An empirical study of attitude towards C&DW recycling: Integrating social impression and environmental consciousness with theory of planned behaviour

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Outline

• Introduction
• Literature Review
• Conceptual Framework
• Methodology
• Results
• Discussion
• Conclusion
C&D Waste in India

- India generates over 65 million tons of C&D waste every year (BMTPC, 2016; TIFAC, 2001).
- Lack of formal waste management practices for managing C&DW.
- The traditional practice in India is to dispose of this waste in landfills or illegally dump in rivers and water bodies.

65% from Concrete, 25% bricks and tiles
Composition of C&D Waste in India

C&DW Recycling

• 70% of the construction industry is not aware of recycling techniques (TIFAC, 2001).
• There is a need for quality standards for recycled aggregate materials and recycled aggregate concrete to help setting targets for quality products and assure the user of a minimum quality requirement, thus encouraging him to use it.
• C&D Waste Management Rules 2016 were enacted by MOEF&CC (2016).
• Main emphasis on ‘hard’ factors
• Soft factors like social and behavioural issues are equally important.
Literature Review

Theory of planned behaviour
- Attitude
- Subjective norm
- Perceived behavioural control (Ajzen, 1991; Fishbein and Ajzen, 1975)

Social Impression
- Opinions and values earned by others (Chen and Hung, 2016)
- Social capital could influence citizens towards solid waste management (Jones et al, 2010)

Environmental Consciousness
- Environmental related factors that predicts human behavior (Chen and Hung, 2016; Iyer et al., 2016; Roberts and Bacon, 1997; Schlegelmilch et al., 1996; de Vicente Bittar, 2018).
- Environmental awareness and environmental behaviour profoundly impact solid waste management (Jones et al., 2010; Manowong, 2012)
Conceptual Framework

- Attitude
- Subjective Norm
- Perceived Behavioral Control
- Social Impression
- Environmental Consciousness

H1+, H2+, H3+, H4+, H5+
Methodology (Continued..)

• Questionnaire design
  – Two parts:
    • Qualifying (those who are aware of C&DW management practices); and
    • Main study (close ended questions pertaining to study’s constructs).

• Face Validity, Pre-test and Pilot testing
  – Pretesting with 26 respondents
  – Pretest involving 7 academicians and 5 industry managers
  – Pilot study conducted with 45 respondents
Methodology (Continued..)

• Data collection:
  – Direct and indirect stakeholders of construction projects having knowledge of C&DW management were the target sampling frame for this study.
  – The data was collected from the respondents residing in South Delhi (India) though street intercept survey.
  – 204 valid responses from 240 responses resulting in response rate of 85%.
Methodology (Continued..)

• Statistical tool: Partial Least Squares Structural Equation Modelling
  – Theory building stage
  – PLS-SEM -a variance based approach has been used for examining the measurement and causal models (Hair et al. 2013; Peng and Lai, 2012; Henseler, Ringle, & Sinkovics, 2009)
# Descriptive Statistics

<table>
<thead>
<tr>
<th>Demographics</th>
<th>Matriculation</th>
<th>Diploma</th>
<th>Graduation</th>
<th>Post-graduation</th>
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<tbody>
<tr>
<td>Gender</td>
<td>Male</td>
<td>Female</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Frequency</td>
<td>139</td>
<td>65</td>
<td></td>
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</tr>
<tr>
<td>Percentage</td>
<td>68.14%</td>
<td>31.86%</td>
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<tr>
<td>Age</td>
<td>&lt;30 years</td>
<td>30-35 years</td>
<td>36-40 years</td>
<td>&gt; 40 years</td>
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<tr>
<td>Frequency</td>
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<td>114</td>
<td>56</td>
<td>37</td>
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<tr>
<td>Percentage</td>
<td>8.81%</td>
<td>50.22%</td>
<td>24.67%</td>
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<td>Education</td>
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<tr>
<td>Designation</td>
<td>Manager</td>
<td>Engineer</td>
<td>Supervisor</td>
<td>Resident</td>
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<tr>
<td>Frequency</td>
<td>16</td>
<td>50</td>
<td>50</td>
<td>88</td>
</tr>
<tr>
<td>Percentage</td>
<td>7.84%</td>
<td>24.51%</td>
<td>24.51%</td>
<td>43.14%</td>
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# Validity and Reliability

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<tr>
<th>Construct</th>
<th>Cronbach's Alpha</th>
<th>CR#</th>
<th>AVE</th>
<th>ATT</th>
<th>SN</th>
<th>PBC</th>
<th>SI</th>
<th>EC</th>
<th>BI</th>
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<tbody>
<tr>
<td>ATT</td>
<td>0.799</td>
<td>0.869</td>
<td>0.627</td>
<td>0.792*</td>
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<tr>
<td>SN</td>
<td>0.797</td>
<td>0.866</td>
<td>0.618</td>
<td>0.601</td>
<td>0.786</td>
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<tr>
<td>PBC</td>
<td>0.831</td>
<td>0.887</td>
<td>0.663</td>
<td>0.381</td>
<td>0.320</td>
<td>0.814</td>
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<tr>
<td>SI</td>
<td>0.808</td>
<td>0.873</td>
<td>0.633</td>
<td>0.389</td>
<td>0.383</td>
<td>0.473</td>
<td>0.796</td>
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<tr>
<td>EC</td>
<td>0.854</td>
<td>0.889</td>
<td>0.534</td>
<td>0.630</td>
<td>0.629</td>
<td>0.473</td>
<td>0.470</td>
<td>0.731</td>
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<tr>
<td>BI</td>
<td>0.808</td>
<td>0.874</td>
<td>0.634</td>
<td>0.699</td>
<td>0.534</td>
<td>0.477</td>
<td>0.566</td>
<td>0.673</td>
<td>0.797</td>
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*The off-diagonal values are the correlations between the latent variables, and the diagonal values are the square roots of the average variance extracted (AVE);

#CR: Composite Reliability ATT: Attitude; SN: Subjective norm; PBC: Perceived behavioural control; SI: social impression; EC: Environmental consciousness; BI: Behavioural intention
Conceptual Framework

- Attitude
- Subjective Norm
- Perceived Behavioral Control
- Social Impression
- Environmental Consciousness

H1+, H2+, H3+, H4+, H5+
Results

- Attitude
- Subjective Norm
- Perceived Behavioral Control
- Social Impression
- Environmental Consciousness

Correlations:
- Attitude: 0.387***
- Subjective Norm: 0.087
- Perceived Behavioral Control: 0.206***
- Social Impression: 0.077
- Environmental Consciousness: 0.241***
Discussions & Managerial Implications

• Environmental Consciousness
  – Found to be positively and significantly related with behavioural intentions: In line with previously reported findings
  – If stakeholders have high environmental awareness or are aware about environmental issues related to C&DW, they are more likely to recycle C&DW
  – Information is a public good; Public provision of information becomes important: Role of governments in providing information about environmental impacts of C&DW and potential benefits from recycling C&DW
Discussions & Managerial Implications

• Perceived Behavioural Control (PBC) and Attitude
  – Found to be positively and significantly related with behavioural intentions: In line with previously reported findings
  – PBC linked with people’s perception about ease/unease of a particular behaviour: Actions of individuals influenced by expected outcomes and their expectations of efficacy in achieving those outcomes
  – Attitude: a predictor of PBC
  – Environmental consciousness alone may not help: external and internal factors
  – For firms managing or looking to manage C&DW, PBC and attitude could be two skills that could be assessed for individuals assigned to decision making roles about C&DW
Discussions & Managerial Implications

- Subjective norms (SN) and social impression (SI)
  - Not found to be significantly associated with behavioural intentions: Contrary to previously reported findings (Jones et al., 2010; Manowong, 2012)
  - SN & SI related to societal perceptions, in turn related to societal norms
  - Low awareness about environmental issues, particularly related to C&DW in Indian society: related to low social expectations and low/nil social norms for C&DW recycling
  - Most of other studies have been done in western contexts: societies with high awareness about environmental issues
  - Possible interpretation: in countries that are less developed and have low public environmental awareness, SN and SI will not be significantly related with recycling behavioural intentions.
Discussions & Managerial Implications

• India is a growing economy: New infrastructure development: lots of activity expected in construction and demolition sector
• Our study positioned in the broader context of current Circular Economy, Resource Efficiency, and Sustainability debates in India
• Highlights importance of soft issues and not just hard issues.
Limitations and Future Scope

• This study measures perceptions of behavioural intentions towards C&DW recycling but could not measure actual behaviour.

• The cross-section data comprised stakeholders of North Central Region of India that raises concern on generalizability of the findings to other geographies of India.
Conclusion

• By focusing on the attitudes of stakeholders towards C&DW recycling by integrating social impression and environmental consciousness with the theory of planned behaviour, we aimed to understand the dynamics of C&DW recycling closely.

• Need to adopt an integrated approach improvement to C&DW recycling where soft issues like environmental consciousness are considered equally important as hard infrastructural issues like recycling plants.

• The insights from our paper can also help the private sector understand the significance of various drivers of recycling behaviour.

• These insights can then be used by specific companies to align C&DW recycling with their SDG strategy.
Thank you 😊

Questions & Suggestions Welcome!