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Contributing to sustainable development through community radios in the developing countries: Assessing perceived impact using SEM approach

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Abstract

An effective communication channel is key to sustainable development. This research aims at investigating the perceived impacts of community radios (CRs) on contributing to sustainable development among rural radio listeners using a mixed method strategy. Based on a focus group discussion and rigorous literature review, a conceptual model was developed. The study was done in an underrepresented country (i.e., Bangladesh) in sustainability and community radio interdisciplinary literature. 306 structured interviews were conducted. Structured equation modeling technique was applied to analyze the collected data and test the hypotheses. Findings are exemplified with earlier case studies done in Bangladesh as well as other developing countries. It is found that the sustainability communications designed, developed and aired based on a participatory, contextual and easily accessible format by the CRs can significantly shape rural people's attitudes, social norms, and capabilities that lead substantial positive intention to be involved in sustainable development. So, CRs can easily be used to diffuse sustainability-related ideas or sustainable development goals in the developing countries by the development stakeholders.

Keywords: Sustainable Rural Development; Community Media; Communication; Developing Country; Structured Equation Modelling; Sustainability Attitude; Capability; Sustainability Norms

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1. Introduction

1.1. Sustainable development overview

Sustainable development is fundamentally aimed at meeting the present population's demands without compromising the ability of future generations to meet their economic, environmental, social (United Nations, 2016; WCED, 1987; Harris, 2003), and cultural needs (UNEP, 2005). The global ambition is to achieve the 17 Sustainable Development Goals (SDGs), emphasizing 169 targets, by 2030, with rural community development being a paramount factor (United Nations, 2016; Mefalopulos, 2008). However, achieving sustainable development necessitates shifts in attitudes, social norms, and capabilities (Basiago, 1999), which can be catalyzed through precise, culturally contextual, and effective communication, especially in rural and isolated communities (Fraser and Estrada, 2002).

1.2. The role of community media in sustainable communication

Effective sustainability communication can alter attitudes, enhance capabilities, and establish social norms (Sood et al., 2004) through education, skill development, and intensive dialogues among stakeholders. This fosters the intention (Mefalopulos, 2008) to seize opportunities for meaningful societal change through the adoption of sustainable behaviours (Basiago, 1999). Although various channels exist for communication, not all are equally effective (Mefalopulos, 2008). Community media, especially radio—due to its extensive reach, trustworthiness, and community-centric nature (AMARC, 2007)—can play a pivotal role in sustainability communication within rural areas (Berrigan, 1979). Community Radio (CR) is particularly effective because it communicates in the local language and can be easily accessed due to its low infrastructure, production, and distribution costs (Manyozo, 2009; Wilkinson, 2017; Khan et al., 2017).

1.3. Community radio and sustainability in developing countries

In developing countries, CR stations, which have been rapidly established since the 1990s, particularly in Asia and Latin America, provide listeners access to information and means of planning, performing, and evaluating programs (Noronha, 2003; Hussain and Tongia, 2007). These stations have proven to be compelling channels for diffusing innovations and development ideas, especially among underserved populations (Mefalopulos, 2008).

1.4. The case of Bangladesh

In the context of Bangladesh, which is on a trajectory from being a least developed country to potentially reaching middle-income status, there is a noticeable socio-economic development gap between rural and urban areas that hinders sustainable development (Anwar, 2015). This is partially attributed to inadequate sustainability communications by mainstream media and commercially oriented traditional developmental communications with insufficient grassroots-level coverage. Recognizing the potential of community media in bridging this gap, the government has facilitated the establishment and support of CRs through various policies and programs (Khan et al., 2017; Ministry of Information, 2008). Existing CRs have already carved a niche in

local communities by providing information and knowledge that have altered attitudes and enhanced capabilities in various sectors, from sustainable farming to climate change adaptation (TNH, 2013).

1.5. Research gap and aim

While CR is anticipated to contribute significantly to sustainable development, there is a dearth of research exploring its tangible impacts, especially in the rural areas. This research gap is attributed to factors such as a lack of indicators to measure effectiveness, a shortage of both quantitative and qualitative research, and the absence of rigorous analyses using behavioural change models. Furthermore, studies on sustainable development and community media in Bangladesh are underrepresented in global sustainability literature. This research aims to address these gaps by exploring the interaction of sustainable development, sustainability communications, and the roles of CR in developing countries, particularly focusing on rural areas, to assess the impacts of CR on sustainable development's behavioural indicators.

1.6. Research questions and structure

This research seeks to answer several questions:

- What distinguishes CR as a sustainability communicator?
- How do CRs shape attitudes, social norms, and capabilities for sustainable development in rural areas through sustainability communications?
- Does the intention of rural people to adopt sustainable behaviours positively correlate with changes in attitudes, social norms, and capabilities?

Following this introduction, the paper reviews relevant concepts towards establishing a theoretical framework and then outlines the methodologies and outcomes of the structural equation modelling (SEM) analysis. Subsequent sections test hypotheses based on findings, engage in discussions exemplified by cases, and draw conclusions. Finally, recommendations for future research will be suggested.

1.7. Novelty and significance

This research unveils new insights into the interrelationships between sustainable development and community media in developing countries, offering perspectives on the characteristics of CR and the perceived impact of sustainability communications on rural populations. Additionally, from a methodological standpoint, this paper elucidates structured interviews and the SEM technique, detailing how to conduct SEM research and explaining model fit indices' reliability and validity. Ultimately, this research seeks to elucidate why and how to utilize CR to amplify media's contribution to sustainable development.

2. Literature review

2.1. Community radio and its multifaceted role in community development

CR has been heralded as an indispensable facet of community engagement and development, notably for its intrinsic non-profit model. It extends an unparalleled platform, not merely for articulating the distinct

challenges communities face but for crafting and introducing potential solutions through various engaging content formats, such as drama, songs, talks, and interactive discussions (Tabing, 2002; Tucker, 2013). Beyond its entertainment value, CR metamorphoses into a vital entity, enhancing community wellbeing and serving as a democratically inclined communication platform, even extending its reach to the marginalized strata of society (Buckley, 2011).

2.1.1. Historical perspectives and evolution of CR

CR, from its inception, was envisaged as an agent for development and empowerment. Its origins can be traced to early applications in Bolivia and Colombia, where CR sought to address endemic issues like poverty and societal inequality by bridging the communication gap amongst isolated or disempowered communities (Wilkinson, 2017). As a tool of local discourse, CR has blossomed into a global public sphere, acting as a catalyst in diminishing disparities and instigating widespread community engagement (Fraser and Estrada, 2001).

Notably, the adaptability and resiliency of CR have been evident in its response to global events and crises. Its pivotal role during the COVID-19 pandemic cannot be overstated, where it emerged as a vital bridge between health authorities and citizens in remote areas, ensuring the transmission of credible information and nurturing community spirits amidst a global crisis (Ling and Lim, 2020).

2.1.2. Technological advancements and CR

Despite CR's traditional appeal lying in its low-cost and accessible nature (Girard, 2007), the advent of the digital era has fused CR with Information and Communication Technologies (ICTs), enhancing its capacity to disseminate information across wider geographies and demographics. The amalgamation of CR with ICTs has localized global knowledge, and furthermore, transformed CRs into vibrant hubs for ICT training within isolated communities (Mefalopulos, 2008). The confluence between CR and the internet, notably in African communities, has been instrumental in fostering digital literacy and inclusivity through participative learning (AMARC, 2007).

In a testament to its adaptability, CR has embraced the digital transition, proactively exploring and integrating new forms of engagement and interactivity through platforms like social media. This has expanded its horizons for participation, information sharing, and collective action, adding an additional layer of interactive communication and community building to its repertoire (Tucker, 2013).

2.2. Enriching the pillars of sustainability through CR

2.2.1. Sustainability and communication dynamics

Achieving sustainability requires the prudent and conscientious development of various dimensions, namely, social, economic, environmental, and cultural, while simultaneously safeguarding the ability of future generations to meet their own needs (Algül, 2013). Communication, and specifically through media like CR, plays an instrumental role in embedding sustainability within societal structures by influencing knowledge, attitudes, and practices related to sustainable development (Gitonga, 2013).

2.2.2. Social sustainability: Fostering equity and empowerment

Social sustainability, with its many facets that include equity, empowerment, and participation, is pivotal for ensuring societal welfare and stability (Chiu, 2004; Basiago, 1999). CR, in its role as a facilitator of community-level debates, a disseminator of knowledge, and a conduit for public decision-making, effectively enhances community empowerment and cohesion (Buckley, 2011).

2.2.3. Economic, environmental, and cultural sustainability: Harmonizing development

Ensuring a balance among agricultural, industrial development, and economic efficiency (Daly, 1996), CR disseminates relevant information, bridges knowledge gaps, and promotes environmentally sustainable practices among communities (Morelli, 2011). Culturally, CR safeguards cultural identities and norms amidst the onslaught of modern entertainment forms and ideologies, ensuring the perpetuation of traditions and unity within communities (Vinnari and Vinnari, 2014).

The strategic blend of indigenous knowledge with contemporary scientific expertise in new-age CR initiatives presents a unique synthesis that aids in protecting traditional practices while concurrently navigating the complexities and challenges posed by contemporary environmental issues (Gumucio-Dagron and Tufte, 2006). This duality not only enhances the validity and acceptance of environmental practices and strategies among indigenous communities but also equips them with the requisite knowledge and skills to adapt to the rapidly evolving global environmental landscape.

2.3. Formulating hypotheses

For sustainability, people's traditional attitude to development needs to be changed (Ochichi, 2014), because attitude is a mental state that combines beliefs and feelings about a phenomenon of interest and works as an indicator of behavior to that phenomenon (Hedlund-de, 2012) Communication as a development element in the form of education and awareness programs can change attitudes and behaviors of people (Chi and Wright, 2009). Notably, the participatory based communication can foster positive attitude to sustainable development (Mefalopulos, 2008) because when people take part physically, mentally, and emotionally in a development process, it removes any doubt about the agreed decisions and enhances trustworthiness of the messages, information, idea, and actions identified in that discussions (Ochichi, 2014). A CR is a participatory communication tool, where the ordinary people (e.g., farmers, women, young people, adults, and seniors, etc.) can participate in discussion with a team of local communicators, presenters, performers, and development experts to analyze various problems, their causes, consequences, and potential solutions, and that is recorded from the beginning to an end before being aired. So, this process of communication can dramatically change attitude to any sustainability initiatives (Ouattara and Ouattara, 2006). Thus, the first hypothesis is proposed as:

> *H1: Sustainability communications via community radio change rural people's attitudes to sustainable development.*

In addition to attitude, social norms or subjective norms is another important determinant of sustainable behavior (Basiago, 1999). Social norms are the principles to be respected by the members of a society in their

behaviors. (Basiago, 1999). In a collectivist society, where people easily share their likes and dislikes and value them in a social setting, informational social influence plays a pivotal role (Basiago, 1999; Shahzalal and Font, 2018). By sharing individual best practices, group behaviors, obvious examples of good deeds in social interactions, normative beliefs, or social norms can be enhanced (Basiago, 1999). Media can create a common shared value among the members of a community (Basiago, 1999) by transmitting what a group of people already knows, what they are learning and what they should learn about a certain behavior, and thus shape the current normative beliefs of people (Ministry of Information, 2008). As CRs easily manipulate the contents in social interactions among the members of a community, it can shape social norms too (Fraser and Estrada, 2002). As in the participatory communication of a CR either at the radio station, listeners' clubs or any other program production process the members can share their opinions about the rights and wrongs of a development decision before broadcasting the message (Bhattacharya, 2015). Thus, everyone understands what is desirable and the pitfalls of negative behavior (Ministry of Information, 2008). Moreover, the members can understand the expectations of the outside stakeholders, including government, private organizations, and NGOs (Rahman et al., 2017). Therefore, the current social norms of the rural peoples can be shaped to positive social change, wellbeing, and ultimately sustainable development (Mefalopulos, 2008). Thus, the next hypothesis is proposed as:

H2: Sustainability communications via CR drive the elements of social norms among the rural people towards sustainable development.

Besides the change in attitude and social norms, people's capacity or behavioral skills is very important to adopt sustainable behavior, and most of the cases rural people lack it. Capacity in relation to behavior change includes people's awareness, knowledge, and skills, experience, as well as cognitive, emotional, social, and informational resources (Eagly and Chaiken, 2011). The greater the ability, the greater the chance to reach a goal (Hughes, 2007). However, sustainability communications can enhance the capacities of the target people (Hedlund-de, 2012). CRs support communities to implement any development ideas (Chi and Wright, 2009) by using communications that combine both music and drama with information from the panel of local and external experts, as well as group discussions of local opinion leaders and beneficiaries that demonstrate both indigenous and technical and or scientific knowledge (Ouattara and Ouattara, 2006). In most cases, demonstrations are done literally and figuratively into the most understandable local language from diversified socio-economic perspectives. As a result, the messages are easily received, well understood, believed as true, and immediately accepted by the rural people (Chapman, 2003) and that ultimately enhances capacities of the rural people. Therefore, another hypothesis for the research may be:

H3: Sustainability communications via CRs can build capacities of rural people for sustainable development.

Attitudes, social norms, and capabilities are the key determinants of intention to do a task and all three are interrelated. Attitude is favorable and unfavorable feelings about an idea/behavior (Sood et al., 2004), social norms are the influences from the other members of the society to accept or reject an idea /behavior (Shahzalal and Font, 2018) and capabilities are the strengths or tools to people required to implement that idea/behavior (Hughes, 2007). When people are personally motivated (based on the personal realization that the change will bring some benefits for them-attitudes) and socially motivated (comply with others' expectations to them-

social norms) (Fisher and Fisher, 1992) they are intended to behave sustainably (Ndebele et al., 2012). If people have a higher positive attitude to sustainability, greater attractions to the likes and dislikes of community members (i.e., social influences) and necessary capabilities (i.e., information or knowledge and skills) they are intended to adopt sustainable behavior (Sood et al., 2004). Overall, based on the relationships of attitudes, social norms, and capabilities with intention, a set of hypotheses regarding the determinants of rural people's intention to engage in sustainable development can be proposed as:

H4a: If the CR listeners' attitude to sustainable development is changed then their intention to be involved in sustainable practices is improved.

H4b: If the CR listeners' social norms to sustainable development are changed then their intention to involve in sustainable practices are improved.

H4c: If the CR listeners' capabilities for sustainable development are changed, then their intention to involve in sustainable practices is improved.

Referring to the literature review and identified hypotheses, it is said that sustainability communications aired by the CRs can shape attitudes, social norms, and capabilities to sustainable development. These behavioral determinates may positively influence the rural people to get involved in the sustainable development process or to adopt sustainable behavior. Therefore, the following hypothesized model is drawn.

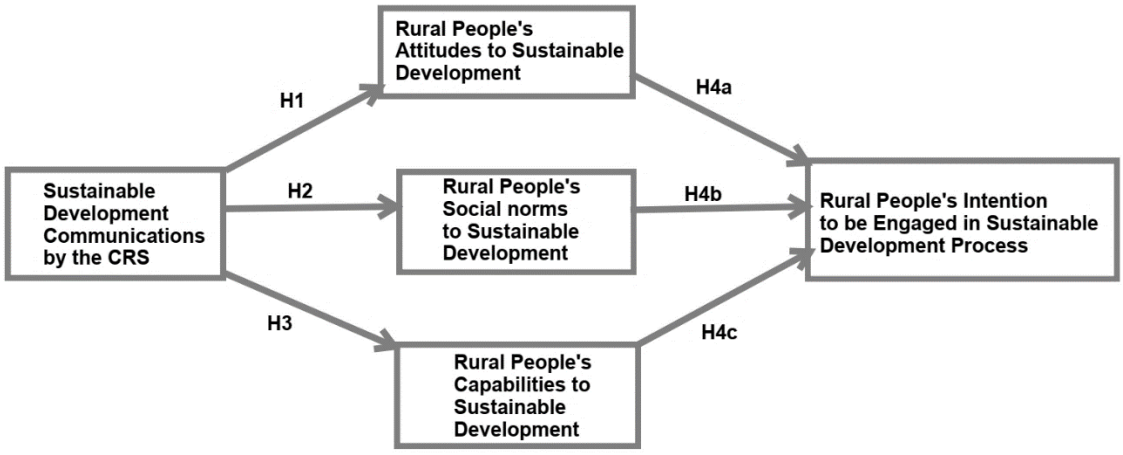


Figure 1. The hypothesized model

3. Methodology

3.1. Materials and methods

As the purpose of the research is to explain the perceived impact of CRs on sustainable development in the developing countries, the researcher has chosen analytical research methodology. This type of research deals with some direct or indirect structured relationships or causal effects between some independent and

dependent phenomena while studying a situation or a problem (Bhatacherjee, 2012; Saunders et al., 2009). A focus group discussion was done among the listeners and CR station managers to identify the hypothetical models and the items in the model.

A survey was designed to collect the data based on the items identified by the participants in focus group, which was initially used to investigate how radio influences the shaping of political opinions in the United States and later widely recognized as the most essential vehicle for gathering unobservable data for quantitative research to measure attitude, beliefs, preferences, behaviour etc. through interviews or standardized questionnaires, and found more accessible to the respondents to give reply" (Bhatacherjee, 2012, p. 73).

3.2. Survey and data collection

For this research, a structured interview similar to the survey questionnaire was done. It is mostly organized around a set of predetermined questions (Alshenqeeti, 2014). This is very suitable to measure attitudes, beliefs, skills, or knowledge (Weller, 1998). For this kind of survey, random sampling is used (Weller, 1998). The potential respondents were invited to participate in the survey wherever they found within the ten square kilometers of six CRs in six districts in Northern Bangladesh. Although structured interviews have similarity to the self-administered quantitative questionnaire in nature, however, in this research context, it has some advantages over a self-administered questionnaire (Alshenqeeti, 2014). As some of the radio listeners are less educated whom neither could fill up a self-administered questionnaire nor could understand accurately, but by giving explanations on the questions in the questionnaire, their accurate opinions would be retrieved. This also has helped the well-educated respondents too to reduce their response time. Therefore, within a short period, the survey was completed. The interactions between the surveyors and the respondents during the survey were recorded and later the researcher cross checked over the phone whether the recorded respondents were truly surveyed.

The researcher, along with two other surveyors, conducted the pilot study in Rangpur (i.e., among the six chosen area for the survey). The researcher employed twelve master's students from a public university as surveyors for the final survey. Primarily, the surveyors were chosen based on their familiarity with the study area and their grades on marketing research. Then the researcher had taken them through a one-and-a-half-hour two-way interactive session on how to conduct face to face structured interviews before appointing them for this purpose. The survey was conducted in September 2018. The survey was conducted in six districts in the Northern part of the country that belongs to 6 out of the 17 CR stations in 16 districts. The researcher has selected this area as it represents 1/3 of the total number of CR stations and listeners. Moreover, the northern part of the country is still less developed but has good development potential compared to the central part of the country.

The surveyors randomly invited 400 potential respondents in the rural villages then delivered the purpose of the research and requested them to participate. The surveyors included only those respondents who were agreed on: i) to give responses and their voices to be recorded simultaneously ii) at the end of the survey put their signatures or fingerprints and contact address on the questionnaire. A total of 306 respondents were agreed to participate in the survey (i.e., 76.5% response rate). The surveyors read out the questions and gave brief explanations, if necessary, then read the answer options before the respondents and next, marked the answers on the questionnaire against each item chosen by the respondents and the conversation between

them were recorded using a mobile phone recorder, and later coded according to respondent number for identification purpose. Six questionnaires were found with missing values so responses from 300 respondents were included in the datasheet.

3.3. Questionnaire design

The questionnaire is written in Bengali (the native language of Bangladesh). The final questionnaire has two parts (See Table 2). In the first part, four basic listenership questions were presented, and in the second part, the items identified at the focus group discussion to assess the impact of sustainability communications aired by the CRs on the rural people's attitudes, social norms, and capabilities were presented.

For the first part, the categorical scale has been used, whereas in the second part a Likert scale is used as it is the widely recognized scale to gather information about attitude, opinions, emotions, and people's attachment to a particular phenomenon in a social science discipline (Gliem and Gliem, 2003). A five-point Likert scale ranged from 1 to 5 (strongly disagree to agree strongly) with a neutral point.

Table 1. Questionnaire constructs and the scale used (translated from Bengali)

Part 01: General listenership Questions		
Code	**Items**	**Scale**
Oft_lis	How often the rural people listen to CRs in a typical week?	1= one day a week; 2= Two to four days; 3= Everyday; 4= Irregular.
Hrs_lis	How many hours do the villagers listen to the CRs in a day?	1= 1 hour; 2= 2-7 hours; 3= 8 or more hours
Mdm_dvc	Which medium/device you use to listen to CR	1= Radio; 2= Mobile FM Receiver; 3= Mobile/PC connected with internet
Ed_qs	What is your education qualification	1= No or primary education; 2= Class six to ten; 3= College/twelve; 4= Graduate/first degree
Part 02: The researcher's developed and validated questions		
	Items to assess the impact of CRs	*Strongly disagree (1), Disagree (2), Neutral (3), Agree (4), Strongly agree (5).*
Codes	**Statements**	**Constructs**
sdc_1	I find CRs' sustainability communications affect my attitudes to sustainability	Sustainable Development communications by CRs (SDC)
sdc_2	I find CRs' sustainability communications affect my social norms to sustainability	
sdc_3	I find CRs' sustainability communications affect my capabilities to sustainability	
asd_1	The sustainability communications that I have received from CR changed my feelings to sustainability	Rural People's Attitudes to Sustainable Development (ASD)
asd_2	The sustainability communications that I have received from CR changed my evaluation of sustainability	
asd_3	The sustainability communications that I have received from CR changed my response to sustainability	

Table 1. *Cont.*

Codes	Statements	Constructs
ssd_1	I find CRs' sustainability communications drive me to think that my neighbors expect sustainable behavior.	Rural people's Social Norms to Sustainable Development (SSD)
ssd_2	I find CRs' sustainability communications drive me to think that my neighbors reward sustainable behavior	
ssd_3	I find CRs' sustainability communications drive me to think that my neighbors punish unsustainable behavior.	
csd_1	I find CRs' sustainability communications enhance my skills to sustainable behavior.	Rural People's Capabilities for Sustainable Development (CSD)
csd_2	I find CRs' sustainability communications enhance my knowledge to sustainable behavior.	
csd_3	I find CRs' sustainability communications guide me to explore opportunities to sustainable behavior.	
isd_1	I am intended to be involved in environmentally sustainable activities	Rural People's Intention to be Engaged in Sustainable Development (ISD)
isd_2	I am intended to be involved in economically sustainable activities	
isd_3	I am intended to be involved in socially sustainable activities	
isd_4	I am intended to be involved in culturally sustainable activities	

3.4. Data analysis methods

In this section, we describe the data analysis methods employed in our research. To present an overview of CR listenership in Bangladesh, we initially utilized simple descriptive statistics. However, to rigorously test the hypotheses within our conceptual framework, we adopted the SEM technique, a commonly used method in social science research (Hooper et al., 2008). SEM is particularly well-suited for nonexperimental research, allowing us to model multivariate relationships, assess both immediate and secondary impacts of one factor on another, and analyze complex situations or phenomena (Bollen, 1987; Byrne, 2016; Teo et al., 2013). Our approach aligns with the deductive method and critical research (Byrne, 2016). We opted for Partial Least Squares-based SEM, a popular choice for exploratory and explanatory analysis (Kline, 2011; Field, 2009). This method facilitates theory testing, theory confirmation, comparison of alternative theories, and provides a global goodness-of-fit criterion (Hair et al., 2012; Hair et al., 2014). The author first conducted a confirmatory factor analysis (CFA) followed by path analysis.

4. Findings

4.1. Results of the listenership study

We explored the basic listenership patterns of CRs in Bangladesh and examined essential demographic characteristics using both primary and secondary research data (see Table 03). Our primary research revealed

that a significant portion (68.6%) of listeners falls within the educational range of class six to class twelve. This group typically occupies various partially skilled roles, such as positions in small businesses, retail stores, and agriculture. It primarily consists of rural youth. Another 18% of individuals have either no formal education or only primary education and are mainly engaged in agriculture, fishing, rickshaw/autorickshaw pulling, and other related activities.

Furthermore, 13.3% (Table 2) of the listeners are graduates. Remarkably, 76% of the population uses FM receivers on their mobile phones to tune in to CR broadcasts, with the majority listening for eight or more hours weekly. Among these listeners, 54% tune in every day, while 34% listen 2-4 days a week. Additionally, a separate study by Hassan and Rahman (2016) indicates that CRs dedicate 14.15 hours of programming to target marginalized communities. They find that people access CR content from their workplaces, gather at listener's clubs, and listen while on the move.

In total, 135 hours of programs aired by 17 CRs reach an audience of 6.526 million people. In our study area, six CRs broadcast 60 hours of programs daily, reaching approximately 2.5 million people, which represents one-third of the total audience. These findings underscore the widespread access to CRs among rural communities in Bangladesh, enabling them to stay informed about development news, advertisements, and diverse content related to sustainable behaviors and development initiatives.

Table 2. Results of listenership survey and CRs' program perspective based on primary and secondary research.

Items	**%**	**Items**	**%**
How often the rural people listen to CRs in a typical week?		The medium/device used to listen to CR	
one day a week	7.7%	Radio	13.3
Two to four days	35.7%	Mobile FM Receiver	76.7
Everyday	54.7%	Mobile/PC connected with internet	10.0
Irregular	2.0%	Education Qualification of the Listeners	
How many hours do the villagers listen to the CRs in a day?		No or primary education	18.0
1 hour	6.0%	Class six to ten	35.3
2-7 hours	32.3%	College/twelve	33.3
8 or more hours	61.7%	Graduate/first degree	13.3
Source: Primary research by the author			
Total number of radio stations	17	The selected area has 1/3 of the total stations	06 CRS

Table 2. *Cont.*

Items	%	Items	%
Total broadcasting hours in a day	135 hours	Selected stations covered more than 1/3 of the total broadcasting hours	60 hours
Total listeners	6.526 million	The study area has more than 1/3 of the total listeners	2.392 million
Total special development news in a day, except*	570 minutes	The CRs in the selected area air more than 1/3 of the total	275 minutes
Total development advertisement except*	108 minutes a day	The selected stations cover more than 1/3 of the total	40 min
Source: Other's research - Morshed, 2017.			
Type of listeners	Youth-boys and girls; labour, adults, women, students, farmers, fishermen, repairmen, auto and human rickshaw puller, tea shop keeper, small entrepreneurs, activists, journalists, teachers' community, local government administration,		
Programs are aired particularly for the marginalised people	14.15 hours		
Where are they listening from?	Local small shop/ tea stall; home; during travel, workplace, listeners' club.		
Favourite program format	Phone in, development drama, news, discussions, interviews, and dialogues.		
Programs broadcast per week	489 programs		

*Note: * List of development related contents are found in table (Source: Hassan and Rahman, 2016)*

4.2. Results of the SEM analysis

The data collected from the second part of the questionnaire were subjected to rigorous analysis to test the hypotheses derived from the results of the SEM analysis. However, prior to assessing the hypotheses, the author conducted an analysis of data reliability, validity, and model fit indices (see Table 3 and 4).

4.2.1. Reliability and validity

Multiple tests confirm the reliability and validity of the collected data. Variance inflation factor (VIF) analysis did not reveal any significant collinearity issues, with all VIF values well below the thresholds of 10.0 and 5.0 (Kline, 2011). Moreover, all R-squared (R2) values for the items (Table 4) and constructs exceed 0.3, indicating strong structural relationships within and between constructs (Hair et al., 2014). Correlations between

hypothesized theoretical constructs are within an acceptable range (between 0.517 and 0.703), and cross-loadings meet recommended criteria for discriminant validity (Bagozzi and Yi, 2012; Henseler et al., 2015). Convergent validity is confirmed with Average Variance Extracted (AVE) values exceeding 0.50 (Hair et al., 2014). The data also meets the threshold for composite reliability, with values at or above 0.80, which is widely accepted (Hair et al., 2012).

Table 3. Model reliability and validity

Constructs	Cronbach's Alpha	rho_A	Composite Reliability	Average Variance Extracted (AVE)
SDC	0.818	0.819	0.818	0.600
ASD	0.793	0.794	0.793	0.561
CSD	0.819	0.821	0.820	0.603
ISD	0.851	0.853	0.852	0.590
SSD	0.774	0.775	0.775	0.534

Table 4. Model fit index

Model Fit		**Heterotrait-Monotrait Ratio (HTMT)**	Range: .551- .777
Indices	values	**VIF**	Range: 1.46- 2.21
SRMR	0.025	**N= 300**	
d_ULS	0.082		
d_G	0.050		
Chi-Square	78.892		
NFI	0.965		

Note: VIF: Variance Inflation Factor; SRMR: Root Mean Square Residual, NFI: Normed Fit Index, N: Number of Valid Sample (Size).

4.2.2. Model fit

The model demonstrates an excellent fit with the collected data according to multiple fit indices. The chi-square ($\chi 2$) statistic is low relative to the degrees of freedom, suggesting a high probability of achieving such a model (Hu and Bentler, 1999; Hooper et al., 2008). Additionally, other indices, such as the Normed Fit Index (NFI), indicate a good fit, with an NFI value exceeding 0.95, considering the sample size (Bentler, 1990). The Root Mean Square Residual (SRMR) also indicates a favorable model fit, with a value of 0.025 (Tabachnick and Fidell, 2007; Hooper et al., 2008).

4.3. Path analysis: results for hypotheses testing

The evaluation of hypotheses in this research relies on the effects of CRs on sustainable development through sustainability communication. Path analysis, as depicted in Figure 2, was conducted to determine the size of effects and the proportion of explained variance for each respective construct. Total effects, which encompass direct and indirect effects, were considered, with direct effects representing influences not mediated by other

variables in the model (Bollen, 1987; Byrne, 2016). R-squared values (Table 5) above 50% for constructs related to human behavior are widely accepted as strong indicators of their significance (Jamil et al., 2022).

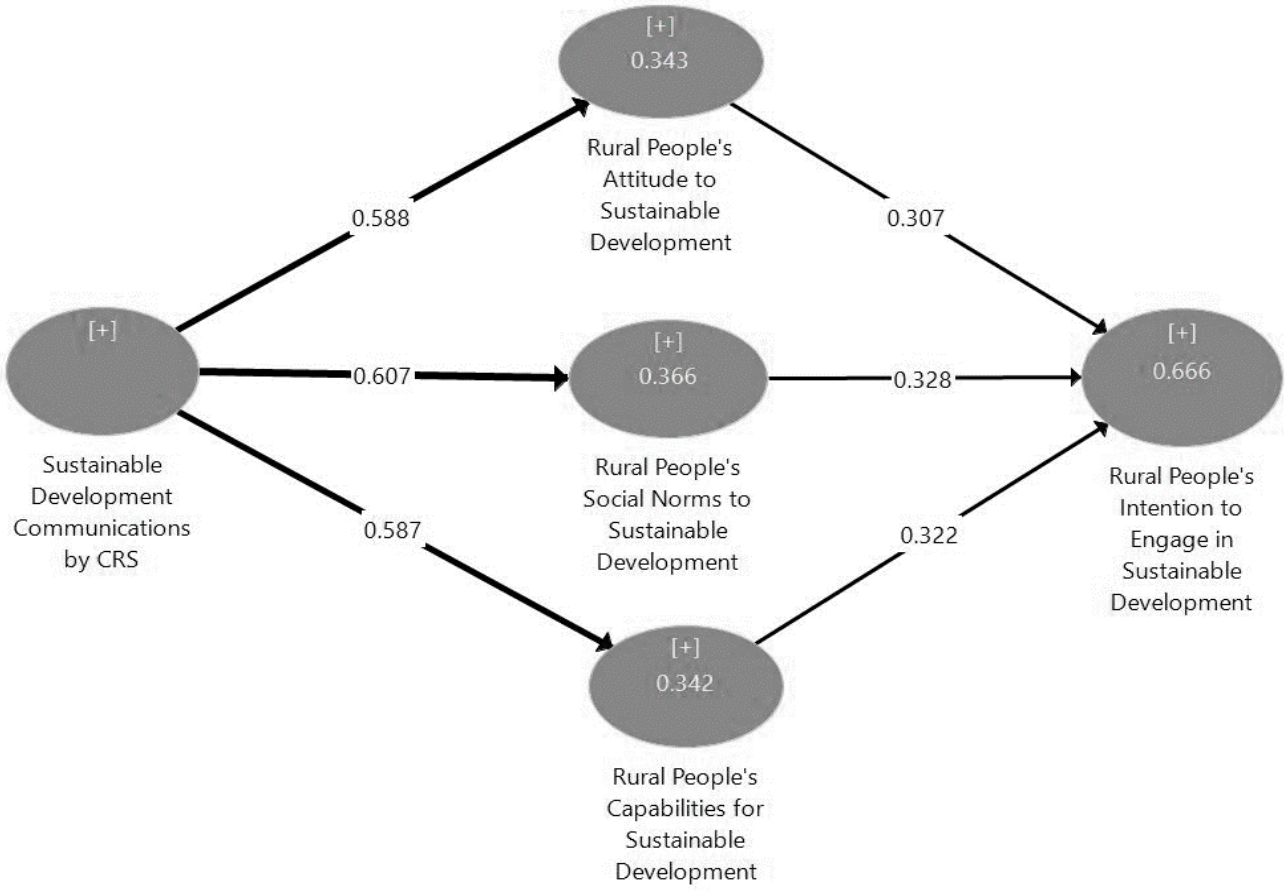


Figure 2. Direct Effects/Path Co-efficients and R-squared values

The results indicate that sustainable development communications aired by CRs have a significant standardized effect of 0.588 on rural people's current attitudes (ASD) toward sustainable development. ASD explains 0.343 (R-squared) of the variability in response data, exceeding 30% and signifying its significant role in the model. Therefore, Hypothesis 01 (H1) is valid. Similarly, sustainable development communications influence social norms (SSD) toward sustainable development, with a substantial standardized effect of 0.607. SSD represents almost 37% of the variability in the collected data, establishing it as the most powerful construct in the model and supporting Hypothesis 02 (H2).

Furthermore, sustainable development communications affect perceived capabilities (CSD) of rural people in adopting sustainable development processes, with an effect size of 0.58. CSD demonstrates a similar level of influence as ASD (R-squared = 0.342), justifying Hypothesis 03 (H3). Hypotheses 4a, 4b, and 4c are also supported by the results of the path model, indicating a significant positive change in attitudes, social norms, and capabilities positively affecting rural people's intention to engage in sustainable development actions.

Attitudes have an impact of 0.307, social norms 0.328, and change in capabilities 0.322 on the intention to engage, collectively explaining 67% of the data's variability.

Table 5. Statistics derived from the SEM analysis.

Items	Loadings	Items	Loadings	Construct	SDC	ASD	CSD	ISD	SSD
sdc_1	0.772	ssd_1	0.755	SDC		[f]0.528	[f]0.526	-----	[f]0.583
sdc_2	0.773	ssd_2	0.720	ASD	[t]9.831	[R].346		[f]0.166	
sdc_3	0.780	ssd_3	0.717	CSD	[t]10.374		[R].345	[f]0.174	
asd_1	0.751	isd_1	0.812	ISD		[t]3.494	[t]3.343	[R].670	[t]2.992
asd_2	0.768	isd_2	0.763	SSD	[t]10.415			[f]0.164	[R].368
asd_3	0.728	isd_3	0.761						
csd_1	0.790	isd_4	0.733						
csd_2	0.801								
csd_3	0.738								

Note: [t] T values, [R] R^2 values, [f] f^2 values

5. Discussion of findings based on previous cases studied

CRs have proven to be successful in addressing critical issues in sustainable development through communication (UNESCO, 2014). The number of CR listeners is rapidly increasing in developed countries such as the USA, Australia, Canada, Hungary, and the UK. Furthermore, CRs have achieved tremendous success in various African countries, including Cameroon, Ghana, Mali, Malawi, Mozambique, Kenya, South Africa, Tanzania, and Uganda (Mefalopulos, 2008). CRs have also made significant strides in Asian countries like Nepal, Indonesia, Thailand, India, and Bangladesh in the realm of development communications. For instance, within just five years, Bangladesh has seen CRs reach 30% of the total population in their broadcasting areas (Hassan and Rahman, 2016).

Given the sustainability challenges faced by rural communities and the importance of finding solutions, CRs have garnered popularity due to their unique ability to effectively communicate sustainability content (Morshed, 2017). Notably, members of listener clubs, including individuals with disabilities, actively participate in program creation, planning, and hosting, often with minimal technical assistance from radio stations. Consequently, these programs reflect the perspectives and interests of ordinary people, gaining trust within local communities (Khan et al., 2017). These programs provide insights into developmental issues, the need for changing current attitudes and behaviors, and guidelines on improving orientations and approaches for sustainable development. As a result, they enhance the intention of individuals to engage in socially, environmentally, economically, and culturally sustainable behavior.

CRs can significantly alter the attitudes (feelings, evaluations, and responses to sustainability) of rural residents toward sustainable development. For example, more than 75% of CR listeners in Satkhira district, Bangladesh, agreed that before the introduction of 'Radio Nalta,' they did not believe their activities were responsible for issues like temperature rise, soil fertility, river erosion, and increased salinity in the locality

(Mominur, 2013). However, CRs have succeeded in changing these traditional beliefs, leading to changes in behavior and the avoidance of environmentally harmful activities by villagers (Mominur, 2013).

In Bangladesh, Radio Jhenuk has significantly altered the attitudes of young boys and girls towards suicide through interviews with psychologists, members of victimized families, and individuals who attempted suicide but survived. Additionally, discussions on coping strategies during life's difficult situations have reduced the suicide rate and fostered social cohesion and sustainability within the radio's broadcast area (Morshed, 2017; Hassan and Rahman, 2016; Genilo et al., 2016).

Analyzing the proportion of explained variance and loadings of indicators in the model reveals that sustainable development communications by CRs have a greater impact on rural people's social norms compared to their attitudes and capabilities for sustainable development. This finding is consistent with earlier behavioral research that indicates attitudes have a somewhat lesser influence compared to social norms and capabilities for sustainable development. Social norms play a crucial role in encouraging people to engage with social issues, particularly in collectivist countries like Bangladesh, where rural communities value their neighbors' expectations, rewards, or punishments.

Antisocial behavior has become increasingly common in many areas of Bangladesh, prompting rural communities to demand solutions. This has resulted in an increase in applied programs on CRs aimed at promoting social sustainability (Rahman, 2017). The participatory nature of communications on CRs leads to rapid social sharing among community members, making CRs more effective than other media in disseminating the impacts of social norms. For example, a study by Rasheed (2012) on the achievements and evaluations of CRs in community development found that Radio Mukti in Bogra, Bangladesh, dramatically influenced levels of respect for social norms related to dowry and eve-teasing among both young and older citizens, addressing many other social problems as well.

Research has shown that CR listeners perceive CRs as vehicles for airing interviews with local and national experts, sharing success stories of local personalities in various fields (Chapman, et al., 2003), and presenting indigenous and modern knowledge through technical demonstrations, traditional songs, and poems, as well as comprehensive community-level discussions. These elements enhance rural people's knowledge, skills, and abilities to explore opportunities for sustainable behavior (Larweh, 2006). Improved skills among rural residents can lead to new capabilities for alternative income generation, natural resource management, social and political development, peace, family health, and cultural preservation (Al-Hassan et al., 2011; Chapman, et al., 2003).

For example, individuals involved in animal husbandry and fishing in coastal or river areas receive expert guidance on sustainable poultry and fishing through CRs. CRs even assist with financing by advising on suitable ways to secure loans and manage repayments (Mrutu, 2008). CRs support farmers in exploring direct income-earning opportunities by providing tips from experts and successful local farmers on alternative crop farming during times of crisis (Chapman et al., 2003). Additionally, CRs offer smallholder farmers and small and medium enterprises information on market access and advertise their goods at minimal or even no cost, reducing their dependency on middlemen and brokers (Al-Hassan et al., 2011). CRs play an instrumental role in promoting tree planting, conserving national parks and game reserves, managing water resources, sustainable land preparation, and cultivating locally adaptable crops (Mrutu, 2008).

In Bangladesh, CRs serve as advocates for protecting people from the effects of climate change (Genilo et al., 2016). During cyclones, floods, and other natural disasters, CRs are considered essential for safeguarding both

assets and lives. They achieve this by translating early warning systems and preparedness information into local languages (Khan et al., 2017). For example, through Krishi Radio, farmers learn which rice seeds are not affected by salt or discover new approaches to work after natural disasters (Basselin and Geertsma, 2017). CRs such as Radio Nalta and Sagorgiri successfully implement community-based adaptation strategies to protect health from climate change in certain areas of the country. They achieve this by changing people's attitudes and abilities regarding health risks and preventive measures associated with climate change, using an edutainment format that includes local folk songs and drama in local languages (Shumake-Guillemot et al., 2014). Consequently, CRs have gained global recognition for their success during emergencies and disasters in Bangladesh (TNH, 2013).

Research based on case studies from other developing countries supports the notion that CRs have contributed significantly to social, economic, and environmental development, particularly in many African countries (Chapman et al., 2003). For instance, 'Simply Radio' in Ghana is so beloved by its community that people say they feel as if someone has taken their food away when they are without the radio (Al-Hassan et al., 2011). Following the broadcast of numerous programs addressing developmental issues, this radio station witnessed an increase in school enrolment, wider adoption of modern farming techniques, increased awareness of hygiene and sanitation, strengthened social cohesion, reduced conflicts, and the establishment of peace (Al-Hassan et al., 2011).

The majority of listeners find that the environmental messages conveyed by CRs are well-developed, accurate, and reliable, prompting them to adopt practices such as bush-burning, using alternatives to chemical fertilizers such as animal manure and green manure from plants, engaging in agroforestry to enhance soil fertility and prevent erosion, and planting trees wherever possible (Chapman et al., 2003). As a result, villagers are now investing time in improving their farms through soil and water conservation techniques, rather than migrating to urban areas for short-term work (Chapman et al., 2003).

In addition to contributing to social, economic, and environmental sustainability, CRs worldwide are making significant contributions to cultural sustainability through special programs. For instance, programs like Community Entertainment and Storytelling have played a pivotal role in preserving local culture (Al-Hassan et al., 2011). These programs are deeply rooted in indigenous design and broadcasting, providing a connection to traditional culture in an era dominated by modern entertainment options (Al-Hassan et al., 2011). Furthermore, in Bandafassi, a CR broadcasts stories, proverbs, traditional music, and the history of various villages, preserving local traditions in this modern age (Al-Hassan et al., 2011). Radio Ada in Ghana even organized a drama workshop to expand the scope of local drama shows among local drama groups, safeguarding local culture (Alumuku, 2006). Additionally, in the current study's country, CRs are actively preserving the cultures of ethnic, indigenous, Dalits, and other marginalized communities (Hassan and Rahman, 2016). This includes dedicating nearly 15 hours per week to special entertainment programs that aim to preserve the cultures of unrecognized people who are often overlooked by traditional mass media (Hassan and Rahman, 2016).

The results obtained through structured equation modeling-based analysis of the surveyed data, combined with the case studies discussed above, consistently demonstrate why people appreciate CRs, how they accept the communications conveyed by CRs, how different programs influence people's attitudes, activate and shape social norms, enhance abilities, and ultimately promote engagement in sustainable development.

6. Conclusions

The unique communication characteristics of CRs make them crucial tools for rural communities in accepting sustainability communications, establishing them as sustainable communication mediums. CRs effectively convey social, economic, environmental, and cultural issues and guidelines to rural people, leading to changes in attitudes, capabilities, and social norms. These changes generate a positive intention among rural communities to engage in sustainable development practices. Policymakers and development agents in developing countries can learn from this study about the initiation and diffusion of sustainability communications through CRs, prioritizing aspects that encourage quick implementation of sustainability ideas for the benefit of the community.

While this study focuses on Bangladesh, its findings align with examples and case studies from various countries, highlighting the impact of CRs on multiple aspects of sustainable development. CRs play a significant role in addressing sustainable development goals related to poverty reduction, health, education, gender equality, water and sanitation, climate action, peace and justice, and environmental conservation. This study reinforces the potential of CRs as valuable tools for achieving sustainable development worldwide.

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