., 2016).
Development of user-friendly web portals to facilitate distance education & telemedicine services in hilly regions.
Creation of a comprehensive digital platform providing detailed information about Uttarakhand's religious places, trekking routes, adventure sites, resorts, homestays, wellness activities, cuisines, handicrafts and related cultural significance; facilitating convenient planning, booking & shopping for visitors.

Skill Development programs

Introducing skill development programs tailored to the local needs, focusing on trades like handicrafts, organic farming, and tourism-related services to boost income opportunities (Arya & Negi 2021).
Establishment of professional learning centers equipped with computers and internet connectivity to facilitate digital education, enhancing access to educational resources for the local population.

Digital Governance

Utilizing digital platforms for efficient delivery of government services can enhance transparency and reduce bureaucratic hurdles. It facilitates timely information dissemination and feedback mechanisms to enhance the efficiency of various government schemes (Ghosh, 2021; Zhao et al., 2022).

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Smart Agricultural Practices

Implementing IoT and AI in smart agricultural practices for hilly regions of Uttarakhand can enhance efficiency and sustainability. IoT sensors can provide real-time data on soil moisture, temperature and crop health. AI algorithms can analyze this data to optimize irrigation schedules and recommend crop-specific interventions.

Drones equipped with sensors can provide aerial views for better monitoring. Drip-irrigation and Vertical farming techniques can significantly address the issues of shortage of water in hills, small land holdings and use of harmful pesticides in agriculture (Qazi et al., 2022).

Smart Tourism Practices

Organising more cultural events and festivals to celebrate local traditions and religious practices can attract more visitors and boost the local economy.

Combining eco-tourism and wellness tourism in Uttarakhand's hilly regions can create a holistic experience for tourists. Developing nature based wellness services can attract tourists seeking both rejuvenation and a deep connection with nature, fostering a balanced and sustainable tourism model.

Establishment of digital platforms or apps that enable locals to share their cultural stories, traditions, and folklore, creating a dynamic repository of the region's rich heritage and offering interactive information, multimedia content, and quizzes to engage and educate visitors about local culture.

Providing reliable Wi-Fi connectivity in key pilgrimage areas, allowing pilgrims to stay connected, share their experiences, and access relevant information.

Introducing smart parking systems using sensors and mobile apps to help tourists find parking spaces efficiently can reduce traffic congestion in popular tourist areas.

Deploying IoT sensors to monitor environmental conditions, such as air quality and weather, providing tourists with real-time information for a safer and more enjoyable experience.

Smart Homestays

Establishing eco-friendly smart homestays that blend with the natural surroundings and promoting it on social media can attract the visitors. Moreover, implementing a user-friendly online booking system can provide convenience for potential guests.

Local community can be involved with homestays for eco-tourism initiatives by allowing guests to experience local culture and traditions. This not only enriches the visitor's experience but also ensures the preservation of local heritage, while contributing to the economic development of the whole region (Rana & Bisht, 2023).

Establishment of wellness centers in homestays offering yoga and meditation, taking advantage of the peaceful ambiance in hilly regions to promote relaxation and rejuvenation.

Offering local cuisines, like jhangora kheer, mandua roti etc., to guests will help them to get an authentic taste of the local culture and It will make their stay more immersive & memorable (Semwal & Singh, 2023).

Ensuring reliable and high-speed internet connectivity for guests to enable them to do their professional work from homestay. Implementing digital feedback systems to collect guest reviews and suggestions will help hosts to continually improve their services based on real-time feedback.

Leveraging GI Tags

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Trademark & logo registration of each GI product is essential to avoid confusion & malpractice in national/international market.
Creation of an app with detail of all GI products including their heritage, production, uses, cultural significance & social importance.
Development of structured rural organisations for management of production, quality assurance and marketing of GI products (Hoang et al., 2020).
Implementing interactive exhibits in museums, incorporating touch-screen displays, holographic projections, 3D technology and interactive installations to make cultural heritage more engaging for visitors (Zhao et al., 2022).
Organising virtual or in-person workshops that showcase GI products oriented culinary practices, traditional crafts and performances, fostering a deeper appreciation for the cultural heritage and traditional recipes of the hilly regions of Uttrakhand.
Incorporating food and beverages made from Geographical Indication (GI) tagged products across hotels, homestays, resorts, and wellness centers in Uttarakhand can effectively boost marketing strategies.

Digital Marketing

Digital marketing for small-scale businesses in rural hilly regions can offer cost-effectiveness, targeted reach, wider audience, measurable results and increased customer engagement. It provides the ability to compete with larger urban competitors on a level playing field.
Social media assists in establishing networks, forming partnerships, and seizing online branding prospects. Small-scale businesses can benefit by sharing detailed posts featuring photos and videos on Facebook, Instagram & YouTube. Social media users tend to be more engaged through actions like clicks, likes, or dislikes, making marketing strategies on these platforms more targeted and closer to consumers (Kano et al., 2022).
Implementing the smart village concept in Uttarakhand has the potential to foster sustainable business practices. It broadly involves two main facets of transformation. Firstly, improving infrastructure to establish seamless connections between urban and rural areas, facilitating easy transportation of goods. Secondly, embracing ICT and IoT technologies for rapid global networking, enabling efficient resource management.

CONCLUSION

The concept of smart village in the hilly regions of Uttarakhand involves a comprehensive strategy that takes into account the unique geographical, social, and economic factors of the area. The first step is to engage local communities actively in the decision-making process. This includes conducting participatory workshops, surveys and discussions to understand the specific needs and challenges faced by residents of different villages. By involving the people who will be directly affected, the initiative gains valuable insights and ensures that solutions are tailored to the community's requirements. Instead of imposing external solutions, the focus is on understanding and addressing the specific needs of the residents. Empowerment of the local population is fundamental to the success of the Smart Village model in Uttarakhand. This involves providing training programs, skill development initiatives, and access to resources that enable residents to actively participate in sustainable business practices. By cultivating a sense of ownership and self-reliance, the community becomes more resilient and capable of driving its development. Through community-driven initiatives, the Smart Village model can be customized to the context of hilly regions of Uttarakhand, fostering long-term sustainability and

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resilience.

The implementation of smart village concept requires integration of innovative technologies to foster sustainable business practices, ensuring economic growth and cultural preservation while minimizing environmental impact. In the domain of smart agriculture, precision farming techniques can be employed, incorporating sensors & data analytics to optimize resource utilization and enhance crop yields. Concurrently, smart tourism initiatives can leverage digital platforms for marketing, providing real-time information to tourists and facilitating secure seamless tourism experiences in the hilly regions. Complementing this, smart homestays can incorporate technology for efficient management, thereby maintaining a balance between providing modern amenities and preserving the authenticity of local culture & traditions.
Additionally, Geographical Indication (GI) tags can play a vital role in economic growth of Uttarakhand by authenticating locally produced goods, preserving the region's unique identity and ensuring fair compensation for local producers. Together, these components create a holistic framework for economic development, environmental conservation and the preservation of socio-cultural heritage in the hilly regions of Uttarakhand.

Establishment of smart villages is crucial for India's evolution into a smart nation. It's necessary to balance development of smart villages with smart cities. While urban and rural development poses distinct challenges, transforming villages into smart villages is relatively easier due to lower population, simpler infrastructure modifications and ample unused land for future planning allowing enhanced standardization. Smart villages can act as additional catalysts for economic development alongside smart cities. They can generate high quality products and services for domestic as well as global markets, thereby encouraging nearby cities to truly become smarter. The simultaneous smart development of both rural and urban regions ensures that technological advancements and sustainable practices benefit all citizens equally. This helps bridge the urban-rural divide and fosters balanced development of the nation.

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