




RESEARCH ARTICLE

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# Assessing the socio-cultural impact of urban revitalisation using Relative Positive Impact Index (RPII)

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## Abstract

Urban heritage is a vital resource that connects communities to their local identity. Unplanned developments and rapid urbanisation often harm the authenticity of historic areas, disrupting the cultural fabric and altering their character. This study introduces the Relative Positive Impact Index (RPII), a novel technique for assessing the socio-cultural impacts of urban revitalisation. The significance of RPII lies in its ability to quantitatively evaluate the impacts on the cultural fabric and integrity of historic urban areas, which is crucial for sustainable urban development. The study's objective is to apply RPII in evaluating qualitative socio-cultural characteristics in historic urban areas, with a focus on four main criteria and 16 sub-criteria, in the case of the Kuttichira precinct. The methodology integrates the analysis of published literature, a quantitative survey mapping the stakeholders' perception, and qualitative insights. This approach facilitates an in-depth understanding of how urban revitalisation affects local socio-cultural dynamics, preserving the authenticity and character of historic areas. The study reveals that the revitalisation project in Kuttichira positively impacts the socio-cultural fabric of the area, maintaining cultural integrity and addressing social challenges. These findings offer valuable insights for sustainable urban development and policymaking in historic areas. The study recommends the application of RPII in other urban precincts for comparative analysis and further development of urban development practices, contributing to informed urban policy and planning decisions.

**Keywords** Urban revitalisation, Socio-cultural impact, Relative positive impact index, Urban heritage, Sustainability

## 1 Introduction

Preserving cultural heritage assets in historic urban areas is crucial as they embody valuable knowledge systems and cultural values (UNESCO 2011). These assets can connect individuals with their past, foster community understanding, improve quality of life, and contribute to social, economic, and sustainable development goals (Figueiredo 2014; Zancheti and Hidaka 2011). Despite being subject to continuous alterations

to accommodate changing demands, these urban spaces serve as a historical record (Abdurahiman and Kasthurba 2022; Labadi and Logan 2016; Udeaja et al. 2020). However, the perception of these heritage sites in developing countries, such as India, is often negative, as they are seen as an obstacle to progress and change rather than being recognised as valuable resources for future generations (Steinberg 1996; Udeaja et al. 2020). Heritage conservation is frequently focused on protecting assets in isolation without considering the potential benefits of incorporating them into the urban environment and community, resulting in neglect and a lack of community involvement (Qu et al. 2023; Vukmirović and Nikolić, 2023). Recent discussions in urban development and spatial planning increasingly recognise the importance of integrating heritage conservation

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in a sensitive manner (Tarrafa Silva et al. 2023). Revitalisation, which utilises heritage assets as development resources while preserving the historic built environment, is seen as a sustainable approach to urban conservation. Revitalisation projects aim to upgrade infrastructure, improve social and cultural conditions, enhance the quality of life, and address social issues (Abdurahiman et al. 2022a, b; Grazuleviciute-Vileniske and Urbonas 2014; Licciardi and Amirtahmasebi 2011; Serageldin 1999). The involvement of the community and public perception is critical to the success of revitalisation efforts. However, most studies in this field are focused on the physical transformation of the built form or landscape rather than the perceptions of the community. This study addresses this gap by presenting the revitalisation project at the Kuttichira tank precinct in Kozhikode City, India and analysing stakeholders' perceptions. The goal is to demonstrate the value of understanding community perception when revitalising historic urban areas.

In India's urban regeneration context, a significant challenge is assessing revitalisation projects' impacts on the socio-cultural fabric of historic urban precincts. Traditional methods like Environmental Impact Assessments (EIA), Heritage Impact Assessment (HIA), and Social Impact Assessment (SIA) often overlook the subtle socio-cultural dynamics changes (Glasson and Wood 2009). Current urban regeneration efforts predominantly focus on physical and economic dimensions, frequently neglecting socio-cultural aspects crucial for community identity and heritage preservation. The study proposes using the Relative Positive Impact Index (RPII) technique to comprehensively analyse impacts on historic urban fabric, thereby gauging the effectiveness of revitalisation efforts. This method offers a more nuanced understanding than approaches like the Triple Bottom Line (Rahman et al 2019), which might not fully capture the intricate socio-cultural elements. Similarly, models focusing on physical infrastructure or environmental sustainability may overlook the intangible cultural heritage and social structures that are integral to urban life in India. RPII allows for evaluating the overall success and identifying areas for improvement in urban regeneration projects.

This study advances the initial research which focused on public perceptions of urban heritage's impact on Kuttichira's social well-being (Abdurahiman et al. 2022a, b), conducted at the outset of the Kuttichira urban revitalisation project. With the project's completion, the objective now is to assess its concrete impact on the socio-cultural fabric of the precinct. Building on the earlier work, this current research refines the socio-cultural aspect framework and aims to evaluate the effects of the completed

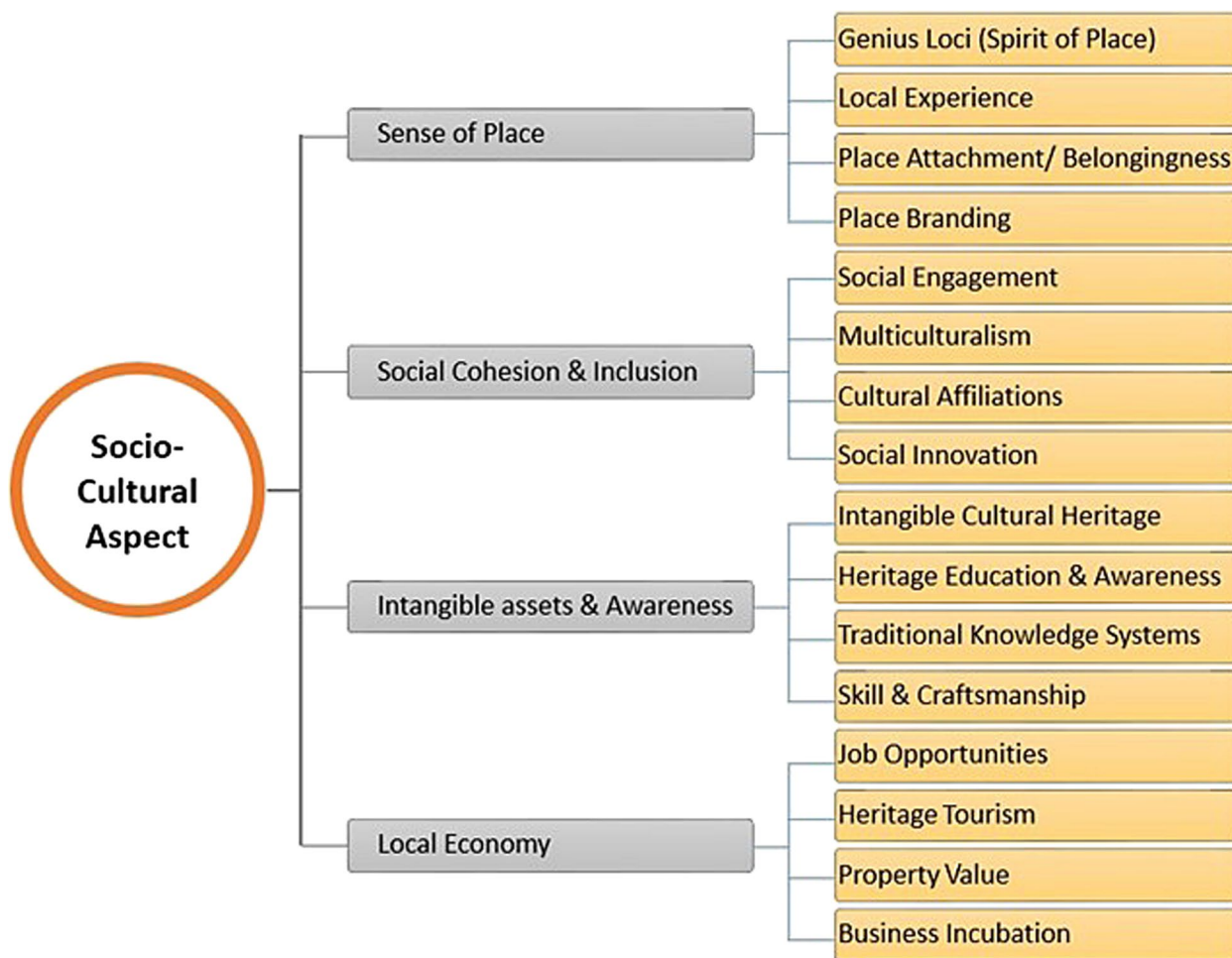
revitalisation on the socio-cultural dimensions of the Kuttichira precinct.

### 1.1 Urban revitalisation as a sustainable urban regeneration approach

Urban revitalisation in historic areas encompasses both place-focused and people-focused approaches, aiming to enhance urban quality and address community needs respectively. This process, variably termed as regeneration, rehabilitation, refurbishment, renewal, or redevelopment, involves infrastructure upgrades, urban amenities enhancement, and streetscape improvements. A key goal is to revive the urban core by restoring commercial activity and environmental quality (Rosly and Rashid 2013). Sustainable urban regeneration integrates social, economic, environmental, and cultural aspects, going beyond physical improvements to prioritise community needs, heritage preservation, and unique urban experiences. Some revitalisation projects tend to prioritise attracting upper classes and tourists over valuing heritage assets or benefiting the community (Abdurahiman et al 2023). Revitalisation proposals significantly shape urban spaces' unique character (Tarrafa Silva et al. 2023). Public understanding and awareness of local heritage's role in urban enhancement are often limited (Greffé 2004). The Faro Convention of 2005 advocates for cultural heritage preservation tailored to national standards, emphasising the meanings and values people assign to heritage (Fojut 2018). It also highlights the importance of public participation in heritage management. Understanding public perceptions is crucial for effective heritage preservation and management (Aas et al. 2005; Abdurahiman et al. 2022a, b). Dowler et al. (2006) define public perceptions as collective views from structured surveys (Dowler et al. 2006). Involving the public contributes to developing context-specific solutions for historic urban areas' sustainable preservation (Chang 2012; Gunay and Dokmeci 2012; Günaydin and Yücekaya 2020; Moroke et al. 2019; UNESCO 2011). Addressing these perceptions is vital in identifying key issues and meeting the social, cultural, and economic needs of residents in historic urban areas.

### 2 Socio-cultural aspect in historic urban precincts-theoretical framework

Historic urban precincts are dynamic entities characterised by a blend of multiple values, crucial for defining their context (Azzopardi et al. 2023; Jain 2023; Zancheti and Jokilehto 1997). Recent urban regeneration studies emphasise the need to integrate socio-cultural aspects into the revitalisation of these areas (Cheshmehzangi 2023). Urban regeneration, traditionally focused on physical and economic dimensions, is increasingly recognised



**Fig. 1** Socio-cultural aspect (Source: the authors)

for its role in fostering unique urban character and identity through socio-cultural engagement (Abdurahiman et al. 2022a, b; Shehata 2023). The socio-cultural aspect, pivotal in shaping a region’s identity and built environment, is often embedded within community fabrics (Jain 2023). This perspective was explored in a public perception study in the Kuttichira precinct, focusing on ‘sense of place’ and ‘quality of life’, each comprising five influential sub-criteria (Abdurahiman et al. 2022a, b). The current study presents a framework to assess the socio-cultural impact of urban development interventions, drawing from expert opinions and literature review. The framework’s 16 identified sub-criteria are tailored to reflect the local socio-cultural context across varying scales of intervention, which are classified under four main criteria: sense of place, social cohesion, intangible assets & awareness, and local economy. These criteria, along with their sub-criteria, not only reflect the current state of urban precincts but also guide future urban interventions, assessing their impact on socio-cultural aspects and the

overall adaptability and sensitivity of these interventions to the local socio-cultural fabric. While this paper focuses on the theoretical framework and its application in assessing the impact of revitalisation projects, it does not delve into the framework’s development. Figure 1 illustrates this socio-cultural framework, and Table 1 details the sub-criteria under each criterion, aiding in the assessment process.

**2.1 Sense of place**

The criteria of “sense of place” in historic urban precincts can be broken down into several sub-criteria, including Genius Loci, Local Experience, Place Attachment, and Place Branding. Genius Loci, the unique character and spirit of a place, is shaped by its cultural assets and design elements, contributing to its distinctive identity (Abdurahiman et al. 2022a, b; Gustafsson 2019). Local Experience, involving both tangible and intangible elements like cultural events, local food, and traditions, offers a unique and authentic experience (Kusumowidagdo et al. 2023).

**Table 1** Descriptions of sub-criteria

SI.No	Sub-criteria	Description
SC11	Genius Loci (Spirit of Place)	Enhancing the spirit of the place by enhancing the meaning of the place and acting in harmony to create a unique cultural landscape (also through sensory aesthetics that contribute to the aura of the place)
SC12	Local Experience	Enhancing the local urban experience in the historic precinct area in terms of spatial and navigational comfort for the user
SC13	Place Attachment	Enhancing place attachment or the feeling of inclusion or acceptance into a group of people
SC14	Place Branding	Enhancing or promoting the idea of discovering or creating some uniqueness differentiates one place from others to gain a competitive brand value for the historic precinct area
SC21	Social Engagement	Supporting and promoting social involvement/ participation refers to one's degree of participation in a community or society
SC22	Multiculturalism	Supporting and promoting all the different cultural or racial groups in a society have equal rights and opportunities, and none is ignored or regarded as unimportant
SC23	Cultural Affiliations	Supporting and promoting cultural affiliations* in the historic precinct area. *an association with a historic immigrant nationality or ethnic group
SC24	Social Innovation	Supporting and promoting new social practices that meet social needs better than the existing solutions
SC31	Intangible Cultural Heritage	Supporting and promoting intangible cultural heritage in the historic precinct area. (Arts, music, dance, crafts, festivals, rituals etc.)
SC32	Heritage Education & Awareness	Supporting and appreciating heritage value through heritage education and awareness programmes in the historic precinct area
SC33	Traditional Knowledge Systems	Supporting and promoting traditional knowledge systems in the historic precinct area (traditions, culture, lifestyle, knowledge etc.)
SC34	Skill & Craftsmanship	Supporting and promoting local building skills and craftsmanship in the historic precinct area
SC41	Job Opportunities	Benefiting through the provision of local job opportunities by a local employer, business, company, enterprise, organisation or local government in the historic precinct
SC42	Heritage Tourism	Benefiting through heritage tourism in the historic precinct area
SC43	Property Value	Benefiting by influencing the property/ land value in the historic precinct area
SC44	Business Incubation	Benefiting through a platform for supporting or promoting business incubation for the historic precinct area

Place Attachment, the emotional bond with a location, is enhanced in historic precincts through cultural heritage preservation and community engagement spaces (Giuliani 2003; Wang 2021; Zhao 2023). Lastly, Place Branding, creating a unique precinct identity, involves using cultural symbols and promoting local traditions, benefiting residents, vendors, and tourists alike (Aitken and Campelo 2011; Walters and Insch 2018). These elements collectively foster vibrant, inclusive communities, deeply connected to their cultural heritage and traditions, thereby reinforcing the overall sense of place in historic urban areas.

## 2.2 Social cohesion & inclusion

In historic urban precincts, “social cohesion & inclusion” is underpinned by sub-criteria such as Social Engagement, Multiculturalism, Cultural Affiliations, and Social Innovation. Social Engagement, through public spaces and community events, fosters interaction and builds community networks (Cachadinha et al. 2011; Pe et al. 2014; Quan-Haase et al. 2002; Rosenblatt et al. 2009; Su 2011). Multiculturalism enhances social cohesion by encouraging diverse cultural exchanges within communities (Cui et al. 2023; Reitz et al. 2009). Cultural

Affiliations strengthen residents’ connections to their heritage, enhancing pride and identity (Azzopardi et al. 2023; Hannerz 1996; Stoffle 2020). Social Innovation, through novel solutions to social challenges, supports vibrant community life and cohesion (Cancellieri et al. 2018; García et al. 2015; Grimm et al. 2013; Martins et al. 2023). These elements collectively contribute to the creation of inclusive, diverse communities with strong social ties and a shared sense of community in historic urban areas.

## 2.3 Intangible assets & awareness

The criteria of “Intangible Assets and Awareness” in historic urban precincts can be analysed through the following sub-criteria: Intangible Cultural Heritage, Heritage Education & Awareness, Traditional Knowledge Systems, and Skill & Craftsmanship. Intangible Cultural Heritage, including traditions and cultural practices, preserves the area’s cultural identity and diversity (Ahmad 2006; Cominelli and Greffe 2012; Lenzerini 2024). Heritage Education & Awareness, through educational programs and cultural events, enhances understanding and appreciation of cultural heritage (İslamoğlu 2018; Lenzerini 2024). Traditional Knowledge Systems, the accumulated

wisdom passed through generations, are vital for preserving cultural identity and heritage (Battiste 2016; Yan and Li 2023). Skill & Craftsmanship, representing specialised techniques in traditional crafts, support local economies and cultural preservation (Klamer 2012; Ocejo 2017). Together, these sub-criteria play a crucial role in valuing and promoting the intangible heritage, ensuring the preservation and awareness of the rich cultural fabric of historic urban precincts.

#### 2.4 Local economy

The criteria of “Local Economy” in historic urban precincts can be analysed through the following sub-criteria: Job Opportunities, Heritage Tourism, Property Value, and Business Incubation. Job Opportunities, particularly in skilled labor for restoration and conservation, support local artisans and professionals, boosting employment and livelihood (Klamer 2012; Kousa et al. 2023; Ocejo 2017; Theodora 2020). Promoting local businesses and entrepreneurial ventures in historic precincts can transform these areas into thriving economic hubs, fostering community development and enhancing the quality of life (Elnokaly and Elseragy 2013). Heritage Tourism is pivotal, attracting tourists through well-preserved cultural sites, thereby generating revenue and encouraging the growth of supporting industries like hospitality and transportation (Du Cros et al. 2005; Madandola and Boussaa 2023; Quinn 2013; Zaei and Zaei 2013). Property Value increases in well-managed historic precincts, enhancing the worth of housing and commercial spaces, albeit with a need to balance development and affordability (Yigitcanlar et al. 2019; Zaei and Zaei 2013). Business Incubation promotes innovative startups, driving economic diversity and sustainability while maintaining cultural heritage (Franco et al. 2018; Gražulevičiūtė, 2006; Gustafsson and

Ijla 2017; Lalkaka 2001; Romein and Trip 2017; Schiopu et al. 2015). Together, these elements contribute to the economic vitality of historic urban precincts, ensuring sustainable growth that benefits local communities and preserves historical significance.

#### 3 Kuttichira urban heritage revitalisation project

Calicut, a historic city on India’s southwestern coast, is renowned for its natural shorelines and its history as the capital of the Zamorins. Noted in Ibn Battuta’s travels, the Zamorin Raja designated Thekkepuram in Calicut for trading communities, leading to the formation of a distinct Muslim community characterised by unique culture, religious beliefs, festivals, and traditions. This area, bordered by the Arabian Sea, Big Bazaar, and the Kallai River, revolves around a central tank or chira, the settlement’s heart. The urban layout comprises a public domain with a main road circling the pond and a private domain with narrow residential streets. The architecture is an Islamic and traditional Kerala style blend, evident in the mosques and large timber houses (Abdurahiman et al. 2022a, b). Prior to revitalisation efforts, the pond and its vicinity were neglected, risking the loss of their natural and cultural heritage value. Infrastructure improvements were necessary to rejuvenate the urban conditions of the Kuttichira precinct, as depicted in photographs from Figs. 2, 3, 4, 5 and 6 before the project.

The revitalisation of Kuttichira pond in Calicut, a collaborative effort between the National Institute of Technology Calicut’s Department of Architecture & Planning, the District Tourism Promotion Council (DTPC), and Nirmiti Kendra, aimed to preserve natural heritage and enhance public spaces. The project, funded by DTPC and MLA fund at ₹2 crores, focused on the cultural heritage of Calicut port city. Key developments



**Fig. 2** Obstruction by hoardings and display boards – north end (before revitalisation). (Source: the authors)



**Fig. 3** Lack of an interface and connection—west end (before revitalisation). (Source: the authors)



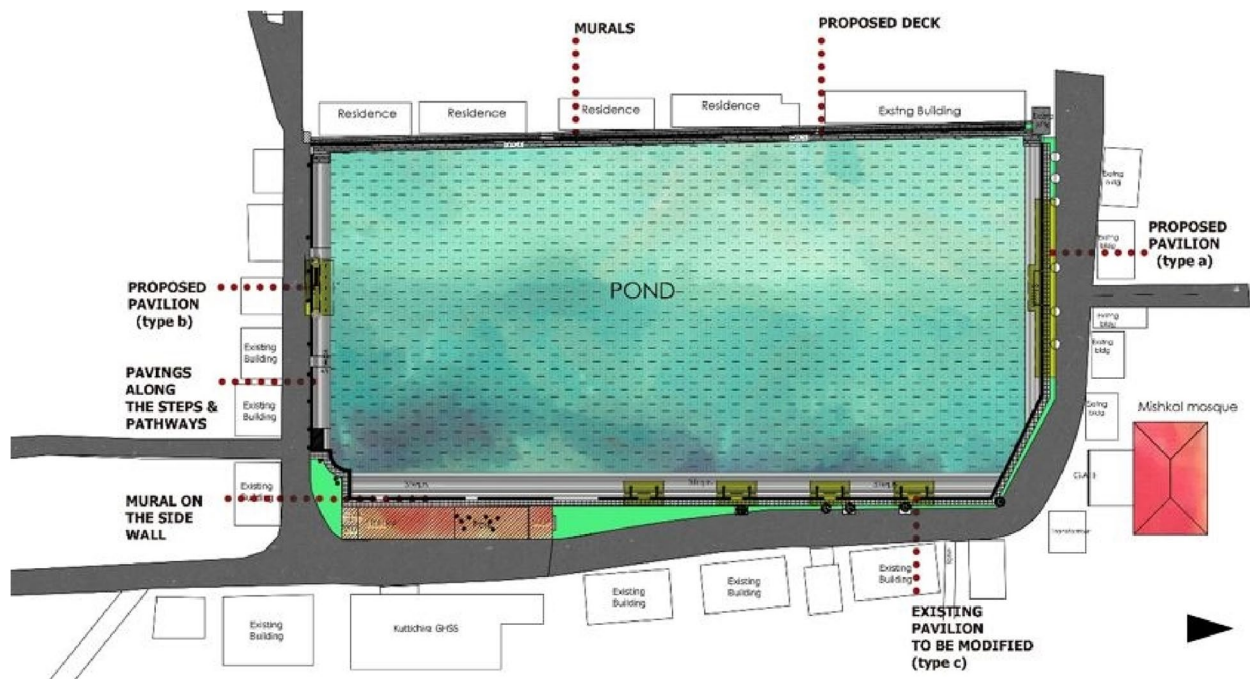
**Fig. 4** Lack of contextual character—east end (before revitalisation). (Source: the authors)



**Fig. 5** Lack of an interactive street interface—south end (before revitalisation). (Source: the authors)



**Fig. 6** Temporary sheltered seating and water drainage (before revitalisation). (Source: the authors)



**Fig. 7** Kuttichira heritage revitalisation project—proposed phase I masterplan layout. (Source: the authors)

included the Ibn Batuta walkway, new structures like open pavilions and a traditional Kerala-style bathhouse (Fig. 7). The proposal focused on enhancing tourism potential and improving usability and safety to the tank. Upgrades in landscaping, paving, drainage, lighting, and waste disposal facilities improved the overall quality of the urban space. The project also addressed the challenge of modern developments disrupting Kuttichira’s traditional character by advocating for regulation and

preservation of the historic style. Figures 8, 9 and 10 depict the completed intervention.

#### 4 Methodology

A thorough analysis of published literature, which includes English and Malayalam newspaper articles, blog posts, and research publications relating to the conditions, activities and lifestyle of the Kuttichira pond precinct before and after the revitalisation, was conducted. The quantitative survey relied on a pretested



**Fig. 8** Street interface character with the bath pavilion—south end. (Source: the authors)



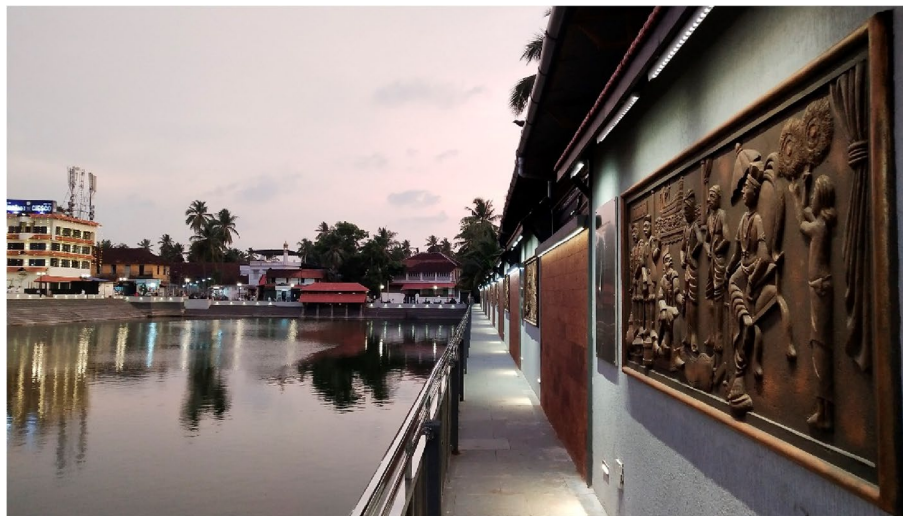
**Fig. 9** Pavilions with contextual character—east side. (Source: the authors)

questionnaire to capture the relative positive impact of the revitalisation project interventions on the socio-cultural fabric. The focus was on four criteria: Sense of Place, Social Cohesion, Intangible Assets & Awareness, and Local Economy. The qualitative survey included questions and inquiries about the respondent's knowledge of the history and heritage of the Kuttichira precinct, their opinions on the necessity of the revitalisation project and its impact, relative success or failure, and any additional thoughts they wanted to express.

#### 4.1 Sample selection

The respondents for the study were sampled through convenience sampling. During the launch of the revitalisation project, 60 key individuals were identified from a stakeholder meeting and the public and acknowledged as possessing a shared viewpoint among a larger group or community in the Kuttichira area. The individual's contacts were collected and frequently contacted to acquire periodic feedback before and after the project to obtain reliable post-completion project assessment feedback. The 60 participants who responded positively in the previous public perception





**Fig. 10** Ibn Battuta Walkway—west end (Source: the authors)

study (Abdurahiman et al. 2022a, b) and have also served as active experts for the current study.

**4.2 Questionnaire design**

The questionnaire was designed so that the respondents, based on their understanding and experience, could assign a relative positive impact score for every item by the revitalisation project through a 7-point Likert scale (Likert 1932). The 7-point scale was established to be fit and acceptable by several authors (Abdurahiman et al. 2022a, b; Colman et al. 1997; Finstad 2010; Johns 2010; Lewis 1993; Miller 1956; Symonds 1924). Likert scale can be treated as continuous variables. The reasoning behind this idea is based on the notion that Likert scale variables, which are ordinal with five or more categories, can often be treated as continuous without negatively impacting the analysis (Johnson and Creech 1983; Norman 2010; Sullivan and Artino 2013; Zumbo and Zimmerman 1993). When this is done, the variable is commonly referred to as an ‘ordinal approximation of a continuous variable’ due to the five or more categories rule. The respondent frequency and percentage of the respondents based on their gender and age were collated using the frequency analysis technique. Face-to-face interviews were held at the Kuttichira tank precinct in Malayalam and audio recorded with consent. The interviews were then transcribed into English. Observations were documented on paper, and photos were taken to enhance understanding of the responses. The study collected, summarised, and analysed stakeholders’ perceptions and subjective views.

**Table 2** Likert and Relative Positive Impact Index (RPII) scale (Source: Authors)

Likert	Relative Positive Impact Index (RPII)	Positive Impact level
1	$0 \leq RPII < 0.15$	Neutral
2	$0.15 \leq RPII < 0.20$	No – Minor Impact
3	$0.20 \leq RPII < 0.35$	Minor Impact
4	$0.35 \leq RPII < 0.50$	Minor- Moderate Impact
5	$0.50 \leq RPII < 0.70$	Moderate Impact
6	$0.70 \leq RPII < 0.85$	Moderate- Major Impact
7	$0.85 \leq RPII \leq 1.0$	Major Impact

**4.3 Relative Positive Impact Index (RPII)**

The public perception study conducted to evaluate the role of urban heritage on the community’s social wellbeing adopted the Average Index technique to establish the levels of agreement for the criteria (Abdurahiman et al. 2022a, b), which aided in determining the relevance of certain criteria to be included, adapted or revisited for the current socio-cultural framework. In the current study, the collected data was analysed using the novel technique proposed by the authors, i.e. Relative Positive Impact Index (RPII) Technique adapted from the Relative Importance Index (RII) technique. RII determines the relative importance of the various influential criteria that determine a particular parameter (Dittrich et al. 2007). In contrast, RPII technique will determine the relative positive impact level of a particular activity/function on the corresponding determining criteria. The seven-point Likert scale ranging from 1 to 7 (1: no major impact; 7: major impact) is adopted and transformed to relative positive impact indices (RPII) for each sub-criterion by using the below equation:

$$RPII = \Sigma W / (A * N)$$

Where ‘W’ is the weighting given to each sub-criterion by the respondents (ranging from 1 to 7), ‘A’ is the highest weight (i.e., 7 in this case), and N is the total number of respondents. The value of RII for each criterion and sub-criteria determines the impact in influencing the criteria. Table 2 shows the adapted 7-point Likert scale from 1 to 7 with its respective Relative Positive Impact Index (RPII) value range and their corresponding positive impact level.

### 5 Results and analysis

A purposive sampling of 60 participants responded to the questionnaire survey. Regarding gender, 60% of the sample constituted male, and 40% constituted female group. Based on age-wise distribution, most of the respondents fall under 25–34 years, with 38 respondents (63.3%), followed by categories 12 respondents under 35–44 years (20%), 6 respondents under 45–59 years, and 60 years & above with four respondents (6.7%). Table 3 shows the demographic overview of the respondents. IBM SPSS Statistics Version 21 was used to conduct reliability analysis by calculating Cronbach’s Alpha ( $\alpha$ ). The Cronbach alpha values obtained for criteria SC1, SC2, SC3 and SC4 are .798, .840, .782 and .842 respectively. The response obtained from the SC3 criteria shows a lower alpha value ( $\alpha = .782$ ) compared to other criteria sets, which would increase to  $\alpha = .784$  if SC34 (skill and craftsmanship) is omitted. Since the change or increase in alpha value is negligible, we retain item SC34 as such. Table 4 shows Cronbach’s alpha values for all the criteria. All the alpha values are above .750, which shows good reliability within each criterion set. Pearson’s correlation was used to study the inter-item correlation within each criterion set (Freedman et al. 2007; Norman 2010; Sullivan and Artino, 2013). The correlation amongst the main criteria was also studied and depicted through a correlation heatmap, as shown in Fig. 11. The Pearson correlation heat maps for all the sub-criteria sets are shown in Fig. 12. All the items showed a significantly positive correlation between each other within all the criteria sets. The

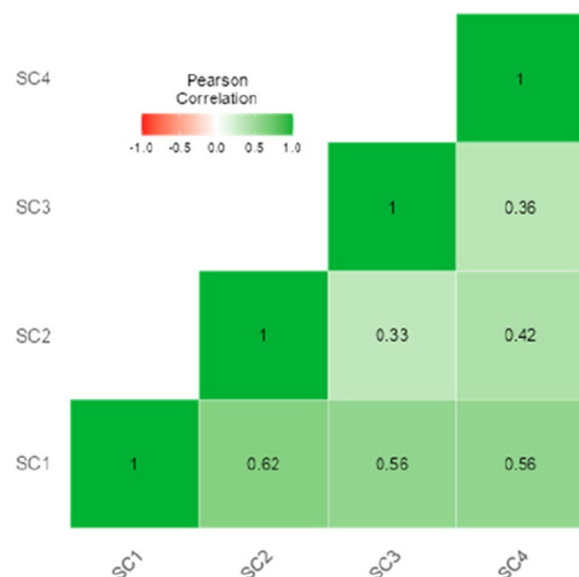
**Table 3** Demographic overview of respondents

	Variable	Frequency	Per cent
<b>Gender</b>	Male	36	60
	Female	24	40
<b>Age</b>	25—34 yrs	38	63.3
	35—44 yrs	12	20.0
	45—59 yrs	6	10.0
	60 yrs. & above	4	6.7

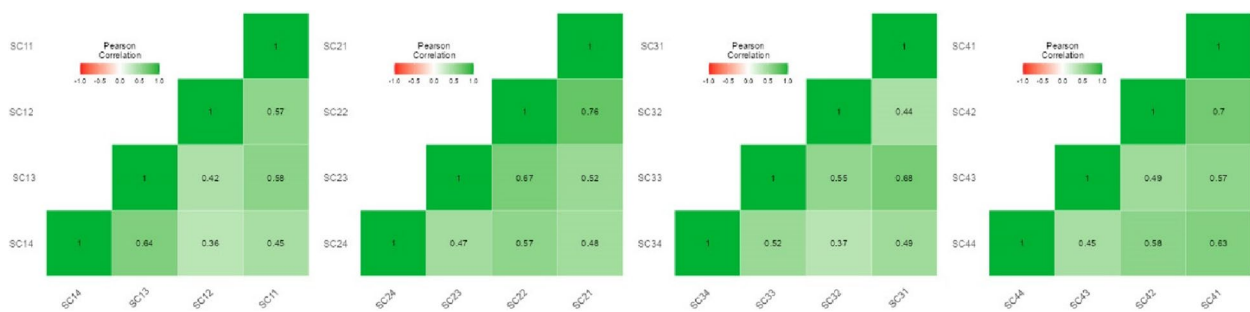
**Table 4** Cronbach’s alpha reliability analysis

Criteria	Cronbach’s Alpha ( $\alpha$ )	Sub-Criteria (item)	( $\alpha$ ) if item deleted
SC1 Sense of Place	.798	SC11	.732
		SC12	.790
		SC13	.699
		SC14	.755
SC2 Quality of Life	.840	SC21	.791
		SC22	.736
		SC23	.813
		SC24	.847
SC3. Intangible Assets & Awareness	.782	SC31	.714
		SC32	.759
		SC33	.668
		SC34	.784
SC4 Local Economy	.842	SC41	.753
		SC42	.786
		SC43	.840
		SC44	.810

responses from the participants were collated in Microsoft excel to understand the frequency distribution of responses. The respondent distribution table for criteria and sub-criteria are shown in Tables 5 and 6, respectively. The descriptive statistics were analysed using IBM SPSS Statistics 21. There were no missing or invalid entries. The positive impact level for each main criterion and their respective sub-criteria was interpreted by calculating the Relative Positive Impact Index (RPII) values. The RPII values of the main four criteria and their ranking is



**Fig. 11** Pearson correlation heat map for criteria. (Source: the authors)



**Fig. 12** Pearson correlation heat map for sub-criteria. (Source: the authors)

**Table 5** Respondent distribution for criteria. (Source: Authors)

Criteria	Neutral 1	No-Minor 2	Minor 3	Minor—Moderate 4	Moderate 5	Moderate-Major 6	Major 7
SC1. Sense of Place	0	0	0	0	3	17	40
SC2. Social Cohesion & Inclusion	0	0	0	0	1	23	36
SC3. Intangible Assets & Awareness	0	0	0	0	1	25	34
SC4. Local Economy	0	0	0	0	10	28	22

**Table 6** Respondent distribution for sub-criteria. (Source: Authors)

Criteria	Sub-Criteria	Neutral 1	No-Minor 2	Minor 3	Minor—Moderate 4	Moderate 5	Moderate—Major 6	Major 7
SC1. Sense of Place	SC11. Genius Loci	0	0	0	0	3	17	40
	SC12. Local Experience	0	0	0	0	0	24	36
	SC13. Place Belongingness	0	0	0	0	9	22	29
	SC14. Place Branding	0	0	0	0	10	23	27
SC2. Social Cohesion & Inclusion	SC21. Social Engagement	0	0	0	0	1	23	36
	SC22. Multiculturalism	0	0	0	0	1	30	29
	SC23. Cultural Affiliations	0	0	0	0	0	22	38
	SC24. Social Innovation	0	0	0	0	12	38	10
SC3. Intangible Assets & Awareness	SC31. Intangible Cultural Heritage	0	0	0	0	0	14	46
	SC32. Heritage Education & Awareness	0	0	0	0	1	24	35
	SC33. Traditional Knowledge Systems	0	0	0	0	0	24	36
	SC34. Skill & Craftsmanship	0	0	0	0	10	28	22
SC4. Local Economy	SC41. Job Opportunities	0	0	0	0	10	28	22
	SC42. Heritage Tourism	0	0	0	0	9	31	20
	SC43. Property Value	0	0	0	0	5	33	22
	SC44. Business Incubation	0	0	0	0	15	35	10

shown in Table 7. ‘Sense of Place’ ranks 4th with an RPII of 0.8429, ‘Social Cohesion & Inclusion’ ranking 2nd with an RPII of 0.8952; ‘Intangible Assets & Awareness’ has the highest RPII of 0.9333, ranking 1st; and ‘Local

Economy’ ranked 3rd with an RPII of 0.8762. The RPII index value for all the sub-criteria and their corresponding local ranks is shown in Table 8. ‘Local Experience’ and ‘Genius Loci’ lead Sense of Place with high RPIIs,

**Table 7** Relative Positive Impact Index values (RPII) for criteria

Criteria	Neutral 1	No-Minor 2	Minor 3	Minor— Moderate 4	Moderate 5	Moderate— Major 6	Major 7	RPII	Rank
SC1. Sense of Place	0	0	0	0	100	156	98	0.8429	4
SC2. Social Cohesion & Inclusion	0	0	0	0	45	156	175	0.8952	2
SC3. Intangible Assets & Awareness	0	0	0	0	5	156	231	0.9333	1
SC4. Local Economy	0	0	0	0	50	192	126	0.8762	3

**Table 8** Relative Positive Impact Index values (RPII) for sub-criteria

Criteria	Neutral 1	No-Minor 2	Minor 3	Minor— Moderate 4	Moderate 5	Moderate— Major 6	Major 7	RPII	Rank
SC11. Genius Loci	0	0	0	0	15	102	280	0.9452	2
SC12. Local Experience	0	0	3	0	0	144	252	0.9500	1
SC13. Place Belongingness	0	0	0	0	45	132	203	0.9048	3
SC14. Place Branding	0	0	0	0	50	138	189	0.8976	4
SC21. Social Engagement	0	0	0	0	5	138	252	0.9405	2
SC22. Multiculturalism	0	0	0	0	5	180	203	0.9238	3
SC23. Cultural Affiliations	0	0	0	0	0	132	266	0.9476	1
SC24. Social Innovation	0	0	0	0	60	228	70	0.8524	4
SC31. Intangible Cultural Heritage	0	0	0	0	0	84	322	0.9667	1
SC32. Heritage Education & Awareness	0	0	0	0	5	144	245	0.9381	3
SC33. Traditional Knowledge Systems	0	0	0	0	0	144	252	0.9429	1
SC34. Skill & Craftsmanship	0	0	0	0	50	168	154	0.8857	2
SC41. Job Opportunities	0	0	0	0	50	168	154	0.8857	2
SC42. Heritage Tourism	0	0	0	0	45	186	140	0.8833	3
SC43. Property Value	0	0	0	0	25	198	154	0.8976	1
SC44. Business Incubation	0	0	0	0	75	210	70	0.8452	4

while ‘Cultural Affiliations’, ‘Social Engagement’, and ‘Multiculturalism’ dominate Social Cohesion & Inclusion. In Intangible Assets & Awareness, ‘Intangible Cultural Heritage’ and ‘Traditional Knowledge Systems’ stand out with the highest RPIIs. ‘Property Value’, ‘Job Opportunities’, and ‘Heritage Tourism’ lead in Local Economy, with ‘Business Incubation’ being less impactful. These RPII values highlight the diverse impacts of each criterion within these precincts. The RPII values for each sub-criterion were multiplied by their parent criteria RPII value to obtain the Global RPII values as shown in Table 9. The global impact rankings were derived based on global RPII values. In the “Sense of Place” category, ‘Genius Loci’ and ‘Local Experience’ are prominent, ranking 9th and 8th. The “Social Cohesion & Inclusion” category is led by ‘Cultural Affiliations’ at 4th, with ‘Social Engagement’ and ‘Multiculturalism’ also notable. The “Intangible Assets & Awareness” category stands out, with ‘Intangible Cultural

Heritage’ ranking 1st, indicating the highest impact, followed closely by ‘Traditional Knowledge Systems’ and ‘Heritage Education & Awareness’. In “Local Economy”, ‘Property Value’ leads the group, while ‘Business Incubation’ ranks lowest.

### 6 Discussions

The study on the case of the Kuttichira heritage revitalisation project indicates a positive impact on the precinct and the community. Utilising the Relative Positive Impact Index (RPII) for quantitative statistical assessment, all criteria demonstrated substantial positive outcomes. The findings suggest that the project’s interventions have effectively and positively influenced the socio-cultural fabric of Kuttichira, both directly and indirectly. The architectural renewal of the new pavilions and street interfaces in Kuttichira has played a pivotal role in rejuvenating the area’s historical and cultural

**Table 9** Global relative positive impact index values

Criteria	RPII	Criteria	RPII	Global RPII	Global Rank
SC1. Sense of Place	0.8429	SC11. Genius Loci	0.9452	0.7967	9
		SC12. Local Experience	0.9500	0.8007	8
		SC13. Place Belongingness	0.9048	0.7626	14
		SC14. Place Branding	0.8976	0.7566	15
SC2. Social Cohesion & Inclusion	0.8952	SC21. Social Engagement	0.9405	0.8420	5
		SC22. Multiculturalism	0.9238	0.8270	6
		SC23. Cultural Affiliations	0.9476	0.8483	4
		SC24. Social Innovation	0.8524	0.7631	13
SC3. Intangible Assets & Awareness	0.9333	SC31. Intangible Cultural Heritage	0.9667	0.9022	1
		SC32. Heritage Education & Awareness	0.9381	0.8756	3
		SC33. Traditional Knowledge Systems	0.9429	0.8800	2
		SC34. Skill & Craftsmanship	0.8857	0.8267	7
SC4. Local Economy	0.8762	SC41. Job Opportunities	0.8857	0.7761	11
		SC42. Heritage Tourism	0.8833	0.7740	12
		SC43. Property Value	0.8976	0.7865	10
		SC44. Business Incubation	0.8452	0.7406	16

essence, exemplifying effective place-making. This process involved creating public spaces that reflect local culture and history while serving community needs. Key to this transformation was thoughtful planning, design, and community engagement, enhancing the sense of belonging among residents and attracting tourists, who further promoted the area through social media. This synergy between residents and visitors has fostered a sense of place, where both groups can connect with and take pride in the unique character and spirit of the area. Quantitatively, 'local experience' and 'spirit of place' were the most positively impacted aspects under 'sense of place'. The revitalisation of the Kuttichira tank has notably enhanced social cohesion in the community by providing spaces for interaction and fostering community engagement. The redesigned tank area has become a hub for socialising, attracting new businesses and amenities, thereby creating jobs and increasing foot traffic. This has led to a more dynamic and culturally diverse community space. Additionally, the project's emphasis on preserving and showcasing the area's cultural heritage has instilled a sense of pride and ownership among residents, encouraging active participation in community development. Quantitative analysis indicates that 'cultural affiliations' and 'social engagement' are the most positively impacted sub-criteria under 'social cohesion & inclusion'. Early indicators of social innovation are evident, including initial community responses, new social practices, and innovative community initiatives stemming from the project. The revitalisation projects in the area have played a crucial role in preserving its soul, consequently revitalising intangible assets like local cuisines, a major draw

for visitors. The increased influx of students and tourists has spurred the popularity of heritage walks, conducted by agencies and NGOs like INTACH. To enhance tourist engagement, local organisations, assisted by experts, organise cultural events showcasing local traditions such as 'kolkalli', 'oppanna', and 'daffmuttu'. These initiatives have boosted awareness and appreciation of the area's cultural heritage, attracting more visitors. Quantitative analysis reveals that 'intangible cultural heritage' and 'traditional knowledge systems' are the sub-criteria under 'intangible assets & awareness' most positively influenced by these efforts. The revitalisation of the Kuttichira tank, while not directly benefitting the local economy due to tourism control by the District Tourism Promotion Council (DTPC), has indirectly boosted local economic activity. Increased foot traffic from outsiders and tourists has created opportunities for local vendors, leading to higher consumer spending. This project is expected to diversify and introduce new revenue streams for the local economy soon. Additionally, it has the potential to influence property values positively, which could further stimulate economic growth. However, this increase in property values might adversely impact the existing heritage structures in the precinct. Quantitative analysis suggests that 'property value' and 'job opportunities' are the sub-criteria most positively affected under 'local economy'.

## 7 Conclusions

In this paper, the impact of a revitalisation project on the socio-cultural aspect of the historic urban precinct of Kuttichira was analysed using the Relative Positive

Impact Index (RPII) technique. The findings of this study show that urban revitalisation projects can positively impact the preservation of cultural heritage promotion of cultural heritage, revitalisation of community life, increased sense of pride, and encouragement of cultural events and activities in historic urban precincts. The findings showed that the project has positively impacted socio-cultural fabric. The survey was designed to gather personal and subjective views from a socio-cultural perspective. The qualitative survey results to assess the perception of the revitalisation project also indicated a positive attitude among the majority of the respondents. By utilising the RPII technique, this study highlights the importance of considering these areas' cultural heritage and intangible cultural assets in planning and implementing urban revitalisation projects. The study indicates that the project has also sparked interest among residents and visitors, leading to a sense of belongingness in the area. The revitalisation project could catalyse further redevelopment projects, boosting the economy through new commercial activities. Another key aspect is the involvement of the local stakeholders. Public consultation is crucial in planning for better contextual policies, even if it slows the process. Community stakeholder involvement during development is essential, followed by post-completion community perception studies to monitor successes and failures for sustainable maintenance or future improvements. This cyclic management process is crucial for the success and appreciation of the revitalisation of the sacred precinct. Community support is key to the success of revitalisation, making it a worthwhile endeavor.

The study's unique and novel contribution lies in its application of the Relative Positive Impact Index (RPII) to assess the socio-cultural impacts of urban revitalisation in the historic precinct of Kuttichira. This approach is unique as it introduces a quantitative method for evaluating aspects that are often qualitative and intangible, such as cultural heritage and community dynamics. The focus on the socio-cultural fabric rather than just economic or infrastructural outcomes sets this study apart. The study emphasises the importance of local community and stakeholder perceptions, providing a comprehensive view of the project's effectiveness from the perspective of those directly affected. This stakeholder-centric analysis is a significant advancement in understanding the real impacts of urban revitalisation projects. Furthermore, the study's recommendations for policy and planning are instrumental, advocating for the broader application of RPII in other historic urban areas. This contributes to more informed, culturally sensitive urban policy and planning decisions. The emphasis on preserving cultural integrity and authenticity in the face of rapid urbanisation

is a critical insight, highlighting the necessity of maintaining cultural heritage in urban development. Overall, the study makes a substantial contribution to the field by bridging the gap between quantitative assessment and the qualitative aspects of urban cultural heritage, offering a nuanced and comprehensive framework for evaluating and guiding urban revitalisation projects.

The study also has its limitations. The qualitative data's inherent subjectivity may not fully represent the broader community sentiment. Stakeholder representation in the study might be limited, potentially affecting the comprehensiveness of the findings. The temporal nature of the study means that evolving perceptions and impacts over time might not be captured. Geographically, the findings are specific to Kuttichira and may not be generalisable to other regions with different socio-cultural dynamics. The quantification of qualitative aspects of cultural heritage and community dynamics presents challenges, as some nuances might not be fully captured by the index. Additionally, response bias in surveys and interviews might influence the results, and external factors like economic or political shifts may not be fully accounted for. Finally, the study might not adequately address the long-term sustainability and ongoing impact of the revitalisation project, a crucial aspect for understanding its lasting effectiveness. These limitations highlight areas for future research and careful interpretation of the findings.

#### Abbreviations

DTPC	District Tourism Promotion Council
EIA	Environmental Impact Assessment
HIA	Heritage Impact Assessment
INTACH	Indian National Trust for Art and Cultural Heritage
MLA	Member of the Legislative Assembly
NGO	Non-Governmental Organisation
RII	Relative Importance Index
RPII	Relative Positive Impact Indices
SIA	Social Impact Assessment
SPSS	Statistical Package for the Social Sciences
UNESCO	United Nations Educational, Scientific and Cultural Organisation

#### Acknowledgements

Not applicable.

#### Authors' contributions

Shahim Abdurahiman – conceived and designed the analysis, collected the data. Kasthurba A. K.- contributed data and analysis tools, proof read. Affa Nuzhat—performed the analysis, proof read.

#### Funding

Not applicable.

#### Availability of data and materials

Not applicable.

#### Declarations

#### Competing interests

The authors declare that they have no competing interests.

Received: 6 July 2023 Accepted: 6 February 2024  
Published online: 22 March 2024

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