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Building a sustainable Bangladesh: Enhancing agriculture, healthcare, and legal education for comprehensive social development

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Abstract
The purpose of this study is to explore factors that can influence the sustainable society development in Bangladesh. This study conducts the research based on elicitation of measurement scales through focus group discussions based on review of literatures, and collection of 394 usable responses. The subsequent data is analyzed through partial least squares structural equation modeling (PLS-SEM) using Smart PLS 3.3.3.The current study has revealed that sustainable agriculture, sustainable health care, and sustainable education significantly influence the sustainable society development in Bangladesh in modern era with the implications of technological advancement and generation of Information and communication Technology (ICT) of 2006, as well as relevant to healthcare and legal education existing laws for establishing of social justice in Bangladesh.

Keywords: Sustainable agriculture, sustainable healthcare, sustainable legal education, sustainable society development in Bangladesh

Introduction
Sustainable village, city or country concept has gained popularity for last two decades due to its' characteristics and features (Silva *et al.*, 2018) [41]. The sustainable village or city concept is rooted in 1980, when easy city management is focused to adapt global market, making them more efficient and competitive (Sokolov *et al.*, 2019) [43]. In the sustainable village or city concept, a new urban planning policy is comprised, where integrated complex information system for urban infrastructure is applied (Masik *et al.*, 2021) [30]. Besides, sustainable city adopt most technological innovations to plan, develop, and operation of urban area (Lai *et al.*, 2020) [28]. Further, sustainable village or city project follow a holistic approach, including legal and technological development, improvement of competitiveness, enhancement of quality of life, and solution of city's problems (Renukappa& Suresh, 2018) [39]. Coupled with the smart or sustainable village or city concept, Bangladesh government have taken initiative to plan, develop, and implement sustainable Bangladesh concept through proposing five pillars(e.g., sustainable citizens, sustainable government, sustainable economy, sustainable society, and sustainable environment) for developing a sustainable society for present and future generations. Thus, the understanding of factors that helps in making sustainable society of Bangladesh crucial and complex, which requires a study from general people perspective.

Although different countries have made their cities sustainable by acceptance tremendous advantages and potentialities across the world (Ruhlandt, 2018) [40], the initiatives of making Bangladesh sustainable have faced several limitations such as lack of skilled labor, lack of high-tech infrastructural facilities, lack of open network linkages, lack of creative business activities, and lack of new technologies, lack of technology enabled judicial trial systems, Legitimate technology enabled farming systems, technology enabled learning and legal educations and practice systems. Specially, justice systems are lagged behind to implementation the technological advancement, which can be a significant barrier for developing the sustainable Bangladesh. Thus, understanding the factors that crucially can influence the developing sustainable society or smart Bangladesh has been regarded as an important issue. However, no study has explored the factors that can contribute to sustainable Bangladesh development.

Previous literature has mainly highlighted on the importance of structure and sustainable governance of smart cities, where Ruhlandt (2018) [40] explain that the sustainable governance is an important elements for making a city sustainable to

achieve sustainability development goal(SDG); Bibri & Krogstie (2017) [5] mention that the institutional structures plays a crucial role for sustainable cities development; and Caragliu & Del Bo, (2019) [7] note that the technology innovation has significant impact on sustainable city or village development.

However, no study has been tailored to exploring factors that can contribute to developing smart Bangladesh. Previous studies, such as, Amini *et al.*, (2019) [3] explain that the sustainable cities refer to information and communication advanced city with operation efficiency. Yigitcanlar *et al.* (2018) [50] define sustainable cities as multi-dimensional mix of skilled labor, high-tech facilities, open network linkages, and creative business activities. Sustainable agriculture is developed focusing on sustainable agricultural productivity and incomes, ensuring precision irrigation and precise plant nutrition (Zhao *et al.*, 2023) [51]. It covers wide array of practical applications for integrating advanced electronic instrumentation and agricultural planning and production. It also increases yields, work efficiency and fuel efficiency, and reduces consumables. Accountable, or transparent healthcare refers to a healthcare that enables patients to communicate with doctors remotely via information and communication technology (ICT) (Taiwo & Ezugwu, 2020) [44]. Ahad *et al.*, (2020) [1] define sustainable healthcare as a service based on network infrastructure, having network externalities characteristics. Greco *et al.* (2020) [10] argue that sustainable transparent healthcare as health service providers that have commonly motion sensors, EMG, ECG, blood pressure, blood glucose, and accelerometers. Sustainable healthcare facilitate people by maintaining paperless environment and real time location monitoring for medical supplies/health equipment (Wan *et al.*, 2018) [48]. Sustainable education refers to learning through effective and coherent use of information and communication technology (ICT) using a suitable pedagogical approach (Visvizi *et al.*, 2018) [47]. It is an interactive collaborative and visual learning model designed to increase students 'engagement and enables teachers to adapt skills (Alam, 2021) [2]. It includes several components such as RFID technology and wireless network, sustainable class room, sustainable learning sustainable campus, and infrastructure (Huang *et al.*, 2019) [26]. Based on these discussions, Bangladesh can be sustainable when it can develop a sustainable society in terms of sustainable agriculture, sustainable healthcare (accountable and transparent healthcare), and sustainable legal education. Therefore, this study has attempted to explore factors that can contribute to developing the sustainable Bangladesh.

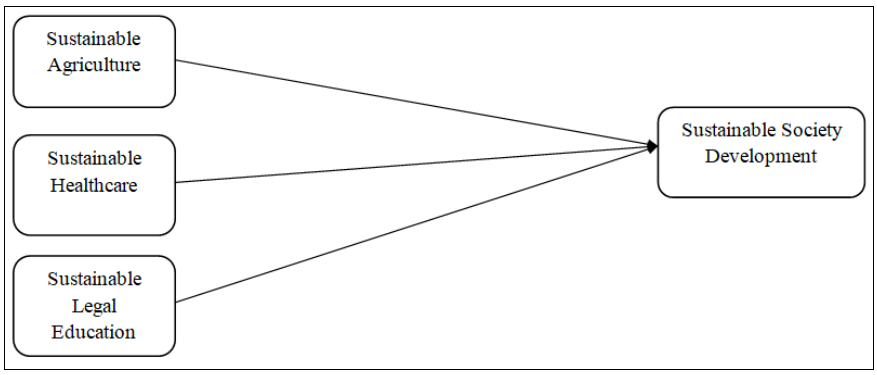
2. Objectives of the study

The primary objective of this study is to explore factors influencing the sustainable society development in Bangladesh. However, several following objectives are also needed to be addressed.

1. To examine how sustainable agriculture influence sustainable society development in Bangladesh.
2. To assess how sustainable healthcare affects sustainable society development in Bangladesh.
3. To evaluate how sustainable legal education influences sustainable society development in Bangladesh.

3. Conceptual framework development

Sustainable agriculture increases agricultural product quality whilst optimizing human intervention (Raj *et al.*, 2022) [37]. Among the prior studies, Perera *et al.* (2014) [35] explain that the sustainable agriculture plays an important role in developing smart cities; Neirotti *et al.* (2014) [33] note that the sustainable cities development is aligned with sustainable agriculture development; and Marcu *et al.* (2020) [29] mention that the sustainable agriculture developed around sustainable village or cities. In addition, Thomas & Suresh (2022) [45] contend that the sustainable or accountable healthcare focuses on healthcare's resilience by strengthening structural and operational aspects, providing to resolving the agricultural land related complexity and other documentary dispute. According to previous study, Pramanik *et al.*, (2017) [36] claim that sustainable healthcare accelerates and enhances services efficiency by providing patients easy appointment with doctors, which in turn develop sustainable cities; Ullah *et al.* (2020) [46] mention that sustainable healthcare plays a vital role to make a city sustainable in an urban area; and Miah *et al.*, (2022) [31] note the that sustainable healthcare is one of the main components' of sustainable village/city/country. In previous study, Rao & Prasad (2018) [38] mention that the sustainable legal education influence a sustainable village or city development; Lai *et al.* (2020) [28] note that the sustainable village or city is related to smart learning; and Yigitcanlar *et al.* (2020) [49] identify that sustainable education system directly or indirectly influence sustainable cities development. Based on these discussions, it can be assumed that sustainable agriculture, accountable and transparent health care, and sustainable legal education may be the important predictors of sustainable society development of Bangladesh, and thus, the following conceptual can used for this study (see Figure).



Source: Authors

Fig 1: Conceptual framework

Hypothesis statements

- **H1:** Sustainable agriculture significantly influences sustainable society development in Bangladesh.
- **H2:** Sustainable healthcare significantly influences sustainable society development in Bangladesh.
- **H3:** Sustainable legal education significantly influences sustainable society development in Bangladesh.

4. Methodology

4.1 Research instruments development

Due to lack of existing validated measurement items, the current study has developed the measurement scales. To carry on the scale development process, primarily previous literatures (Sokolov *et al.*, 2019; Simonofski *et al.*, 2021; Ruhlandt, 2018; Hasan & Rahman, 2023; Biswas *et al.*, 2021; Hasan, 2022a; Hasan, 2023; Hasan, 2022b; Hasan & Rahman, 2023b; Hasan, 2023b; Hasan, 2023b; Hasan, 2023c; Hasan, 2021; Hasan, 2023e; Mondal & Hasan, 2023) [6, 13-24, 32, 40, 42, 43] are studied to understand the possible factors that are related to sustainable society development in Bangladesh.. Subsequently, a focus group discussion (FGD) is conducted where 7 participants are from academicians, lawyers, and high government officials. The focus group members are provided some articles and contents written on sustainable society development sustainable and the floor is opened to discuss about the sustainable agriculture, sustainable healthcare, sustainable legal education, and sustainable Bangladesh development. Importantly, some open-ended questions are asked to the participants. The FGD is endured about 85 minutes and initially 6 measurement items of sustainable agriculture, 5 items of sustainable healthcare, 11 items of sustainable legal education, and 4 items of sustainable society development in Bangladesh development are developed. After conducting a pilot study on 30 participants of general people of Bangladesh and expert opinions finally 2 items of sustainable agriculture, 2 items of sustainable healthcare, 3 items of sustainable legal education, and 2 items of sustainable society development of Bangladesh development are retained. It is important to note that all measurement items are scaled by five-point Likert scale, where "1" denotes strongly disagree and "5" denotes strongly agree.

4.2 Data collection and sampling procedures

A convenience sampling technique is used to collect data from original citizen of Bangladesh. To carry out this study, the survey questionnaires are purposively sent to individuals who are aged between 18 years and 70 years among original citizens of Bangladesh from October 2023 to December 2023 by three months. Primarily, 600 individuals are approached and 425 individuals participated to the survey process with the response rate of 70.83%. After evaluation of the responses, 394 valid responses are retained for the final data analysis with valid response rate of 65.67%. Importantly, survey was conducted in Rajshahi, Barishal, and Patuakhali districts in Bangladesh, and participants are offered no remuneration for their participation.

4.3 Data analysis: The current study uses a two-step approach suggested by Anderson & Gerbing (1988) [4] and conduct the study through partial least squares structural equation modeling (PLS-SEM) using Smart PLS 3.3.3. Moreover, the study uses SPSS 25v for descriptive statistics analysis.

Table 1: Demographic profile of respondents (n = 394)

Variable	n	Percentage (%)
Gender		
Male	201	51.01
Female	193	48.99
Age (years)		
18 to 30	135	34.27
31 to 50	154	39.09
51 to 70	105	26.64
Monthly income (BDT)		
Below 30000	156	39.59
30000-60000	106	26.90
Above 60000	132	33.51
Marital status		
Single	119	30.20
Married	241	61.17
Divorced/widowed	34	08.63
Education level		
Undergraduate	81	20.55
Graduate or above	313	79.45

Source: Authors

5. Results: The demographic profile of the respondents are presented in Table I which indicates that 51.01% (n = 201) respondents are male and 48.99% (n = 193) respondents are female. In case of age, 34.27% (n = 135) respondents have age between 18 years and 30 years, 39.09% (n = 154) respondents are between 31 years and 50 years old, and rest 26.64% (n = 105) are between 51 years and 70 years old. In terms of monthly income, 39.59% (n = 156) earns below BDT30000, 26.90% (n = 106) earns between BDT30000 and BDT60000, and rest 33.51% (n = 132) earns above BDT60000. In case of marital status, 30.20% (n = 119) are single, 61.17% (n = 241) are married, and rest 08.63% (n = 34) are divorced or widowed. In the education level, 20.55% (n = 81) are undergraduates and 79.45% (n = 313) are graduates or having above degrees.

6. Findings of measurement model: The reliability of the measurement items is checked by evaluating Cronbach's alpha and composite reliability (CR). Table II represents that the alpha values of all constructs are greater than 0.70 suggested by (Hair Jr *et al.*, 2014) [12] range between 0.750 and 0.824; and the values of composite reliability (CR) range from between 0.888 and 0.914 greater than the suggested threshold of 0.70 (Hair, 2009) [11]. Thus, the results indicate that the measurement model has achieved adequate level of reliability for further analysis. The study verifies the convergent validity by assessing the value of outer loadings and average variance extracted (AVE). The factor loadings of all items are between 0.963 and 0.580, which are greater than the suggested threshold of 0.70 (Hair, 2009) [11]; and the AVE values of all constructs belong between 0.751 and 0.780 greater than suggested value of 0.50 (Fornell & Larcker, 1981) [9]. Thus, the findings indicate that measurement items have achieved adequate level of convergent validity.

To examine the discriminant validity, the square root of AVE is compared with AVE of each construct. The subsequent results presented in Table III indicates that the square root of AVE of each construct is greater than the AVE, indicating adequate level of discriminate validity (Chin, 1998) [8]

Table 2: Measurement model results

Constructs/Items	Outer loadings	Cronbach's alpha (α)	Composite reliability (CR)	Average variance extracted (AVE)
Sustainable agriculture				
Bangladesh applies modern Information and communication technologies in agricultural productions.	0.940	0.816	0.914	0.843
Applications of sustainable smart technologies in agriculture gives farmers the ability to more effectively use crop inputs including fertilizers, pesticides, tillage and irrigation water.	0.896			
Sustainable healthcare				
Sustainable healthcare integrates patients and doctors onto a common platform to improve day-to-day human activities.	0.933	0.800	0.908	0.832
Sustainable healthcare technology enhances patients' outcome and drive healthcare innovation.	0.890			
Sustainable legal education				
Sustainable legal Education ensures effective and coherent use of information and communication technologies.	0.872	0.824	0.894	0.738
Through sustainable legal education, teacher provides the human touch in a personalized learning environment.	0.943			
Sustainable legal education instigates smart learners to meet the needs of the work and life.	0.752			
Sustainable society development				
I think that the Bangladesh has been becoming technologically advanced and sustainable cities.	0.912	0.750	0.888	0.799
I think that the Bangladesh is creating a more prosperous, equitable, and sustainable future of the nation.	0.875			

Source: Authors

Table 3: Results of discriminant validity and collinearity

	SA	SH	SLE	SSD
SA	*0.918*			
SH	0.297	*0.912*		
SE	0.251	0.448	*0.859*	
SBD	0.394	0.495	0.427	*0.894*
Notes: SA = Sustainable agriculture, SH = sustainable healthcare, SLE = Sustainable legal education, SSD = Sustainable society development				

Source: Authors

6.3 Findings of structural model

The results of structural model are analyzed through *path* coefficients, *T*-statistics, and *P*-value to test the casual relationships among the proposed theoretical variables. Table IV shows that sustainable agriculture is significantly related to sustainable society development (H1) (β= 0.242, t= 5.501, p = 0.000), supporting *H1*. Besides, the current study has revealed that the strength of relationship between sustainable healthcare and sustainable society development (H2) is found significant (β= 0.325, t= 6.671, p = 0.000), and thus, the findings support *H2*. Furthermore, sustainable legal education is significantly related to sustainable society development (H3) (β= 0.220, t= 4.464, p = 0.000), supporting *H3*.The overall findings indicate that people's involvement in sustainable agriculture, sustainable health care, and sustainable legal education significantly influence sustainable society development in Bangladesh in the modern age.

Table 4: Path coefficients and hypothesis testing

Hypothesis	Relationships	Beta	T-*Statistics*	P-*Values*	Decisions
H1	Sustainable Agriculture -> sustainable society development	0.242	5.501	0.000	Supported
H2	Sustainable Healthcare -> sustainable society development	0.325	6.671	0.000	Supported
H3	Sustainable Education -> sustainable society development	0.220	4.464	0.000	Supported

Source: Authors

7. Discussions and conclusions

Sustainable society development in Bangladesh concept is based on five pillars such as sustainable village or citizens, sustainable government, sustainable economy, sustainable society, and sustainable legal environment. Sustainable society development is the combined efforts of making sustainable village or cities, sustainable healthcare(accountable and transparent healthcare), sustainable agriculture, sustainable energy, and sustainable governance and institutions for making sustainable future Bangladesh (Pal & Sarker, n.d.) [34]. The current study has revealed that sustainable agriculture significantly influences Sustainable society development where sustainable agriculture increases agricultural product quality whilst optimizing human intervention (Raj *et al.*, 2022; Hasan, 2022) [37]. Among the prior studies, Perera *et al.* (2014) [35] explain that sustainable agriculture plays an important role in developing sustainable village or cities; Neirotti *et al.*

(2014) and Hasan *et al.* (2021) [13, 33] note that sustainable cities development is aligned with sustainable agriculture development; and Marcu *et al.* (2020) [29] mention that the sustainable agriculture developed around sustainable village or cities. Further, this study identifies that sustainable healthcare has significant influence on Sustainable society development consistent with previous studies. As such, Thomas & Suresh (2022) [45] contend that the sustainable healthcare focuses on healthcare's resilience by strengthening structural and operational aspects, providing green technologies. According to previous study, Pramanik *et al.*, (2017) [36] claim that sustainable healthcare accelerates and enhances services efficiency by providing patients easy appointment with doctors, which in turn develop sustainable cities; Ullah *et al.* (2020) [46] mention that sustainable healthcare plays a vital role to make a city sustainable in an urban area; and Miah *et al.*, (2022) [31] note that the sustainable healthcare is one of the main components' of sustainable city/country. Moreover, the current study has revealed that sustainable legal education significantly influences Sustainable society development which is consistent with previous studies, where Rao & Prasad (2018) [38] mention that the sustainable education influence a sustainable city development; Lai *et al.* (2020) [28] note that the sustainable village/city is related to sustainable learning; and Yigitcanlar *et al.* (2020) [49] identify that the sustainable legal education system directly or indirectly influence sustainable cities development. Interestingly, no previous studies have developed scales of quantifying the effects of sustainable agriculture, sustainable healthcare, and sustainable legal education on sustainable Bangladesh development. Thus, the study uniquely contributes to the literatures of sustainable Bangladesh development in modern economy. Moreover, Bangladesh should adopt technology enabled justice systems, which will save the time and reduce witness crisis; additionally, Bangladesh can develop several ICT and Agricultural related laws such as Land Reforms Act, Internet Transactions Act, Department of Information and Communications Technology Act, and Cybercrime Prevention Act for speeding up the justice procedures effectively and efficiently.

However, the current study has been constrained with several limitations. First, the current study is conducted for a specific period, while future studies can be conducted through following a longitudinal approach. Second, the current study uses a convenience sampling technique, while future studies can follow simple random sampling technique. Finally, this study has used sustainable agriculture, sustainable healthcare (accountable and transparent healthcare), and sustainable education, while future studies can conduct the research measuring the effects of village/cities and sustainable governance on sustainable society development in Bangladesh.

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