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# Assessing the Socio-Economic Impacts of Rural Infrastructure Projects on Community Development

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**Abstract:** Public construction infrastructure projects have been recognized as one of the fundamental tools in enhancing community socio-economic conditions for community development. The purpose of this study is to empirically investigate the impacts of socio-economic factors on community development of rural regions. Through a questionnaire survey administrated in Pakistan, public construction practitioners' views were sought and evaluated. Empirical support for the argument originated from the data collected from 213 respondents in Pakistan's public construction industry. The questionnaire's data were evaluated employing the partial least square structural equation modeling (PLS-SEM). The study's findings showed that economic and social factors influence the community development of rural regions. The result obtained from PLS-SEM proposed a more viable method to realize community development and objectives. The study's results have offered precious lessons for local authorities, policymakers, and project stakeholders to strengthen the drive for achieving community development goals. Strategies supporting community development in rural regions are indispensable for local community development. This study provides empirical confirmation for the understanding and combining the community development concept; it illuminates absent knowledge about community development, especially in rural regions. This is one of the few studies investigating the influencing dimensions of community development in rural regions. To the authors' best knowledge, this is the first research article providing empirical evidence of the influencing dimensions of community development in rural regions in a developing country.

**Keywords:** socio-economic; rural areas; community development; public infrastructure projects



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## 1. Introduction

Infrastructure projects in the rural region are usually constructed to support the local community enabling them to access the resources, to resolve the rural problems, hence, positively changing the general rural environment [1] and also helping to achieve numerous goals and objectives of communities [2,3]. However, the absence of these projects poses severe socio-economic problems for the local communities, for example, devastating impact on living standards, adverse impact on quality of life, more expenditure on healthcare and education [4], lower economic growth, and increased unemployment [5]. The importance of infrastructure projects in a community's life necessitated taking necessary action for community development [3,6] in rural regions.

Recently, rural infrastructure has gained popularity in the public domain to make the public infrastructure projects sustainable in the rural areas that directly support the development of the community. The idea of sustainability while constructing the development projects to strengthen sustainable societies [7] in the rural region has many features. One of the fundamental socio-economic elements is the influence of infrastructure on sustainable rural development, such as regional economic development through providing transport

infrastructure among territories which can also help decrease societal differences [8]. Public infrastructure projects have the ability to influence many features of societal and economic activities [9] such as better quality of life, gross domestic growth, quality education, employment, poverty alleviation, education, and better healthcare facilities [10,11]. The study performed by Valdes-Vasquez and Klotz [12] explores that an accurately sustainable construction project, for instance, should comprise social as well as economic significance about the end-users and concerns about the influence of the project in the society in terms of the education, health, and safety of society or public involvement. Socio-economic dimensions have the potential to define community development in the contemporary era, especially in rural regions, and their influences are shown to be associated with local development [13].

During the past decade, approaches have been suggested to measure the infrastructure project's sustainability [14–16], directing to create community development considerably. The infrastructure projects conduce sustainability both in the short and long term that can be evaluated using socio-economic enhancement standards and objectives. The standards are needed to a medium that must be satisfied to achieve the standards of sustainability [17] and community development. In Pakistan, the public construction industry is regarded as a dynamic sector because of its volatile market situation [7]. The growth and progress of this sector have been found remarkable compared to the other areas of the economy. In Pakistan, rural infrastructure is still in the initial stages of the adoption of sustainability and community development. The infrastructure projects and their influence on community development remain a significant national issue, left unexplored. Therefore, this study aims to identify the various socio-economic dimensions of infrastructure projects to enhance the development of local communities in rural regions.

There is a lack of research on this significant part, and in developing nations such as Pakistan, that how economic and social development factors can jointly enhance community development. Li et al. [18] have taken economic development and social development as independent variables, whereas the dependent variable was development in their study. The current research provides to the existing body of knowledge by applying the approach of partial least squares structural equation modeling (PLS-SEM) for investigating how embedding socio-economic dimensions in day-to-day operations of the local society can enhance the community development through public infrastructure projects. Hence, this study investigates contemporary socio-economic dimensions to enhance community development, using data from Pakistan public construction practitioners.

The community is the key and fundamental unit of rural development. The fundamental objective of the study is to explore the socio-economic dimensions to enhance community development in rural regions of Pakistan. This study will contribute to the current literature in three different aspects. First, the community development paradigm is well captured in social sciences, which also has importance in construction management literature. This study contributes to providing experience from a developing country's construction industry. Second, it presents the socio-economic perspectives critical for the development of communities in the rural region, and lastly, it provides implications for the policymakers to consider the social and economic realities for the community development of the infrastructure projects and its influence on the community life in the rural region [14,19].

The current paper is organized as follows: Section 2 examines the associated literature review. Whereas Section 3 designs the conceptual model of the study. Then the following section which is Section 4 explains the research methodology, whereas Section 5 is about results and data analysis. The last section which is Section 6 describes and discusses the results. The last section includes conclusion, some recommendations for future research, research implications, limitations, and delimitation of the study.

## 2. State of the Art on Socio-Economic Impacts of Rural Infrastructure Projects on Community Development

Public infrastructure projects perform a coercive role in enhancing the development of rural regions all over the world [20]. Infrastructure in rural areas, such as roads, hospitals, educational institutions, irrigation canals, water supply, electricity, and telecommunication, helps facilitate growth and fulfill basic requirements and useful activities in the rural region [21]. Improved rural development has often been connected with more investment. Some have leaped, stating that rural areas would be suitable for rapid socio-economic growth if only they had a better competitive infrastructure accessible from several urban regions [22]. The expectation is that improved quality education, better water and electricity, low transportation cost, improved telecommunication, and increased information infrastructure in rural regions can enhance the economic conditions and quality of life [4,23,24], help in poverty reduction and development of rural residents [25,26]. A set of socio-economic dimensions ascertained the community development. Gorbenkova et al. [27] proposed a model measuring settlement development at the rural level permits achieving the primary index of settlement development in rural areas and defining the significant features and it is appropriate for use in the enhancement of regional planning projects. Elmualim et al. [28] found that legislation is the most important handler for accomplishing sustainable practices.

To enhance the general socio-economic conditions of rural residents, public infrastructure projects help improve the sustainability performance of future generations. It is also believed that rural infrastructure projects can generate more local job openings and the economic base of the indigenous civic can be supported [29]. Fan et al. [30] revealed that rural infrastructure and rural development are connected to reducing rural poverty and increasing the standard of living through agricultural productivity improvement, employment opportunities, and nonfarm employment. It is considered that rural infrastructure is constructed to help various economic, social, and environmental goals. A survey done by Shen et al. [21] in China's rural regions showed that in developing countries the infrastructure in rural areas has a vital role in poverty alleviation, development of the community, and agricultural growth. Furthermore, they revealed eight vital measurement criteria for determining the advantages of investing in rural infrastructures such as status of employment, standard and quality of living, an ability to provide related amenities, safety benefit, index of air pollution, degree of surface water pollution, solid waste pollution level and impact of water, and soil loss.

According to Moseley [31], rural development is defined as a continuous and sustainable procedure of social, cultural, economic, and environmental changes planned to improve the continuing welfare of rural civics. Stimulation of economic growth and poverty reduction [32] are basic purposes, and they are the main sources of the social and economic development of rural regions. Growth is the only approach to providing an enduring solution to the poverty problem and increasing the overall well-being of rural dwells [30]. Lucas [33], for example, suggested a systems approach to assessing the role of rural educational institutions may be more suitable where "the community system" signifies incorporation of the comparatively objective factors of the economic infrastructure with the fulfillment of important social needs. Ahmad et al. [24] examined that community empowerment has a strong impact on sustainable development in rural regions of Pakistan. The authors found that a sense of community is a vital explanatory variable in describing the association between empowerment of the community and project sustainability so that the residents can accomplish the standard of living.

A study was done by Warhurst [34] that believes that the overall improvement made with regard to development is measured by a mixture of the particular areas regarding their interest. Indicators of community development have to be chosen and agreed upon by the suitable societies of interest [35]. Riva et al. [36] found that the usage of electricity is interrelated with various dimensions of socio-economic development, such as revenue-creating endeavors, market production, and profit maximization, enhancing the domestic

economy, citizen health and population, education, and shared values. Similarly, Okkonen and Lehtonen [37] found that community wind power is the key source of resources to be re-invested in regional development goals, such as local trades, social services, and infrastructure and interactions. Moreover, a study held by Cook [38] reviews the literature on the role and the relationship of infrastructure, rural electrification, and development in rural areas on economic growth and social development.

Pavlovskaia [39] found that the necessary measures and conditions for interference should be satisfied to achieve a sustainability standard. Sustainability must be started at the local public level, where the necessities, benefits, and desires of the residents compared with community development must be examined and achieved. National investment policies in infrastructure projects and development plans are indispensable for community development and will continue in a state's strategy and remain to play a substantial role in intending regard to economic development, social welfare, and sensible utilization of available natural resources [14,19]. Krajangsri and Pongpeng [15] revealed that development goals could be enhanced successfully with the help of sustainability in rural infrastructure projects.

Albeit there have been many previous papers by scholars and researchers on factors for enhancing socio-economic sustainability, there is a lack of research that combines and systemizes the relationship between socio-economic development dimensions and community development by using the PLS-SEM technique especially in the context of rural regions in Pakistan. This study shapes the previous research by providing and assessing a conceptual model of how socio-economic development factors can influence community development in rural regions. In line with this knowledge gap, the key objective of this study has been to increase the understanding of community development efforts from socio-economic development. Henceforth, the current study aims to fill the existing gap in the present literature by studying the projects related to public infrastructure that contributes to socio-economic development which drives the community development in the context of rural territories.

Furthermore, sustainable infrastructure can be applied as a local growth mechanism to increase community development [40], and it has become an important component in the accomplishment of development goals [15] in rural counties. The current study has identified the substantial importance of socio-economic dimensions and community development. The public infrastructure project promotes community development [15] in both short and long term, which can be determined by means of socio-economic development measures, conditions, and goals, as the socio-economic status of local residents is the strongest predictor of the community development.

## 3. Conceptual Model

The conceptual model of the study (Figure 1) is grounded on a review of existing literature, a questionnaire survey, and pilot study. The model presented in this study is a detailed description of socio-economic development and community development that has so far been overlooked in the literature. Partial least square structural equation modeling (PLS-SEM) is employed to evaluate the socio-economic dimensions that enhance the community development of rural regions, and a conceptual model is developed. This model is comprised of two independent variables and one outcome (dependent) variable. Employing the structural equation modeling (SEM) method, the model is developed with 27 observed variables and grouped into three categories. These groups are social factors (SOC), have twelve observed variables and economic factors (ECO), and have ten observed variables. The endogenous latent variable community development (COMD) has five observed variables.

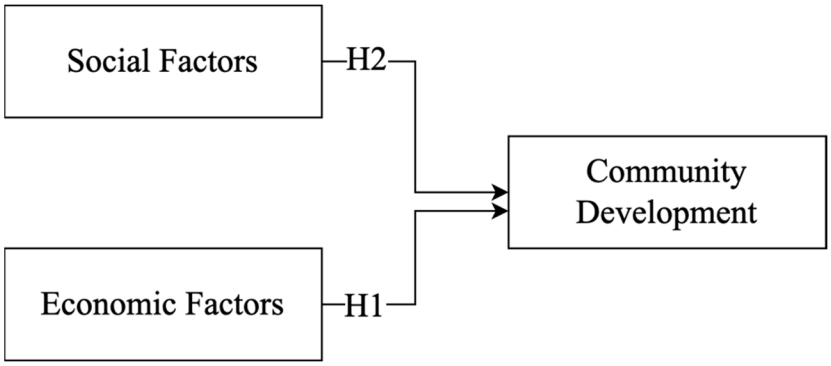


**Figure 1.** Conceptual model of the study.

Socio-economic elements play a vital role in enhancing community development. Various countries worldwide have been intensifying the sustainability of infrastructure for the reason that sustainable infrastructure possibly enhances the community development of any region. Socio-economic factors were significant factors that support community development, such as productivity, development, accessibility, growth, and sharing [41]. Public infrastructure projects promote economic welfare, social benefits, and facilitate accessibility and convenience to the societies [40]. Arnold [42] found that economic concerns are indispensable with the aim of ensuring, between other things productivity and economic stability, whereas social concerns are essential to make sure satisfaction of objectives and needs, for example, security, social justice, better education, provide equal opportunities. Community development is certainly a normative concept [43], signifying values and ethical contemplations of the society [44], satisfying human needs and confirming social equity [45], and increasing economic growth [46]. Although there are a number of studies to investigate community development, nevertheless, there is a lack of knowledge that develops a comprehensive theoretical framework of socio-economic dimensions and community development. In response to this knowledge gap, there is a requisite to develop a conceptual model that can be utilized in policy and decision-making to confirm that public infrastructure projects are constructed in relation to traditions that will benefit the local community. A model is necessary to access public construction practitioners' views to find out how socio-economic dimensions enhance the community development.

The findings from this study are imperative because they propose a complete assessment of construction practitioners. Such evidence can be indispensable for the government and decision-makers to evaluate the effectiveness of community development. Such findings can also be important for the community development of rural infrastructure projects. This study contributes insight into the observed differences of the respondents concerning the level of significance of the variables. Public construction policy-makers and practitioners can benefit from realizing the socio-economic development that enhances community development and thus making new balanced policies and plans for improving the community development goals.

The following hypothesis is suggested for the relationship between the socio-economic dimensions and community development:

**H1.** *The economic factors are significantly and positively enhancing community development.*

**H2.** *The social factors are significantly and positively enhancing community development.*

## 4. Research Methodology

The procedure for data collection consists of three key phases as shown in Figure 2, such as in phase one the authors identified key variables from the relevant literature then the authors conducted a pilot study, and finally, the authors conducted a questionnaire survey.

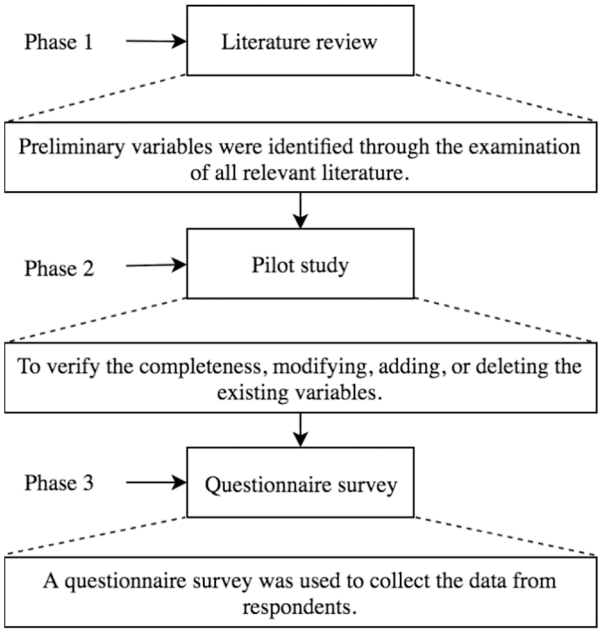


**Figure 2.** Data collection procedure.

A preliminary questionnaire was carried out based on socio-economic dimensions and community development of rural regions emerging from the literature review and written in a well-defined and clear language to improve the respondents' capacity to exercise comprehensive assessment. A small pilot study with 14 professionals was conducted before distributing the questionnaires, and the questionnaire was refined according to the response. The purpose of the pilot study was to confirm the content validity and completeness of the survey questionnaire in apprehending the enhancing factors applicable to Pakistan. The experts were senior executives from the public construction departments with more than 15 years of working experience. Furthermore, all the professionals had better knowledge regarding implementing community development. The questionnaire was improved based on the professionals' opinions. The final questionnaire consists of two main parts. The first part consists of the respondent's personal profile, e.g., age, experience, qualification, etc., while the second part consists of 27 comprehensive factors, which is shown in Table 1. The second part is categorized into three main sub-groups, i.e., social-related factors (SOC), economic-related factors (ECO), and community development (COMD). A five-point Likert scale (1 = Strongly disagree to 5 = Strongly Agree) was used to gauge the importance of each factor.

The sampling framework used for this study consisted of construction practitioners employed in Pakistan's public construction industry. In total, 300 questionnaires were distributed to randomly selected construction practitioners in Pakistan. A simple random sampling method is applied for the selection of the sample. The targeted respondents of the study were those who are directly associated with projects such as executives, head of the department, managers of the project, engineers, and architects who have been working with the sampled organizations and have experience related to infrastructure and sustainable development projects.

The data collection effort produced 213 completed questionnaires, yielding a response rate of 77%. For this study, email and in-person methods were chosen for the survey because it allow direct correspondence between the investigator and the targeted respondents. The study used PLS-SEM to evaluate the hierarchical conceptual model. PLS-SEM is a common multivariate analysis technique that is used to assess variance-based structural equation models [47]. Moreover, PLS-SEM provides an opportunity to conclude complex procedures of relations and causal relationships that are else complex to explain.

**Table 1.** Socio-economic development factors and community development factors.

| Sr. No. | Factors | Code |
|---|---|---|
| | **Economic Factors** | |
| 1 | Improve access to employment opportunities [48] | ECO_1 |
| 2 | Increases farming income [49] | ECO_2 |
| 3 | Increases local income [50] | ECO_3 |
| 4 | Increase agricultural production [51] | ECO_4 |
| 5 | Decrease traveling cost [4] | ECO_5 |
| 6 | Increase in the demand for local products [4] | ECO_6 |
| 7 | Create new business investment opportunities [52] | ECO_7 |
| 8 | Expands the rural economy [53] | ECO_8 |
| 9 | Ensures long-term business profitability [14] | ECO_9 |
| 10 | Create many jobs for locals [54] | ECO_10 |
| | **Social Factors** | |
| 1 | Provision of social infrastructure [55] | SOC_1 |
| 2 | Availability of job opportunities [56] | SOC_2 |
| 3 | Access to a public facility [57] | SOC_3 |
| 4 | Access to work [58] | SOC_4 |
| 5 | Proximity to business activities [58] | SOC_5 |
| 6 | Provision of public facilities, e.g., Schools, health care services, and sports facilities [58] | SOC_6 |
| 7 | Preservation of local characteristics [59] | SOC_7 |
| 8 | Improves local standard of living [1] | SOC_8 |
| 9 | Security against crimes [58] | SOC_9 |
| 10 | Establishment of different business activities, e.g., Retail, shops, banks [59] | SOC_10 |
| 11 | Ability to fulfill psychological needs [60] | SOC_11 |
| 12 | Satisfaction of welfare requirements [61] | SOC_12 |
| | **Community Development** | |
| 1 | Embraces sustained resident empowerment and equity [62] | COMD_1 |
| 2 | Supports residents in their advocacy for their neighborhood [63] | COMD_2 |
| 3 | Increase community capacity building [64] | COMD_3 |
| 4 | Rural community resilience [41] | COMD_4 |
| 5 | Resource development, involves increased productivity and growth [41] | COMD_5 |

## 5. Results and Data Analysis

### *5.1. Descriptive Statistics*

The information related to the demography of the 213 respondents is presented in Table 2. The key target respondents for the survey were construction practitioners who have gained familiarity with the concept of socio-economic and community development. The respondent's age was divided into five groups; starting from 21–25 years (7.51%), 26–30 years (11.27%), 31–35 years (21.60%), 36–40 years (37.09%), and above 40 years (22.54%). Most of the respondents were aged 36–40 and above 40 and better understood the importance of the study. This could be attributed to that respondents in this age range have better knowledge about the socio-economic factors that enhance the community development in the region.

Data analysis from Table 2 shows that 33.33%, 43.19%, and 23.47% have a bachelor's degree, master's degree, and MPhil degree, respectively. While the majority of the respondents have a master's degree (43.19%) and most of the respondents were experienced in the study and had suitable information to understand the questionnaires and to answer accordingly. This implies that respondents had enough competency to respond to the survey questionnaire.

**Table 2.** Characteristics of the study population.

| | Total | Percentage |
|---|---|---|
| **Working Experience** | | |
| 5–10 years | 51 | 23.94% |
| 11–20 years | 71 | 33.33% |
| 21–30 years | 66 | 30.99% |
| >30 years | 25 | 11.74% |
| **Age** | | |
| 21–25 | 16 | 7.51% |
| 26–30 | 24 | 11.27% |
| 31–35 | 46 | 21.60% |
| 36–40 | 79 | 37.09% |
| >40 | 48 | 22.54% |
| **Education** | | |
| Bachelors | 71 | 33.33% |
| Masters | 92 | 43.19% |
| MPhil | 50 | 23.47% |
| **Target respondents** | | |
| Executive Engineers | 44 | 20.66% |
| Department heads | 54 | 25.35% |
| Project managers | 42 | 19.72% |
| Project engineers | 51 | 23.94% |
| Architects | 22 | 10.33% |

### *5.2. Measures and Analysis*

The questionnaire is assessed on a five-point Likert scale to evaluate how socio-economic factors influence community development through public infrastructure projects in the rural region. To measure the hypothesized model, Smart PLS V3.0 was used to conclude the parameters of the conceptual model. In this circumstance, PLS path modeling was employed with a path weighting scheme for inside approximation [65] with 1000 maximum iterations. Subsequently, bootstrapping was applied with 5000 subsamples with no sign changes were used to obtain the standard estimate errors [65].

According to Henseler et al. [66], PLS comprises a two-step method that includes estimation of the outer measurement model and measurement of inner structural model.

#### 5.2.1. Assessment of Outer Measurement Model

It was necessary to measure the reliability, convergent and discriminant validity of the scales to examine the qualities of the measurement model. The measurement model must be measured with regard to their reliability and validity. The outer measurement model comprises all unobserved variables in the model and denotes the indicators for each construct. To check the internal consistency of the model, the researchers have employed different measures, i.e., Cronbach's alpha, composite reliability (CR), and average variance extracted (AVE). The criterion checked was Cronbach's alpha and CR, which validate the internal consistency and an approximation of the reliability based on the indicator correlations. A normal limit value for an accepted model recommended by previous researchers had a Cronbach's alpha value greater than 0.7, CR score was higher than 0.7 [67], and AVE was above 0.5 [68]. The results from Table 3 show that Cronbach's alpha and CR for all constructs were greater than the limit value (0.7), indicating acceptable reliability. The AVE for all constructs was more than 0.5, implying convergent validity at the construct level. The results from Table 3 validated convergent validity since all indicators loaded significantly higher on their hypothesized indicators than on other variables. Internal reliability and construct reliability of all constructs were achieved. Hence, the model is suitable for the analysis.

**Table 3.** Construct reliability and validity.

| | Cronbach's Alpha | CR | AVE |
|---|---|---|---|
| Economic Factors | 0.957 | 0.963 | 0.725 |
| Social Factors | 0.954 | 0.959 | 0.664 |
| Community Development | 0.816 | 0.872 | 0.577 |

Discriminant validity (DV) can be measured by testing the cross-factor loadings of the computes [69]. The intra-construct factor correlations must be higher than the inter-construct factor correlations [70]. Moreover, DV defines the point to which a construct is empirically definite from other constructs in the path model [71]. Furthermore, from Table 4, the Average Variance Exerted (AVE) square root was measured to ensure the discriminant validity, which was higher than the inter-correlations of the variables with the other variables in the model. Further verification for discriminant validity gets through assessment of the cross loadings when there are no cross-loadings of measured items on latent constructs. Table 5 shows the cross loadings of all factors in the model. Accordingly, the suggested model was observed as acceptable, with support of sufficient reliability, convergent and discriminant validity and confirming the hypothesized study model.

**Table 4.** Fornell–Larcker criterion test.

| | Economic Factors | Social Factors | Community Development |
|---|---|---|---|
| Economic Factors | **0.851** | | |
| Social Factors | 0.243 | **0.815** | |
| Community Development | 0.639 | 0.625 | **0.76** |

**Table 5.** Cross loadings.

| | Economic Factors | Social Factors | Community Development |
|---|---|---|---|
| ECO_1 | **0.809** | 0.185 | 0.534 |
| ECO_2 | **0.823** | 0.260 | 0.515 |
| ECO_3 | **0.797** | 0.302 | 0.561 |
| ECO_4 | **0.933** | 0.198 | 0.578 |
| ECO_5 | **0.815** | 0.220 | 0.562 |
| ECO_6 | **0.852** | 0.185 | 0.548 |
| ECO_7 | **0.839** | 0.201 | 0.546 |
| ECO_8 | **0.906** | 0.166 | 0.535 |
| ECO_9 | **0.840** | 0.200 | 0.525 |
| ECO_10 | **0.889** | 0.148 | 0.525 |
| SOC_1 | 0.166 | **0.822** | 0.503 |
| SOC_2 | 0.212 | **0.780** | 0.478 |
| SOC_3 | 0.226 | **0.849** | 0.519 |
| SOC_4 | 0.156 | **0.821** | 0.481 |
| SOC_5 | 0.241 | **0.770** | 0.545 |
| SOC_6 | 0.182 | **0.771** | 0.443 |
| SOC_7 | 0.198 | **0.823** | 0.520 |
| SOC_8 | 0.201 | **0.827** | 0.497 |
| SOC_9 | 0.169 | **0.840** | 0.495 |
| SOC_10 | 0.192 | **0.788** | 0.537 |
| SOC_11 | 0.213 | **0.843** | 0.505 |
| SOC_12 | 0.210 | **0.835** | 0.561 |
| COMD_1 | 0.507 | 0.471 | **0.803** |
| COMD_2 | 0.490 | 0.500 | **0.802** |
| COMD_3 | 0.517 | 0.407 | **0.752** |
| COMD_4 | 0.465 | 0.488 | **0.718** |
| COMD_5 | 0.448 | 0.503 | **0.721** |

5.2.2. Assessment of the Inner Structural Model

The next step is the fundamental standard for the measurement of the inner structural model, which comprises the significance of the path coefficient ($\beta$), the coefficient of determination ($R^2$), effect size $f^2$, the predictive relevance ($Q^2$), goodness-of-fit index, and model fit summary. The following sections describe more detailed information for each step.

Significance of the Path Coefficient ($\beta$)

An estimated variation in the latent endogenous variable for a unit variation in the exogenous variable is represented by the path coefficient, which is also called the standardized beta coefficients ($\beta$) of the structural model. The values of $\beta$ of every path in the hypothesized path model were evaluated, and greater $\beta$ value denotes the significant influence on an endogenous variable. In partial least square (PLS) path modeling to define the confidence interval of the path coefficients, the non-parametric bootstrapping technique was applied. Then, to validate the significance of the path coefficients, a *t*-test was used.

From Table 6 and Figure 3, it can be seen that the economic factors have the greater path coefficient in the model, which is 0.518, this shows that it has a higher variance value and high influence relating to achieving the aims of community development in rural regions. The *t*-value of the model is greater than the minimum cut-off value 1.96 at the 5 percent significance level [72]. The p-value of the model is 0.000. Moreover, on the basis of the final findings as revealed in Table 6 and Figure 3, it is found that economic factor and community development ($\beta$ = 0.518, t-value = 12.982, *p*-value = 0.000) was positive and statistically significant; thus, H1 was supported. The findings of SEM analysis support H2, indicating a robust and positive direct relationship between the social factor and community development ($\beta$ = 0.499, t = 12.022, *p* = 0.000). From this calculation, it can be concluded that all the hypothesized paths relationship in the path model were significant and meaningfully verified.

**Table 6.** Path coefficient of the model.

| | **Beta** | **Standard Deviation** | ***t*-Test** | ***p*-Values** |
|---|---|---|---|---|
| Economic Factors -> Community Development | 0.518 | 0.040 | 12.982 | 0.000 |
| Social Factors -> Community Development | 0.499 | 0.041 | 12.022 | 0.000 |

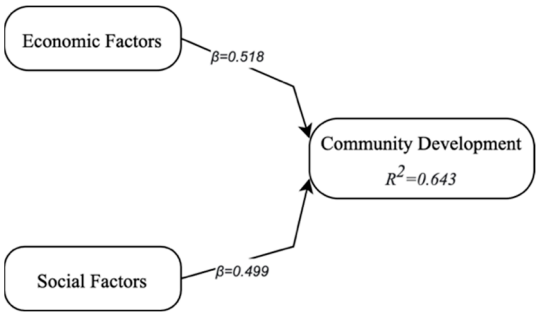


**Figure 3.** Path model of the study.

Coefficient of Determination ($R^2$)

The $R^2$ measures the complete effect size for the structural model and is thus a degree of the model's predictive accuracy. The model shows $R^2$ values of 0.67 (substantial), 0.33 (moderate), and 0.19 (weak). In this study, as from Figure 3, the inner path model is 0.643 for the community development of endogenous latent constructs. This suggests that the two independent constructs, i.e., economic and social factors have a significant 64.3% of the variance in enhancing the community development in the rural regions. The result from

Figure 3 reveals that the suggested model has 63.4% of explanatory power for community development with $R^2$ value equal to 0.634.

Effect Size $f^2$

The $f^2$ is used to evaluate the influence of an individual exogenous latent variable on the endogenous latent variable. To measure the $f^2$ value of each exogenous latent construct in the path model, we calculate the $f$ square value from the calculation. $f^2$ values of 0.35, 0.15, and 0.02 means large, medium, and small effect, respectively. In this study, as from Table 7, the effect size of the $f^2$ value of social-related factors was 0.655, which means substantial impact on the endogenous latent construct, whereas economic-related factors was measured to be 0.706 which also means substantial impact on the community development.

**Table 7.** Effect size $f^2$.

| | **Community Development** |
|---|---|
| Economic factors | 0.706 |
| Social factors | 0.655 |

5.2.3. Model's Predictive Relevance $Q^2$

As represented in Figure 3, $R^2$ value of the model was 0.634, which shows that the conceptual model has satisfactory explanatory significance. It is not a good method to support models based on only $R^2$ values [73]. Therefore, a nonparametric Stone–Geisser's test [74] was applied to ascertain the predictive relevance of the model. By running the blindfolding procedure with an omission distance of seven, generated cross-validated redundancy value for the endogenous latent variable which was above zero, i.e., 0.345, this gives confirmation for the strong model's predictive relevance.

Goodness-of-Fit (GOF) Index

While PLS-SEM do not explain global goodness-of-fit indices of the model, to validate that the model adequately explicates the survey data, we use the GOF index for both models, i.e., outer measurement model and inner structural model, which is introduced by Tenenhaus et al. [75] as the goodness-of-fit index for PLS-SEM. The GOF index is measured by the following equation which is suggested by Tenenhaus et al. [75].

$$\text{Goodness-of-Fit} = \sqrt{\text{Average AVE} \times \text{Average R square}} \quad (1)$$

The cut-off values for GOF index are in between 0 and 1, where 0.1 is small GOF, 0.25 is medium GOF, and 0.36 is large GOF. In this study, the GOF is 0.65, which denotes that the model fits the data totally satisfactorily and has effective predictive power.

Model Fit Summary

Table 8 shows the model fit summary of the conceptual model of this study, and the SRMR is a degree of estimated model fit. It evaluates the differences between the observed correlation matrix and the model-implied correlation matrix. Thus, it permits evaluating the average magnitude of the differences between observed and expected correlations as an absolute measure of (model) fit criterion [76]. The study has a good model fit when SRMR = < 0.08 [77]. According to the threshold, in this study SRMR is 0.069, Chi-Square is 3108.44, NFI is 0.586, and rms-Theta is 0.202, as exhibited in Table 8.

**Table 8.** Model fit summary.

| | Saturated Model | Estimated Model |
|---|---|---|
| SRMR | 0.069 | 0.069 |
| d_ULS | 1.793 | 1.793 |
| d_G1 | 4.54 | 4.54 |
| d_G2 | 4.394 | 4.394 |
| Chi-Square | 3108.44 | 3108.44 |
| NFI | 0.586 | 0.586 |

Latent Variable Correlation

Table 9 shows the correlation coefficient between the latent variables. The coefficient in the "Latent Variable Correlation" Table 9 shows that economic factors have a strong correlation to community development at a higher absolute value of 0.639, whereas social factors have a tied correlation to community development at the greater absolute value of 0.625. Furthermore, Table 9 shows the degree of correlation (0.243) between the social and economic variables.

**Table 9.** Latent variable correlation output.

| | Economic Factors | Social Factors | Community Development |
|---|---|---|---|
| Economic Factors | 1 | 0.243 | 0.639 |
| Social Factors | 0.243 | 1 | 0.625 |
| Community Development | 0.639 | 0.625 | 1 |

Based on the above complete and detailed analysis of the measurement model and structural model, it is determined that both models were confirmed and validated.

## 6. Discussion

The findings of the current study revealed that both proposed hypotheses were robustly sustained, and economic and social factors enhance community development through public projects. Findings of the current study revealed that economic factors ($\beta$ = 0.518, $t$ = 12.982, $p$ = 0.000, H1 accepted) are vital to the attainment of community development. The results are similar to the previous research in the same area, such as Ortiz et al. [78] concluded that improving economic indicators of development are moving into consideration in the construction industry, which creates building sector sustainability and encourages the use of sustainable construction practices. Moreover, the authors inferred that public construction industries should utilize construction rules and policies to enhance community development.

Similarly, Shen et al. [56] found that the construction project's sustainable performance throughout its life cycle is a key feature in triumphing the purpose of community development. The current study findings reveal and provide empirical evidence to the previous studies that suggested economic factors lead to an improvement in community development outcome in rural regions by constructing public projects in the region. Public projects in rural regions are believed to be a vital source of solving community problems. Moreover, infrastructure projects encourage economic welfare, and comfort and facilitate the local civics. An infrastructure project contributes to community development in the long and short term, which can be determined using economic enhancement standards and targets. Better strategies and policies that assist economic growth may be vital in accomplishing community development [45]. Sustainable infrastructure has developed as great functioning qualities which are likely to have better performance for the current local residents and future generations. Hence, this will increase employment opportunities, local income, agriculture production, create many jobs, etc. Moreover, rural infrastructure plays a vital role in community benefit and positively influences the rural economy and enhances community development by building infrastructure projects. Economic factors

are indispensable to the attainment of community development through public projects. An appropriate and sustainable infrastructure project in rural regions is one of the most significant infrastructure features that enhances ease of access to regions and improves rural development. If the construction practitioners consider the economic factors, substantial enhancement would be placed to improve sustainable practices. The findings reveal and provide empirical evidence to the previous studies that suggested economic factors lead to an enhancement in the outcome of community development in rural regions.

Similarly, the findings of the study showed that social factors positively and significantly influence community development ($\beta = 0.499$, $t = 12.022$, $p = 0.000$), that provides support for H2. This finding suggests that the integration of the social factors can directly enhance community development. This finding is similar to the finding of Holden et al. [45] who found that social equity and democratic participation are the important themes of community development. The public project contributes to community development in the long and short term, determined through social development measures. The measures are necessary for an intervention that should be accomplished to achieve a community development criterion [17]. According to the Gannon and Liu [79], infrastructure is a creator of long-term development in the regions of ultimate needs. Generally, the influence on social improvement in the short-term and long-term increases the community development in the region. However, the findings of this study are supported by the views of earlier studies, such as Vuong et al. [80], Sierra et al. [17], Yilmaz et al. [23], and Holden et al. [45]. It was found from this study that social factors have distinctive domains on community development through public projects. The basic aim is to design infrastructure projects that would provide more jobs, proximity to business activities, access to work, improve the standard of livings, ensuring their welfare and security against crimes. Moreover, the study found that social-related factors are supposed to be carried out in construction projects to address social activities so that community development can be enhanced. Therefore, it is suggested that the government should make a set of policies in line with theoretical and practical findings to enhance community development in rural regions.

Moreover, social factors as the vital facet of community development are of significant worth to sustainable rural development, as the on-going growth and progress of rural development. In a related study, Valdes-Vasquez and Klotz [12] equally asserted that if social factors are identified which are more indispensable for the community development, they can be accomplished during the different phases of the infrastructure project because they are more societally oriented.

## 7. Conclusions and Policy Implication

The key contribution of current study was using PLS-SEM to examine the relationship between socio-economic factors and community development in rural regions through public infrastructure projects and to elucidate the causal relationship. Given both significant path coefficients, the hypotheses proposed in this study seem to have been confirmed; that is, the SEM model was established.

The results of this study can support the public construction industries to improve community development in the rural areas by incorporating the vital constructs they need to set their emphasis on the betterment of the rural society and the trustworthiness of the public construction projects. The model manages to incorporate many segments of the industry's administration systems into a distinct management system for enhancing and completing success of the projects accomplished by the industry for community development in rural areas. If economic development is better in the region, investing the economic conditions of the residents accurately and adequately would be better and more sustainable. The model will be adept at accomplishing potential development and needs for the benefit of current and future generations in the rural regions.

The construction industry practitioners tend to agree that the development of infrastructure projects has a positive influence on the region's community development as well as increasing the facilities. Rural residents within the rural areas in Pakistan are strug-

gling with socio-economic encounters and immediately necessary innovative actions are needed to maintain inhabitant needs and primary services. In this research, we examined the critical socio-economic factors that enhance the community development of the rural regions.

### 7.1. Research Implications

The outcomes of the development of SEM in this study will benefit the public construction industries in ascertaining the key areas where socio-economic enhancement is necessary and help the public construction experts to realize the most important enhancing factors, which can be applied as standards for the public construction industry to enhance the community development. The model can be used before the execution of a public project to choose the sustainable alternatives in the rural regions most appropriate to a situation for the benefit of its community development. Accordingly, the results of this study can be a guide for related rural community development research. It provides for ascertaining useful rural socio-economic policies and plans concerning enhancing accessibility, development, productivity, and growth. Furthermore, this study gives a complete and valuable approach to monitoring community development and to support in enhancing the community development in rural regions. Moreover, we revealed that better social and economic conditions enhance the local communities' sustainable life. This study has important implications for policy- and decision-makers. The socio-economic factors that keep showing up as the important factors may draw policymakers' attention to enhance the community development in rural regions. The gap between community and public organizations as well as public authorities could be linked through further interaction. According to the findings and the literature examined in the current study, government construction authorities and practitioners should develop and make suitable strategies for community development that enhance the widespread use of public infrastructure projects and promote better opportunities for the local residents while considering the needs of the local residents.

### 7.2. Future Recommendations

In the future, this research will be extended so that the relations with other socio-economic dimensions can be identified and assessed that enhance community development. More research is needed in other sectors in different industries and in other territories. Moreover, important factors that may most likely guide the analytical and logical strength of the model are supposed to be investigated in future research. Due to restricted means and time limitations, this study used a simple random sampling method; nevertheless, future research can carry out to fulfill this limitation by applying other sampling methods. Moreover, respondents in Pakistan may possibly have different approaches and skills backgrounds compared to that of other countries' respondents. Thus, future studies that expand and sample sufficient numbers of multi-diverse respondents from different countries improve the robustness of the elucidated findings.

### 7.3. Limitations

Although, this study was performed in Pakistan in a specific setting and shed light on several vital matters, some limitations should be taken into consideration. As mentioned above, due to restricted means and time limitations the current study comprises respondents (practitioners) from public construction industry only; because of that a comparative analysis of results with different industries was not possible; thus, it is believed a limitation of the current study. Moreover, the theoretical findings may not be applied to other sectors of projects in different territories.

Another possible limitation of the research is of missing the gender aspects of the respondents and accordingly no inferences provided on it. The role of gender-specific characteristics is of importance to predict the possibilities of social factors. However, in the case of rural Pakistan, where most of the construction and policy experts are men and

thus for the purposes of this paper women are essentially excluded. However, in order to capture this element, further research is needed to capture the gender-specific impacts on the socio-economic factors in the development projects.

### *7.4. Delimitation of the Study*

The study is delimited to a group of public construction practitioners from rural areas. Public practitioners were requested both to participate and respond to a questionnaire survey. The findings were generally attributed to the questionnaire survey, the researchers' personal judgment, and the related personal opinions about community development in rural regions. Therefore, the objective of this study was to propose and describe an effective and logical method for measuring socio-economic dimensions enhancing community development that adequately accounting for the progression of the rural community and trustworthiness of the public construction projects in Pakistan. This study used simple random sampling in which an equal representation of genders who have a clear idea of community development and living in rural areas constituted the respondents of the study. The collected data were analyzed using PLS-SEM technique.

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