

An integrated livelihood resilience framework for informal waste workers in Nepal's circular economy

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Abstract: The role of informal waste workers (IWWs) has been vital in the development of circular economy (CE) systems across urban areas of the Global South. Despite the vital role of IWWs in the recycling process, these workers are vulnerable to socio-economic risks, political exclusion, and psychological aspects. This study will develop and validate the Integrated Livelihood Resilience Framework (ILRF), including political capital and psychological capital as essential factors of livelihood resilience among IWWs. The study will apply the mixed-methods approach, which includes a survey of the IWWs of the Kathmandu Valley, Nepal and qualitative interviews. To analyze the data, the study will use exploratory factor analysis, confirmatory factor analysis, and structural equation modelling. The study contributes a theoretically grounded, empirically testable framework to better understand livelihood resilience and to inform inclusive policies for a just transition toward CE systems.

Keywords: Informal waste workers; Livelihood resilience; Circular economy; Integrated Livelihood Resilience Framework; Informal economy.

Introduction

The problem of rapid urbanisation, population increase, and generation of wastes has worsened the management of wastes in a sustainable manner worldwide [1]. In the cities of the Global South, the role of IWWs in the recycling and resource recovery process is significant. The workforce includes itinerant waste buyers (IWBs), scrap centre workers, rag pickers, and waste labourers in landfills, who collect and trade recyclable materials [2] and play a significant role in the protection of the environment and CE systems.

Despite their important contributions, IWWs often face improper working conditions, including low income, occupational hazards, social stigma, and limited institutional support [3], and are excluded from formal waste management policies and decision-making processes. This creates structural vulnerabilities to waste workers that affect their economic livelihoods and psychological well-being.

Existing livelihood frameworks have been critiqued for their strong emphasis on material assets and livelihood strategies, while giving comparatively limited attention to political processes, power relations, and broader structural factors that shape livelihoods [4]. This study will address this gap by proposing the

development of an ILRF that incorporates both political and psychological capital. It will help to better understand how informal waste workers sustain their livelihoods within emerging CE systems.

Related work

The IWWs collect recyclable materials from households, streets, markets and landfills and help to divert large quantities of waste from disposal sites. Despite these contributions, IWWs often face severe socio-economic challenges, including low and unstable incomes, lack of job security and hazardous working conditions. Many of those workers perform their daily job without personal protective equipment (PPE), and they are exposed to injuries, infections and long-term health risks [5]. In addition, they frequently experience social stigma and discrimination due to the perceived nature of their work. In cities like Kathmandu, the informal waste sector remains an essential but largely invisible component of the urban economy.

SLF is used to assess people's livelihood conditions and evaluate their livelihood-generating activities [6]. This framework identifies five key forms of capital such as natural, human, social, financial and physical. The SLF has been instrumental in analysing livelihood strategies; however, it has been critiqued for its limited focus on power relations, governance structures, and psychological factors that impact livelihood outcomes. The literature, in this case, is mostly descriptive, with limited empirical analysis of the interactions among capitals and their impact on resilience. Resilience is a dynamic process that depends on the mobilisation of diverse resources, thus necessitating broader analytical perspectives [7].

In this regard, political and psychological capital are underexplored concepts. Political capital involves the ability to influence decision-making and access institutional support. According to other theorists, informal workers are key actors in urban economies but are often excluded from governance [8,9]. For IWWs, exclusion from decision-making hampers their ability to access rights and better working conditions. Psychological capital is also another area that is equally significant but underexplored. The discrimination, job insecurity, and power inequalities are negatively related to mental well-being and psychological agency among workers [10]. This underscores the need to extend livelihood concepts to incorporate political and psychological capital.

The following gaps have been identified:

- i. Insufficient theoretical integration of political capital into livelihood frameworks.
- ii. Ignorance of aspects of mental health and psychological well-being.
- iii. Lack of instruments for measuring the psychological and political capital of waste workers.
- iv. Predominance of descriptive research over explanatory model testing.

The key objective of this research study is to develop, validate, and operationalise an Integrated Livelihood Resilience Framework (ILRF) for informal waste workers (IWWs) in the context of circular-economy transitions.

The study will be guided by the following research questions:

- i. What are the key indicators of political capital and psychological capital among informal waste workers in the Kathmandu Valley?
- ii. How do political capital and psychological capital combine to affect livelihood resilience?
- iii. What implications does the validated framework have for designing inclusive circular economic policies?

Key Contribution

This study will contribute to the existing body of knowledge pertaining to IWWs by creating and empirically testing the ILRF, which for the very first time includes the integration of political capital and psychological capital in a model.

Method, Experiments and Results

Research Design

The research design will employ a sequential explanatory mixed-methods design. In phase one, a cross-sectional survey will be conducted with 400 informal waste workers to establish hypothesized relationships. In phase two, in-depth interviews will be conducted with the participants to provide an explanation for the results.

Study Area

The research will focus on the Kathmandu Valley, one of Nepal's largest urban regions. The valley hosts numerous IWWs who play a critical role in recycling and waste recovery.

Sampling

The research will conduct a survey of 400 informal waste workers (IWWs) in the Kathmandu Valley. A stratified purposive sampling approach will be employed to ensure adequate representation of the various occupational groups within the informal waste sector. The sample will include IWWs from key categories such as IWBs, scrap center workers, rag pickers and landfill workers. The proportional allocation method will be employed, and participants will vary in age, gender, and location. The inclusion criteria are: involvement in waste work as primary source of income for ≥ 6 months and age ≥ 18 years.

Data Collection

The data will be collected by using both quantitative and qualitative methods. In the quantitative method, a structured survey questionnaire will be used to measure key constructs in the proposed framework. The questionnaire will focus on evaluating political and psychological capital and livelihood resilience of IWWs. Likert scale items will be used to measure workers' perceptions and experiences. It will help to examine aspects such as political participation, access to institutions and support systems, psychological well-being, livelihood security and overall livelihood stability of workers.

In-depth qualitative interviews will also be conducted with a selected group of participants. The interviews will explore issues such as workers' experiences of discrimination and exclusion, and the strategies they use to cope with economic and social challenges. It will also explore their perceptions of dignity and social recognition, as well as their interactions with municipal authorities and formal waste management institutions.

The structured questionnaire will have five sections:

- A. Socio-demographics – age, gender, education, type of work, income, household size.
- B. Political capital – collective membership, access to institutions, influence in decision-making, rights awareness.
- C. Psychological capital – self-efficacy, hope, resilience, optimism.
- D. Livelihood resilience – income stability, adaptive capacity, access to social support, asset ownership.
- E. Perceptions about circular economy – awareness, inclusion in CE policies.

Data Analysis

The quantitative data will be analyzed using Statistical Product and Service Solutions (SPSS). The data will be analyzed starting with descriptive statistics. This will give a summary of the socio-demographic characteristics of the participants and the general patterns observed. This will be followed by Exploratory Factor Analysis (EFA). This will aid in identifying the basic factor structures and the dimensionality of the scales. Then, Confirmatory Factor Analysis (CFA) will be used to validate the measurement model and confirm the reliability and validity of the constructs used. Also, the relationship between political capital, psychological capital, and livelihood resilience will be analyzed using Structural Equation Modelling (SEM). The qualitative data collected from interviews will be analyzed through thematic analysis with the help of ATLAS.ti tool. In this, the data will be coded, and themes will be identified, thus interpreting the data to understand the mechanisms behind the relationships identified in the quantitative data analysis.

Discussions

The results of this research will validate that both political capital and psychological capital extend the traditional SLF model. The addition of political capital in this model was also in line with earlier recommendations to include power relations in livelihoods studies, while the addition of psychological capital was in recognition of the often neglected mental aspects of IWWs. This research will make an important contribution to CE policy in terms of its implications that CE policies need to address both formalization and workers' representation as well as psychological capital in order to deliver a just transition.

Conclusions

1. Problem Statement – Closes the gap in livelihood research by considering the role of both political and psychological capital, driven by the precarious nature of IWWs in CE systems.
2. Method – Sequential mixed-methods approach with a sample of 400 workers in Kathmandu Valley using a survey and interviews, with factor analysis, SEM, and thematic analysis.
3. Hypotheses – (H1) political capital positively influences livelihood resilience, (H2) psychological capital positively influences livelihood resilience, and (H3) they jointly explain variance beyond traditional assets.
4. Key Findings – Successfully establish the ILRF, with results indicating the significance of political and psychological capital in determining livelihood resilience.
5. Limitations and Future Work – Study's cross-sectional nature and focus on a single city limit the results' generalizability.

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