ASSESSING CRITICAL FACTORS AFFECTING THE DEVELOPMENT OF A NATIONAL MAINTENANCE POLICY

BABATUNDE F. OGUNBAYO1, CLINTON O. AIGBAVBOA1, DIDIBHUKU W. THWALA2, and OLUSEGUN A. OGUNTONA3

1cidb Centre of Excellence & Sustainable Human Settlement and Construction Research Centre, Faculty of Engineering and the Built Environment, University of Johannesburg, South Africa
2Dept of Civil Engineering, College of Science, Engineering and Technology, University of South Africa (UNISA), Pretoria, South Africa
3Dept of Built Environment, Walter Sisulu University, Butterworth Campus, South Africa

A national maintenance policy is a maintenance strategy that outlines the rules for triggering maintenance actions for buildings and other structures within a country. This study assessed critical factors affecting the development of a national maintenance policy in Nigeria. Through a Delphi survey, the required data for this study was obtained. The Delphi findings indicate twelve (12) factors affecting the development of a national maintenance policy in Nigeria. Among these twelve (12) factors, five (5) had a very high impact (VHI: 9.00-10.00) on the factors affecting the development of a maintenance policy/law in Nigeria, while three (3) of the factors had a high impact (HI: 7.00-8.99) and four (4) other factors scored a medium impact (MI: 5.00-6.99). The study's key finding indicates that the critical factors affecting Nigeria's development of a national maintenance policy were corruption and corrupt practices, lack of clear national maintenance vision, lack of continuity in governance, lack of accurate data of buildings stocks, and inadequate legislation on infrastructure. The study suggested a need for independent authority established by law responsible for implementing maintenance policies or laws. The study concluded that there should be a standalone national maintenance policy or law that will holistically address maintenance-related issues in the country.

Keywords: Governance, Legislation, Building maintenance, Nigeria.

1 INTRODUCTION

Howlett (2009) defined policymaking as the means of creating and implementing mixes of policy instruments required to accomplish policy objectives. Subsequently, Lateef (2010) and Ogunbayo et al. (2021) state that maintenance organisations use maintenance policy to guide their personnel in making decisions on the maintenance of building facilities. Olanrewaju and Abdul-Aziz (2015) posited that maintenance policy guarantees that maintenance resources are used effectively and efficiently. According to Mkilania (2016), proper integration of maintenance planning and scheduling with effective policies will help maintenance organisations achieve their maintenance objectives effectively. Pintelon and Muchiri (2009) noted that maintenance policies outline the rules for triggering maintenance actions. Pintelon and Muchiri (2009) posits that
maintenance policies are essential tactical-level decisions to develop a course of action in maintenance operations.

Developed and developing economies have formulated maintenance policies to maintain the building stocks within their countries (Ogunbayo and Aigbavboa 2019). These countries' national maintenance policies were geared toward the government's direction or action to achieve their national maintenance objectives (Tangkilisan 2003). However, there is poor policy implementation in many developing economies without proper maintenance policy instruments (Tangkilisan 2003). One of the challenges confronting the developing countries' infrastructural maintenance and management was poor and weak maintenance policy (Obamwonyi 2009). Tan et al. (2012) stated that the need for maintenance functions of their public infrastructure increases as their economy grows. Obamwonyi (2009) noted that for developing countries to sustain their national infrastructure, viable maintenance policies backed by legislation are required. Developing countries' gross domestic product (GDP) has been estimated to be between 1.5% and 3.3%, due largely to their infrastructural maintenance needs (Estache and Fay 2007). Sánchez-Silva et al. (2016) observed that problems that cause strain in defining optimal maintenance policy are due to factors such as political, technical, and environmental. Many of the strategic plans for maintenance policy fail because they are designs that are at the end stored at the executive level (Frangopol et al. 2016). Although the government of developing countries formulated maintenance policies to maintain the condition of existing buildings, their development is affected by factors such as insufficient resources allocation, poor maintenance executions, and administrative lapses (Chanter and Swallow 2007).

Afrane and Osei-Tutu (1999) stated that one of the factors affecting the development of national maintenance policy in developing countries in the maintenance of public infrastructure is the non-availability of a standard maintenance policy and lack of clear maintenance vision. Nkrumah et al. (2017) state that lack of political will and national maintenance guidelines affect national policy development in developing countries. Nkrumah et al. (2017) state that developing national maintenance policy in developing countries is further affected by bad governance and lack of accurate data of building stocks. Yinghua et al. (2018) asserted that poor and inadequate feasibility studies in national planning affected maintenance policy development in developing countries. Yinghua et al. (2018) study findings further showed that erratic and conflicting government policy is another problematic factor affecting its development. Simpeh (2018), in his study, affirmed that corrupt and corrupt practice is a challenge affecting the development of national maintenance policy. Wuni et al. (2018) posited that the lack of independent maintenance authority is a problem in developing national maintenance policy. Wuni et al. (2018) also stated that inadequate legislation on infrastructure is another challenge faced in national maintenance policy development.

Similarly, Human (1998) asserts that developing a national maintenance policy in developing countries is affected by alignment to western patterns of maintenance policy development to solve developing countries' maintenance problems. Ugwu et al. (2018) emphasizes that national maintenance development in most African countries is affected by political instability and partial political will on the part of the government. Ugwuanyi (2014) sustained that political instability and lack of continuity in governance in most developing countries are challenges in developing a national maintenance policy. The above review shows that different factors could affect the development of a national maintenance policy in a country, especially in developing countries. Thus, this study aimed to determine critical factors affecting the development of a national maintenance policy in Nigeria toward developing a maintenance strategy to maintain its national assets.
2 METHODOLOGY
The study used the Delphi technique to assess critical factors affecting the development of a national maintenance policy in Nigeria. As noted by Fletcher and Marchildon (2014), the technique in academic research applies to both qualitative and quantitative. It involves using a structured questionnaire in seeking the opinion of experts’ panelists, after which consensus will be built from their responses through rounds of well-structured questionnaires (Fletcher and Marchildon 2014). The Delphi technique is an important tool for obtaining data in qualitative and quantitative studies (Aigbavboa 2013). Hence, this qualitative study utilized and adapted the Delphi process suggested by Aigbavboa 2013.

To achieve the study’s set objective, which was to assess the critical factors affecting the development of a national maintenance policy in Nigeria, relevant literature on the subject matter was first reviewed to identify these critical factors, then used to develop the questionnaire for the study. Secondly, experts were selected to represent a broad spectrum of opinions on the subject under investigation (Loo 2002). Experts for this study were drawn from academia, the construction industry, and government agencies based on their practical and adequate theoretical knowledge of policy formulation on the subject matter (national maintenance policy). In selecting the experts used for the study, non-probability sampling was adopted based on the desirable respondents’ characteristics and the researcher’s knowledge and experience. A total of 12 experts take part in the Delphi survey. The population is adequate based on Tilakasiri (2015) recommendation that 10-15 participants provide adequate coverage in Delphi studies. Using a relative importance index (RII) as recommended by Aigbavboa (2013), consensus on experts’ responses was analysed and determined (See Table 1 below).

Table 1. Consensus scale for this current study.

<table>
<thead>
<tr>
<th>s/n</th>
<th>Consensus</th>
<th>Median (M)</th>
<th>Relative impact index (RII)</th>
<th>Interquartile deviation (IQR)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Strong consensus</td>
<td>9-10</td>
<td>0.80-1.00</td>
<td>≤1</td>
</tr>
<tr>
<td>2</td>
<td>Good consensus</td>
<td>7-8.99</td>
<td>0.60-0.79</td>
<td>≥1, 1≤ 2</td>
</tr>
<tr>
<td>3</td>
<td>Weak consensus</td>
<td>&lt;6.99</td>
<td>&lt;0.59</td>
<td>≥2, 1≤ 3</td>
</tr>
</tbody>
</table>

The Delphi was structured on a 10-points influence scale: where 1-2 signify no influence; 3-4 signify low influence; 5-6 signify medium impact; 7-8 signify high influence, and 9-10 denote very high impact. An appraised statistical view of the experts’ panelist using mean, median, standard deviation, and interquartile deviation was calculated and analysed at the end of the Delphi survey.

3 RESULTS
The Delphi survey in Table 1 below indicates that the panelists validated twelve (12) critical factors identified from existing literature that were perceived to have affected the development of a national maintenance policy in Nigeria. Out of the twelve (12) factors, five (5) of the items had a very high impact (VHI: 9.00-10.00) which are ‘corruption and corrupt practice’, ‘lack of clear national maintenance vision’, ‘lack of continuity in governance’, ‘lack of accurate data of buildings stocks’, and ‘inadequate legislation on infrastructure’, while three (3) of the factors had a high impact (HI: 7.00-8.99) which are: ‘lack of political will’, ‘erratic and conflicting government policy’, and ‘alignment to western patterns and notion of maintenance policy development’, whereas four (4) other factors were scored as having a medium (MI: 5.00-6.99)
which are ‘lack of independent maintenance authority’, ‘bad governance’, ‘political instability’, and ‘poor and inadequate feasibility studies in national planning’.

Table 2. Critical factors affecting the development of a national maintenance policy Nigeria.

<table>
<thead>
<tr>
<th>Sub-attributes</th>
<th>Median (M)</th>
<th>Mean (x̅)</th>
<th>Standard deviation (σx)</th>
<th>Interquartile deviation (IQD)</th>
<th>Mean scores ranking (R)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lack of clear national maintenance vision</td>
<td>9</td>
<td>8.73</td>
<td>0.77</td>
<td>1.00</td>
<td>2</td>
</tr>
<tr>
<td>Corruption and corrupt practice</td>
<td>9</td>
<td>8.87</td>
<td>1.15</td>
<td>0.00</td>
<td>1</td>
</tr>
<tr>
<td>Lack of political will</td>
<td>8</td>
<td>8.28</td>
<td>1.12</td>
<td>1.00</td>
<td>6</td>
</tr>
<tr>
<td>Lack of accurate data of buildings stocks</td>
<td>8</td>
<td>8.33</td>
<td>1.01</td>
<td>0.50</td>
<td>4</td>
</tr>
<tr>
<td>Bad governance</td>
<td>6</td>
<td>6.58</td>
<td>1.60</td>
<td>2.08</td>
<td>10</td>
</tr>
<tr>
<td>Poor and inadequate feasibility studies in national planning</td>
<td>6</td>
<td>6.31</td>
<td>1.30</td>
<td>3.00</td>
<td>12</td>
</tr>
<tr>
<td>Erratic and conflicting government policy</td>
<td>8</td>
<td>8.27</td>
<td>0.44</td>
<td>0.50</td>
<td>7</td>
</tr>
<tr>
<td>Alignment to western patterns and notion of maintenance policy development</td>
<td>9</td>
<td>8.24</td>
<td>1.24</td>
<td>1.00</td>
<td>8</td>
</tr>
<tr>
<td>Lack of independent maintenance authority</td>
<td>6</td>
<td>6.79</td>
<td>1.82</td>
<td>3.00</td>
<td>9</td>
</tr>
<tr>
<td>Inadequate legislation on infrastructure</td>
<td>9</td>
<td>8.31</td>
<td>1.58</td>
<td>1.00</td>
<td>5</td>
</tr>
<tr>
<td>Political instability</td>
<td>6</td>
<td>6.52</td>
<td>1.60</td>
<td>2.08</td>
<td>11</td>
</tr>
<tr>
<td>Lack of continuity in governance</td>
<td>9</td>
<td>8.63</td>
<td>1.04</td>
<td>1.00</td>
<td>3</td>
</tr>
</tbody>
</table>

4 DISCUSSION OF FINDINGS

The study aims to assess critical factors affecting the development of a national maintenance policy in Nigeria. Twelve factors were identified through the review of relevant literature. Among the twelve (12) factors, five (5) factors have a very high impact with a median score range (VHI: 9.00-10.00), whereas three (3) factors have a high impact (HI: 7.00-8.99) and four (4) other factors recorded a medium impact (MI: 5.00-6.99). Even though the level of consensus varied among the factors, the IQD scores respectively showed consensus, with the IQD being ≤1 for eight (8) factors. Likewise, the factors respective standard deviation (σx) indicates consistency in the experts’ responses as their respective σx scores were at most one (1).

Out of the twelve (12) factors, five (5) factors that recorded (VHI: 9.00-10.00) were ‘Corruption and corrupt practice,’ with mean (x̅) value of (+8.87) ranked first, ‘lack of clear national maintenance vision’ with x̅ value of (+8.73) ranked second, ‘lack of continuity in governance’ with x̅ value of (+8.63) ranked third, ‘lack of accurate data of buildings stocks’ with x̅ value of (+8.33) ranked fourth and ‘inadequate legislation on infrastructure’ with x̅ value of (+8.31) ranked fifth in the critical factors affecting the development of a national maintenance policy Nigeria. The finding is in-line with the studies of Afrane and Osei-Tutu (1999), Agyemang-Yeboah and Boafo (2017), Nkrumah et al. (2017), and Simpeh (2018).

Similarly, three (3) factors that scored (HI: 7.00-8.99) were ‘lack of political will,’ with x̅ value of (+8.28) ranked six, ‘erratic and conflicting government policy’ with x̅ value of (+8.27) ranked seventh, and alignment to western patterns and the notion of maintenance policy development’ with x̅ value of (+8.24) ranked eighth. This finding is consistent with the studies of Human (1998), Yinghua et al. (2018), and Ugwu et al. (2018). Moreover, the remaining four (4) factors also recorded good consensus, with scores ranging from 1.10 to 2.00. While the standard
deviation for their respective values indicates inconsistency and variability in experts’ responses as their respective $\sigma$ values were $> 1$.

The four (4) factors with a medium influence score (MI: 5.00-6.99) were ‘lack of independent maintenance authority’ with $\bar{x}$ value of (+6.79) ranked ninth, ‘bad governance’ with $\bar{x}$ value of (+6.58) ranked tenth, ‘political instability’ with $\bar{x}$ value of (+6.52) ranked eleventh, and ‘poor and inadequate feasibility studies in national planning’ with $\bar{x}$ value of (+6.52) ranked twelfth. The finding agrees with the study of Nkrumah et al. (2017), Wuni et al. (2018), Ugwu et al. (2018), and Yinghua et al. (2018). It is pertinent to note that, although all the four (4) factors recorded good consensus with a medium score (MI: 5.00-6.99), nevertheless, the four (4) factors have a weak consensus among the expert panelists as they all have a medium value that is $\leq 6.99$, and IQD $\geq 2$, $1 \leq 3$. Hence, these four (4) factors were not part of critical factors affecting the development of a national maintenance policy in Nigeria.

5 CONCLUSIONS

This study was carried to assess critical factors affecting the development of a national maintenance policy in Nigeria. The expert panelists assessed a total of twelve (12) factors that were perceived to have been affecting the development of a national maintenance policy. Out of all factors assessed, the study's findings showed that eight (8) factors critically affected the development of a national policy in Nigeria. The study's key finding indicates that the critical factors affecting Nigeria's development of a national maintenance policy were ‘Corruption and corrupt practice’, ‘lack of clear national maintenance vision,’ ‘lack of continuity in governance,’ ‘lack of accurate data of buildings stocks,’ and ‘inadequate legislation on infrastructure,’ ‘lack of political will,’ ‘erratic and conflicting government policy,’ and alignment to western patterns and notion of maintenance policy development. Moreover, these factors were coherent with earlier studies and some national contexts of both developed and developing countries on factors affecting the development of a national maintenance policy. The study suggested a need for independent authority established by law that will be responsible for implementing maintenance policies or laws. The study concluded that there should be a standalone national maintenance policy or law that will holistically address maintenance-related issues in the country.

References


