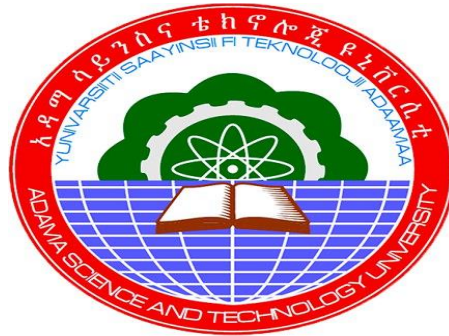


***Flooring Finishing Materials selection criteria in Addis Ababa
Building project using multi-criteria decision- Model***



Duresa Husen Mude

A Thesis Submitted to

Department of Civil Engineering

College of Civil Engineering and Architecture

***Presented in Partial Fulfillment of the Requirement for the
Degree of Master's in Construction Engineering Management
(Specialization in)***

Office of Graduates Studies

Adama Science and Technology University

MAY 2025

Adama, Ethiopia

**Title Flooring Finishing Materials selection criteria in Addis
Ababa Building project using multi-criteria decision- Model**

Duresa Husen Mude

Advisor Bahiru Bewket, PhD

Department of Civil Engineering

College of Civil Engineering and Architecture

*Presented in Partial Fulfillment of the Requirement for the Degree
of Master's in Construction Engineering Management*

(Specialization in)

Office of Graduates Studies

Adama Science and Technology University

MAY 2025

Adama, Ethiopia

DECLARATION

I hereby declare that this Master thesis entitled “**Flooring Finishing Materials selection criteria in Addis Ababa Building project using multi-criteria decision- Model**” is my own Original work. That is, it has not been submitted for the award of any academic degree, diploma or certificate in any other university. All sources of materials that are used for this thesis have been duly acknowledge through citation.

Duresa Husen

Name of student

Signature

Date

RECOMMENDATION

I/we, the advisor(s) of this thesis, hereby certify that I/we have read the revised version of the thesis entitled **“Flooring Finishing Materials selection criteria in Addis Ababa Building project using multi-criteria decision- Model”** prepared under my/our guidance by Duresa Husen Mude submitted in Partial Fulfillment of the Requirement for the Degree of Master’s of Science in Construction Engineering Management. Therefore, I/we recommend the submission of revised version of the thesis to the department following the applicable procedures.

Bahiru Bewket, PhD

Major Advisor

Signature

Date

Co- Advisor

Signature

Date

APPROVAL PAGE FOR THESIS

I/we, the advisor(s) of this thesis entitled **“Flooring Finishing Materials selection criteria in Addis Ababa Building project using multi-criteria decision- Model”** developed by Duresa Husen Mude hereby certify that the recommendation and suggestion made by the board of examiners are appropriately incorporated into the final version of the thesis.

<u>Bahiru Bewket, PhD</u>	_____	_____
Major Advisor	Signature	Date
_____	_____	_____
Co- Advisor	Signature	Date

We, the undersign, members of the board of examiners of the thesis by Duresa Husen Mude have read and evaluated the thesis entitled **“Flooring Finishing Materials selection criteria in Addis Ababa Building project using multi-criteria decision- Model”** and examined the candidate during open defense. This is, therefore, to certify that the thesis is accepted for Partial Fulfillment of the Requirement for the Degree of Master’s of Science in Construction Engineering Management

_____	_____	_____
Chairperson	Signature	Date
_____	_____	_____
Internal Examiner	Signature	Date
_____	_____	_____
External Examiner	Signature	Date

Final approval and acceptance of the thesis is contingent upon submission of its final copy to the office of Postgraduate Studies (OPGS) through the Department Graduate Council (DGC) and School Graduate Committee (SGC)

_____	_____	_____
Department head	Signature	Date
_____	_____	_____
School Dean	Signature	Date
_____	_____	_____
Office of Postgraduate Studies, Dean	Signature	Date

ACKNOWLEDGEMENT

First and foremost, I thank Almighty God for His guidance, strength, and endless blessings throughout my life. I am deeply grateful to my beloved family for their unconditional love, constant encouragement, and unwavering support, which have been a source of strength and inspiration. I also sincerely thank my academic advisors for their invaluable guidance, insightful feedback, and continuous support, all of which have played a key role in shaping this work.

ABSTRACT

In rapid-growing construction sector of Addis Ababa, the selection of appropriate flooring finishing materials is a key decision that significantly affects the quality, durability, and cost-efficiency of building projects. Despite its importance, the selection process challenged by a lack of structured evaluation methods, leading to decisions based on limited information or subjective preferences. This study aims to address this gap by identifying the key criteria influencing flooring material selection and applying a quantitative, data-driven approach to prioritize these criteria using the Analytic Hierarchy Process (AHP). The objectives of this research were four part: to assess current practices in flooring material selection within Addis Ababa, to identify and structure the main selection criteria, to apply the AHP model to rank the criteria and flooring alternatives based on expert judgment, and to develop a data-supported decision-making framework that construction professionals can apply in similar contexts. The study conducted on a sample of 18 high-rise buildings (14 commercial buildings above G+10 and 4 public buildings above G+6), using purposive sampling techniques 18 building selected for this study. Data collected through structured questionnaires targeting professionals who assigned on the selection process of flooring materials such as engineers, architects, and project managers. The AHP model applied to analyze six major dimensions of material selection: economic, technical, aesthetic, functional, environmental, and stakeholder preference. These were further broken down into 15 specific sub-criteria. Nine commonly used flooring materials in Addis Ababa evaluated, including rubber flooring, wood flooring, engineered wood, vinyl, terrazzo, porcelain/ceramic tiles, concrete-based flooring, natural stone, and epoxy. The results showed that Porcelain/Ceramic Tiles were ranked highest in overall priority (16.76%), followed by Concrete-Based Flooring (15.91%) and Natural Stone Flooring (12.19%). Among the criteria, Initial Cost (14.8%), Maintenance Cost (10.37%), and Durability (8.8%) found to have the greatest influence on material choice. The findings of this study contribute to improving the decision-making process in flooring material selection by offering a transparent, replicable, and objective framework rooted in empirical data. The proposed model can support construction professionals in Addis Ababa in making more efficient and rational choices, ultimately enhancing project outcomes in terms of cost, performance, and material suitability.

Keywords: Analytic Hierarchy Process (AHP); Multi-Criteria Decision-Making (MCDM) Selection Criteria; Alternative Flooring Finishing Materials; Selection Framework

TABLE OF CONTENT

DECLARATION	III
RECOMMENDATION	IV
APPROVAL PAGE FOR THESIS.....	V
ACKNOWLEDGEMENT	VI
ABSTRACT.....	VII
LIST OF TABLE	XII
LIST OF FIGURE.....	XIII
ACRONYMS.....	XIV
CHAPTER ONE	- 1 -
INTRODUCTION	- 1 -
1.1. Background	- 1 -
1.2. Problem Statement	- 3 -
1.3. Research Objectives.....	- 4 -
1.3.1. General Objective	- 4 -
1.3.2. Specific Objectives	- 4 -
1.4. Research Question	- 4 -
1.5. Significance of the Study	- 5 -
1.6. Scope of the Study	- 6 -
1.7. Study Variables.....	- 7 -
1.7.1. Dependent Variable.....	- 7 -
1.7.2. Independent Variables.....	- 7 -
1.7.2. Control Variables	- 8 -
CHAPTER TWO	- 9 -
LITERATURE REVIEW	- 9 -
2.1. Introduction.....	- 9 -
2.2. Importance of Flooring Material selection.....	- 9 -
2.3. Criteria for Flooring Material selection	- 9 -
2.3.1. Economic Factors.....	- 10 -
2.3.2. Technical Factors	- 10 -
2.3.3. Aesthetic Factors.....	- 11 -
2.3.4. Environmental Factors	- 11 -
2.3.5. Functional Factors.....	- 12 -
2.3.6. Stakeholder Preferences.....	- 12 -
2.4. Flooring Material Alternatives.....	- 13 -
2.4.1. Porcelain and Ceramic Tiles	- 14 -

2.4.2. Natural Stone Flooring (Marble and Granite).....	- 14 -
2.4. 3. Concrete-Based Flooring (Polished, Colored, Micro cement).....	- 14 -
2.4. 4. Wood Flooring (Hardwood).....	- 14 -
2.4.5. Engineered Wood Flooring (Laminate & Wood-Plastic Composite - WPC)	- 15 -
2.4.6. Vinyl Flooring (Luxury Vinyl Tiles - LVT & Vinyl Composite Tiles - VCT)	- 15 -
2.4.7. Rubber Flooring (Including Recycled Rubber).....	- 15 -
2.4.8. Terrazzo Flooring.....	- 16 -
2.4.9. Epoxy Flooring	- 16 -
2.5. Multi-Criteria Decision-Making Models	- 16 -
2.5.1. Overview of MCDM Methods in Construction	- 16 -
2.5.2. Role of MCDM in Construction Decision-Making	- 17 -
2.5.3. MCDM in Flooring Material Selection.....	- 18 -
2.6. Application of AHP in Flooring Material selection.....	- 19 -
2.7. Challenges in Flooring Material selection in Addis Ababa	- 20 -
2.8. Research Gaps and Future Directions	- 21 -
CHAPTER THREE	- 25 -
METHODOLOGY	- 25 -
3.1. Introduction.....	- 25 -
3.2. Research study area.....	- 25 -
3.3. Research Design and Approach	- 25 -
3.3.1. Research Design.....	- 25 -
3.3.2. Research Approach	- 26 -
3.4. Population and Sampling	- 26 -
3.4.1. Population	- 26 -
3.4.2. Sampling Technique	- 27 -
3.4.3. Sample Size and Composition	- 27 -
3.4.4. Sampling Procedure	- 28 -
3.5. Variables and Operational Definitions.....	- 28 -
3.5.1. Dependent Variable.....	- 29 -
3.5.2. Independent Variables.....	- 29 -
3.5.3. Control Variables	- 30 -
3.6. Data Collection Methods and Tools.....	- 31 -
3.6.1. Data Collection Methods	- 31 -
3.6.2. Data Collection Tools	- 33 -
3.7. Data Collection Procedures.....	- 34 -
3.8. Identification of Evaluation Criteria	- 35 -

3.9. Identification of Flooring Material Alternatives	- 36 -
3.10. Data Analysis Techniques.....	- 37 -
3.10.1. Bases for selecting AHP	- 37 -
3.10.2. AHP Analysis Process	- 38 -
3.10.3. Tools Used	- 46 -
3.11. Validity and Reliability of Instruments.....	- 46 -
3.11.1. Validity	- 46 -
3.11.2. Reliability of the Research Instrument.....	- 47 -
3.12. Research Ethics.....	- 48 -
CHAPTER FOUR.....	- 50 -
DATA ANALYSIS & DISCUSSION	- 50 -
4.1. Introduction.....	- 50 -
4.2. Overall survey response level rate	- 51 -
4.3. Respondent Profile.....	- 52 -
4.3.1. Respondents' education level.....	- 52 -
4.3.2. Respondents total experience in the construction industry	- 53 -
4.4. Questionnaire data reliability and Consistency.....	- 53 -
4.5. Current Practices in Flooring Finishing Material Selection.....	- 55 -
4.5.1. Selection Criteria Used in Practice	- 55 -
4.5.2. Current Decision-Making Practices	- 57 -
4.5.3. Discussion of Findings.....	- 57 -
4.6. Determination of Criteria Priority Weights Using AHP	- 58 -
4.6.2. Discussion and Interpretation of Criteria Weights.....	- 61 -
4.7. Determination of Alternative Priority Weights under Each Criterion	- 63 -
4.7.1. Alternatives under Initial Cost criterion.....	- 64 -
4.7.2. Determination of Alternative Priority Weights under Maintenance Cost.....	- 65 -
4.7.3. Determination of Alternative Priority Weights under Installation Cost.....	- 67 -
4.7.4. Determination of Alternative Priority Weights under Durability	- 68 -
4.7.5. Determination of Alternative Priority Weights under Resistance to External Factors ..	- 70 -
4.7.6. Determination of Alternative Priority Weights under Ease of Installation	- 71 -
4.7.7. Determination of Alternative Priority Weights under Appearance.....	- 73 -
4.7.8. Determination of Alternative Priority Weights under Design Compatibility	- 74 -
4.7.9. Determination of Alternative Priority Weights under Sustainability	- 76 -
4.7.10. Determination of Alternative Priority Weights under Recyclability	- 77 -
4.7.11. Determination of Alternative Priority Weights under Environmental Impact	- 79 -
4.7.12. Determination of Alternative Priority Weights under Comfort	- 80 -

4.7.13. Determination of Alternative Priority Weights under Safety.....	- 82 -
4.7.14. Determination of Alternative Priority Weights under User Preference	- 83 -
4.7.15. Determination of Alternative Priority Weights under Local Availability.....	- 85 -
4.8. Overall Priority Calculation of Flooring Alternatives Based on weighted criteria.....	- 86 -
4.8.1. Discussion and Interpretation: Overall Priority Calculation	- 89 -
4.9. Decision Support Framework for Flooring Material Selection.....	- 90 -
4.9.1. Introduction.....	- 90 -
4.9.2. Framework Objective and Scope	- 90 -
4.9.3. Structure of the Decision Support Framework.....	- 90 -
4.9.4. Application Workflow	- 91 -
4.9.5. Performance Results and Rankings.....	- 92 -
4.9.6. Visual Framework Model	- 93 -
4.9.7. Excel-Based Tool Implementation and User Guide.....	- 93 -
4.9.8. Summary	- 94 -
Case Study: Flooring Material Selection for Addis Tower Commercial Complex	- 95 -
CHAPTER FIVE	- 100 -
CONCLUSION AND RECOMMENDATION	- 100 -
5.1. Conclusion	- 100 -
5.2. Recommendation	- 101 -
Limitations and Future Research Directions.....	- 103 -
REFERENCES	- 105 -
APPENDICES	- 109 -

LIST OF TABLE

Table 2.1. Identified Research Gaps from literature and Coverage in This Study	- 23 -
Table 2.2. Source of research gap from Literature review	- 24 -
Table 3.1 sample composition by building type	- 28 -
Table 3.2 Operationalization of Independent Variables	- 30 -
Table 3.3 Kobo Toolbox's Data Collection Process	- 34 -
Table 3.4. Saaty scale	- 40 -
Table 3.5 Random index value	- 42 -
Table 4.1 Consistency Ratio of criteria and alternative for each criterion pairwise comparison.....	- 55 -
Table 4.2: Criteria for Flooring Material Selection and Their Priority Weights.....	- 56 -
Table 4.3: Final Priority Weights of Criteria for Flooring Material Selection	- 59 -
Table 4.4 Main Criteria Priority Weights	- 60 -
Table 4.5 Final Priority Weights of Alternatives under Initial Cost Criterion.....	- 64 -
Table 4.6 Final Priority Weights of Alternatives under Maintenance Cost Criterion.....	- 66 -
Table 4.7 Final Priority Weights of Alternatives under Installation cost Criterion	- 68 -
Table 4.8 Final Priority Weights of Alternatives under Durability Criterion	- 69 -
Table 4.9 Final Priority Weights of Alternatives under Resistance to External Factors Criterion ..	- 70 -
Table 4.10 Final Priority Weights of Alternatives under Ease of Installation Criterion.....	- 72 -
Table 4.11 Final Priority Weights of Alternatives under Appearance Criterion	- 73 -
Table 4.12. Final Priority Weights of Alternatives under Design Compatibility Criterion	- 75 -
Table 4.13. Final Priority Weights of Alternatives under Sustainability Criterion.....	- 76 -
Table 4.14. Final Priority Weights of Alternatives under Recyclability Criterion	- 78 -
Table 4.15. Final Priority Weights of Alternatives under Environmental Impact Criterion.....	- 79 -
Table 4.16. Final Priority Weights of Alternatives under Comfort Criterion	- 81 -
Table 4.17 Final Priority Weights of Alternatives under Safety Criterion	- 82 -
Table 4.18 Final Priority Weights of Alternatives User Preference Criterion	- 84 -
Table 4.19. Final Priority Weights of Alternatives Local Availability Criterion	- 85 -
Table 4.20 overall score calculation or global priority	- 87 -
Table 4.21 Overall Rank of Alternatives	- 88 -

LIST OF FIGURE

Figure 2.1. Criteria Hierarchy	- 13 -
Figure 3.1. Conceptual framework	- 31 -
Figure 3.2 AHP Criteria hierarchy diagram.....	- 39 -
Figure 3.2 data analysis techniques step	- 46 -
Figure 4.1 Questionnaire survey response level	- 52 -
Figure 4.2: Respondents level of education	- 52 -
Figure 4.3: Respondents experience years.....	- 53 -
Figure 4.4 Final Priority Weights of Criteria for Flooring Material Selection	- 59 -
Figure 4.5 Main Criteria Priority Weights	- 61 -
Figure 4.6. Final Priority Weights of Alternatives under Initial Cost Criterion	- 64 -
Figure 4.7. Final Priority Weights of Alternatives under Maintenance Cost Criterion	- 66 -
Figure 4.8. Final Priority Weights of Alternatives under Installation cost Criterion.....	- 68 -
Figure 4.9. Final Priority Weights of Alternatives under Durability Criterion.....	- 69 -
Figure 4.10. Final Priority Weights of Alternatives under Resistance to External Factors	- 71 -
Figure 4.11 Final Priority Weights of Alternatives under Ease of Installation Criterion	- 72 -
Figure 4.12 Final Priority Weights of Alternatives under Appearance Criterion	- 74 -
Figure 4.13 Final Priority Weights of Alternatives under Design Compatibility Criterion.....	- 75 -
Figure 4.14 Final Priority Weights of Alternatives under Sustainability Criterion	- 77 -
Figure 4.15. Final Priority Weights of Alternatives under Recyclability Criterion.....	- 78 -
Figure 4.16. Final Priority Weights of Alternatives under Environmental Impact.....	- 80 -
Figure 4.17. Final Priority Weights of Alternatives under Comfort Criterion.....	- 81 -
Figure 4.18. Final Priority Weights of Alternatives under Safety Criterion	- 83 -
Figure 4.19. Final Priority Weights of Alternatives User Preference Criterion.....	- 84 -
Figure 4.20. Final Priority Weights of Alternatives Local Availability Criterion	- 86 -
Figure 4.21. Overall Rank of Alternatives	- 88 -

ACRONYMS

AHP - Analytic Hierarchy Process

MCDM - Multi-Criteria Decision-Making

LEED - Leadership in Energy and Environmental Design

BREEAM - Building Research Establishment Environmental Assessment Method

LCA - Life Cycle Assessment

EPD - Environmental Product Declarations

BIM - Building Information Modeling

CR - Consistency Ratio

TOPSIS - Technique for Order of Preference by Similarity to Ideal Solute

CHAPTER ONE

INTRODUCTION

1.1. Background

The construction industry in Addis Ababa, Ethiopia is growing fast due to urbanization and a rising need for infrastructure and housing developments. Consequently, the city is undergoing a transformation that is marked by high-rise commercial, public, and residential buildings. The construction sector not only contributes to economic development but also play an important role in providing the city is urban housing and service requirements.

In this case, the selection of building materials is a significant driver of construction quality, cost-effectiveness, and environmental performance. Building materials affect strength, durability, energy efficiency, and environmental footprint buildings. Higher levels of urban construction sophistication require products that meet several demands technical, economic, environmental, and functional at once. Floor materials, on the other hand, are essential considerations that determine user safety, comfort, and aesthetic appeal and long-term maintenance requirements. In multi-story buildings, the performance of floor structures is particularly critical owing to load distribution, fire resistance, sound insulation, and cleanliness. (Ashby M. , 2013)

Flooring is a fundamental aspect of building construction that serves structural and functional purposes. It provides a firm, durable surface to bear occupants and furniture, in addition to enhancing the building's comfort, Aesthetic, and safety. In modern construction, especially in high-rise commercial and public structures, floor selection directly associated with load-carrying capacity, sound and thermal performance, ease of maintenance, and resistance to wear and environmental condition. With the development of technology in building construction, the quality of flooring systems and materials has enhanced, providing designer and developers with an extensive selection suitable for particular building requirements. Familiarization with the floor use pattern in building construction will ease the process of making right decisions suitable for both performance expectations and users' requirements (Allen, 2019)

Material selection is not simple. There are several possibilities. They have their advantages and tradeoffs. Classic decision-making pays a great deal of attention to cost and availability. Key considerations like durability, external resistance factors, ease of installation, design

compatibility, and environmentally impact usually neglected. Akinlabi, (2025). These cost-driven decisions might seem reasonable at first. Ultimately, increase operational costs and Structural failures. Environmental consequences that endure for decades. Contemporary techniques of construction are developing. They encourage multi-dimensional decision-support frameworks. The frameworks take into account economic, technical, environmental, and functional considerations; Comfort, Safety, User preference, and Local availability all these are important (Wu, 2011).

This trend aside, Ethiopia lags behind. Especially in urban centers like Addis Ababa. Comprehensive material selection frameworks are rarely applied. Research concentrates on conventional practices. They neglect multi-criteria decision-making (MCDM) methods. This leads to suboptimal decisions. Increased costs. Lower sustainability. Low-performing buildings, when they should not. Addis Ababa faces special challenges. Limited availability of local materials. Volatile prices. An urgent need for sustainable building practices. Without systematic evaluation frameworks, these challenges will not vanish (Woldetensay, 2016).

This research aims to address this gap by developing a structured, multi-criteria decision-making framework for selecting flooring materials in high-rise buildings in Addis Ababa. Using the Analytic Hierarchy Process (AHP), a widely recognized MCDM method, the study will systematically evaluate various selection criteria, including initial cost, maintenance and installation cost, durability, resistance to external factors, ease of installation, design compatibility, sustainability, recyclability, environmental impact, comfort, safety, user preference, and local availability. The expected outcome is a robust supporting framework that enables construction professionals to make informed, evidence-based decisions, enhancing the efficiency and sustainability of construction projects in Addis Ababa. This framework will also serve as a replicable model for other developing regions facing similar challenges, contributing to the broader discourse on sustainable construction practices.

1.2. Problem Statement

The construction industry in Addis Ababa, Ethiopia, is undergoing rapid growth due to increased urbanization and rising demand for infrastructure and housing. Despite this expansion, decision-making regarding the selection of flooring finishing materials remains largely informal, subjective, and unstructured. Typically, decisions based on a few visible factors such as initial cost and local availability, while critical performance-related criteria such as durability, lifecycle cost, sustainability, safety, and aesthetic compatibility frequently overlooked. This inadequate approach to material selection leads to several negative project outcomes, including higher long-term maintenance costs, reduced user satisfaction, and environmental inefficiencies. Ultimately, the absence of a holistic material evaluation framework undermines the functional, economic, and environmental performance of buildings over their lifecycle (Kiflu, 2022).

Several studies have highlighted the complexity and multi-dimensional nature of flooring material selection. For instance, (Ashby M. F., 2005) (Cabeza, 2014) emphasize the importance of considering multiple factors technical, environmental, economic, and aesthetic in material decisions. Yet, in the Ethiopian context, and specifically in Addis Ababa, there is limited localized research and decision-support frameworks that guide practitioners in balancing these diverse criteria. This gap contributes to uninformed decisions that are often driven by conventional practices, short-term cost savings, and limited technical awareness.

Furthermore, Addis Ababa presents unique challenges, including fluctuating material prices, limited access to sustainable flooring options, and a scarcity of trained professionals in materials evaluation. These issues compounded by the lack of systematic tools that enable stakeholders to evaluate and prioritize flooring alternatives based on multiple interrelated criteria.

Globally, Multi-Criteria Decision-Making (MCDM) methods particularly the Analytic Hierarchy Process (AHP) developed by Saaty (1990) have successfully applied in material selection contexts. AHP helps decision-makers structure complex problems, compare alternatives based on both qualitative and quantitative criteria, and derive priority rankings that reflect stakeholder values. However, its application in the flooring material selection process in Addis Ababa remains underexplored.

Given the rapid urban development of the city, there is an urgent need for a structured and context-specific decision-making framework that integrates the diverse criteria relevant to flooring materials. This research addresses that need by proposing an AHP-based model tailored to Addis Ababa's construction industry, with the goal of supporting more balanced, informed, and sustainable material selection decisions that align with both local challenges and global best practices.

1.3. Research Objectives

1.3.1. General Objective

The General objective of this research is to develop a decision-support framework for the selection of flooring finishing materials in building projects in Addis Ababa, utilizing a Multi-Criteria Decision-Making (MCDM) model.

1.3.2. Specific Objectives

The specific objectives of this study are as follows:

1. To examine the current practices for selecting flooring finishing materials in building projects in Addis Ababa.
2. To apply the Analytical Hierarchy Process (AHP) model to prioritize criteria based on expert judgment and real-world data.
3. To develop and validate decision-support using stakeholder inputs.

1.4. Research Question

This research on a study of Flooring Finishing Materials selection criteria in Addis Ababa Building project using multi-criteria decision- Model Aims to Address the Following Specific Research Questions.

- i. What are the current practices and trends in selecting floor-finishing materials in Addis Ababa building projects?
- ii. What are the most important criteria influencing the selection of floor finishing materials in Addis Ababa building projects?
- iii. How AHP model applied to prioritize floor finishing material selection criteria using expert input and real-world data?

1.5. Significance of the Study

The use of suitable construction materials is a critical element of construction work since it has profound impacts on their quality, cost, sustainability, and overall performance. In Addis Ababa, given the development of cities at a fast pace and increasing needs for efficient, affordable, and sustainable construction procedures, it has become highly essential to utilize a scientific and trustworthy material selection method. However, the lack of standardized criteria and decision-making tools has a tendency to create poor material selection, which detracts from the project outcome, the cost of construction, and the overall city environment.

The research seeks to fill this gap through the usage of multi-criteria decision-making (MCDM) models for formulating a systematic method of flooring material selection for the construction sector in Addis Ababa. Integrating fundamental criteria like initial and maintenance costs, durability, sustainability, availability, and aesthetic compatibility, the research puts forward a holistic rating model that is specific to the conditions and capacities of the city's construction sector.

The outcome of this research will be of benefit to different stakeholders such as architects, engineers, contractors, and policy planners. The study will provide an evidence-based, practical decision-making tool that can make flooring material selection efficient, cost-effective, and environmentally friendly in construction projects. By providing unambiguous, actionable advice, this research will make material selections reflect technical requirements and environmental considerations for the sustainable long-term viability of projects.

Moreover, the study adds to the growing body of literature in the field of using MCDM models in the construction industry, i.e., selection of flooring material. The model established here will act as a ground for future research in support of the usage of MCDM models in other cities or building material categories.

Finally, the current study contributes to the overall agenda of sustainable urban development in Addis Ababa by encouraging informed, evidence-based practice of decision-making in construction. In paying particular attention to the local context, the current study presents a valuable model for maximizing the choice of materials towards better building performance, cost-effectiveness, and environmental sustainability.

1.6. Scope of the Study

This research involves assessing selection criteria for commercial and public building construction finishing material in Addis Ababa, Ethiopia, through the Analytical Hierarchy Process (AHP) Multi-Criteria Decision-Making (MCDM) model. The study seeks to determine material selection key drivers and formulate a systematic decision procedure that will help stakeholders properly give precedence to materials

The study targets commercial exceed G+10 floors and public buildings exceed G+6 floors, .Residential houses, industrial facilities, and infrastructures like roads and bridges are not the subject of this research. In flooring materials being compared, the study only compares those, which are readily available and commonly used in Addis Ababa's commercial and public structures. Special-purpose floor coverings, and polyurethane, bamboo, and cork floors, not employed on a large scale in the subject buildings.

This research compares floor coverings against a set of selection criteria that cover economic, technical, aesthetic, environmental, functional, and stakeholder preference factors. These are initial cost, cost of maintenance, and cost of installation, durability, and resistance to external factors, ease of installation, appearance, design compatibility, sustainability, recyclability, comfort level, safety level, user preference, and availability from local sources.

Primary data for this study gathered using structured questionnaires from the major stakeholders such as project managers, architects, engineers, and contractors who were engaged in the construction of commercial and public buildings in Addis Ababa. Secondary data gathered from local market construction reports, material specs, and past studies regarding flooring material choice in the area. The Analytical Hierarchy Process (AHP) as the main tool of systematic evaluation and ranking of flooring material according to the expert opinions and the above choice criteria.

By defining the scope of study in such a manner, the study remains targeted towards those factors affecting the choice of floor covering materials in the case of Addis Ababa public and commercial buildings. This focus study ensures that the study offers to decision-makers in the construction sector information that is useful to them but precise and concise in the analysis.

1.7. Study Variables

The research employed three types of variables: dependent variables, independent variables, and control variables. All the variables have a definite role in the decision-making process and are measured using definite indicators for the evaluation in a proper way using the Analytic Hierarchy Process (AHP) model.

1.7.1. Dependent Variable

The best material for flooring is the dependent measure used in this study. It is the ultimate result of a choice the material that been found to be best from a range of alternatives against a set of many criteria. The alternatives are porcelain or ceramic tiles, vinyl, terrazzo, rubber, engineered wood, natural stone, concrete, epoxy, or solid wood. The best performer is the one that has the highest cumulative rank from stakeholder and expert judgment against all the criteria.

1.7.2. Independent Variables

Independent variables are the comparison criteria applied to evaluate and compare the various flooring materials. They grouped into six broad dimensions: economic, technical, aesthetic, environmental, functional, and stakeholder preference. Each criterion has corresponding quantifiable indicators to make them objective and dependable.

Under the dimension of economic factors, the parameters are the initial cost (in ETB per square meter for the material cost), the maintenance cost (one-off annual cleaning and maintenance cost per square meter), and installation cost (total accessory and labor cost per square meter). These utilized to determine the affordability and long-term cost of each of the flooring types.

Technical factor consist of durability, the estimated life of the material in years; resistance to external factors like moisture, scratching, and heavy loading, on a 1 to 5 scale; and ease of installation, rated by expert judgment, on a 1 to 5 ease of difficulty scale. The aesthetic factor include appearance, as per stakeholder rating in terms of color, texture, and style on a Likert scale, and design compatibility, taking into consideration expert views on whether the flooring is appropriate for the overall style and design of the building.

For the environmental factors, the parameters are sustainability, in percentage renewable or recycled material content in the material; environmental impact, estimated in terms of the carbon footprint of the material; and recyclability, as a simple Yes or No depending on whether the material can be recycled or not. The functional factor also consist of user experience factors. These are comfort, which scores thermal and acoustic performance based on the rating of the

stakeholders, and safety, which analyzes slip resistance and fire rating and scores them qualitatively.

Finally, stakeholder preference dimension has two standards. User preference based on questionnaires that tally opinions of critical decision-makers like owners, contractors, and architects. Local availability is an estimate of whether the material sourced in the Addis Ababa market, rated using a Yes/No answer and a comment on how difficult it is to locate.

1.7.2. Control Variables

To make the findings reliable and true, the study has incorporated multiple control variables. The study is restricted within Addis Ababa to keep local factors like climate, resource availability, and construction techniques constant. The study addresses commercial and public structures of G+10 stories and above, holding constant usage diversity of buildings, occupancy density, and durability considerations. The experts' panel consists of contractors, architects, and engineers selected to provide diverse professional opinions. Their answers checked for AHP consistency ratio ($CR < 0.1$). Additionally, all data were collected in 2025 and economic values calculated to the current market levels. All these steps guarantee findings validity, context-specific, and methodologically sound

CHAPTER TWO

LITERATURE REVIEW

2.1. Introduction

Material selection is a foundation of the building process that significantly affects the usability, sustainability, and performance of a building (Ashby M. , 2013). Because of the upward trend towards green building practices, efficiency in energy and cost-saving, optimal material selection has become a multi-faceted issue for the building industry. Materials choice decides not only the cost of construction and time for the project but also the building's usage efficiency and environmental impact (Ortiz, 2009). Describing flooring materials, the choice process further made more difficult by reconciling technical performance, aesthetics, and environmental sustainability. This paper approaches the frameworks, criteria, and decision-making models employed in the selection of the flooring materials and identifies the Analytic Hierarchy Process (AHP) as a means of addressing these complexities.

2.2. Importance of Flooring Material selection

Floor materials have a double function to play in construction, being both structural and aesthetically important. Proper choice guarantees durability, safety, and aesthetic value, and even contributes to the sustainability of the building as a whole (Cabeza, 2014). Conventional selection procedures never consider sophisticated aspects like environmental impact, lifecycle cost, and user needs, and hence the necessity to employ improved decision-making methods such as Multi-Criteria Decision-Making models (MCDM) (Zavadskas, 2007)

Developing nations such as Ethiopia, where economic constraints and local market issues have a central role in material selection, a systematic approach to selecting flooring is more important. As an example, within Addis Ababa, the urbanization process and growing demand for infrastructure have resulted in giving more priority to the implementation of sustainable and affordable flooring materials that are sensitive to local condition and aesthetics (Tadesse G. &, 2018; Behailu, 2022).

2.3. Criteria for Flooring Material selection

Flooring material selection is a multifaceted decision that governed by a set of criteria, usually grouped into economic, technical, aesthetic, environmental, functional, and stakeholder preference factors. Each of the criteria ranked in relative ranking in accordance with project background, cost, building use, and stakeholder priorities. Various studies have highlighted the

fact that choosing good flooring materials entails compromising between cost, performance, environment, and user preference ((Ashby M. F., 2005); (Kibert, 2016)).

2.3.1. Economic Factors

Economic factors are a major consideration in flooring material specification since they will have a direct impact on the overall project cost and long-term sustainability. Initial cost, maintenance cost, and installation cost are the top economic considerations to be included in flooring material specification. So Initial cost means the initial cost of buying the flooring materials and is most often of particular importance, particularly in cost-conscious construction environments like Addis Ababa. Under such conditions, the decision-makers will utilize materials that find a balance between performance and affordability. For example, ceramic tiles and vinyl flooring are generally more cost-effective compared to higher-priced alternatives like natural stone or hardwood (Ashby M. F., 2005).

Maintenance cost refers to the repeated expenses of cleaning, refinishing, and fixing floor surfaces throughout life. Maintenance costs can have the potential to affect the cost of ownership. Materials like hardwood and marble have a tendency to require regular maintenance, while materials like polished concrete have low maintenance demands (Kibert, 2016). Installation cost Installation cost refers to the materials and labor utilized during the installation process. Instalment difficulty is different based on flooring types, influencing cost and project duration. For instance, terrazzo flooring requires skilled labor and extended installation time, which increases overall costs, while laminate flooring presents a more economical and time-efficient option (Kibert, 2016). These economic considerations are of utmost relevance in such a way that chosen materials for flooring must be compatible with project budgets and long-term expenses In Addis Ababa, under tight budgets, developers choose floor coverings that have both lowest initial expenses and long-term expenses and possess durability and functionality.

2.3.2. Technical Factors

Technical performance of flooring materials at different levels makes them appropriate for different applications. Key technical criteria in flooring material selection include durability, resistance to external factors, and ease of installation. Durability is most important, especially for areas with high traffic such as commercial buildings, where materials must withstand continuous wear and tear. Hard materials such as granite and ceramic tile used for their long lifespan and efficiency, but the softer types such as linoleum tend to degrade more quickly under similar conditions (Kibert, 2016)).

Resistance to external factors key consideration is resistance to external forces, with flooring materials needing to withstand diverse environmental and use stresses such as moisture, chemical exposure, and mechanical impact. For instance, water resistant materials such as vinyl and epoxy commonly used in wet areas, while rubber flooring is favored in industrial settings for its impact resistance (Zhao, 2007). Ease of installation also a major factor in material choice, which has an effect on the duration and expense of a project. Materials such as engineered wood and laminate flooring, on which floating installation is used, are quicker and less manual labor to install than such conventional products as hardwood or terrazzo on which expert skills and longer installation lengths are needed (Yates, 2001). These technical criteria ensure that the selected flooring materials meet the functional demands of their intended environments.

2.3.3. Aesthetic Factors

Aesthetic considerations influence user perception and the overall ambiance of a building. Aesthetic considerations play a significant role in shaping user perception and influencing the overall ambiance of a building. These factors are mainly appearance and design compatibility. Appearance deals with visual attributes of flooring materials, including color, texture, and pattern, all of which used to provide aesthetic identity to an environment. In luxury commercial buildings, marble and natural stone materials chosen to express beauty and style. Wood or laminate flooring chosen for domestic designs to produce a cozier and welcoming environment (Assefa, 2017).

Design compatibility is the selection of material flooring in a way that it matches the building's architectural design and interior design tastes. In the Ethiopian scenario, cultural considerations also take center stage in selection, where stone and natural wood employed in high-end residential and public projects to evoke traditional design and values (Gebremariam, 2020). These aesthetic factors are integral to creating visually harmonious and culturally resonant interior environments.

2.3.4. Environmental Factors

Sustainability is an increasingly important issue in material choice with greater focus on minimizing environmental impact. The most important environmental factors to consider when choosing flooring materials are sustainability, recyclability, and overall environmental impact. Sustainability is all about using renewable and ecofriendly materials that play a part in maximizing long-term environmental objectives. Flooring products made from reclaimed wood and recycled material are examples reducing Raw material demand rate and providing sustainable building solutions (Kibert, 2016)).

Recyclability refers to the potential of flooring materials to recycle or re-use after the life cycle has expired, reducing construction and demolition waste. Some carpet tiles and vinyl floor coverings specifically manufactured for recyclability, thus offering environmentally friendly options (Zhao, 2007). Environmental impact refers to the overall environmental footprint of flooring materials during production, transportation, and disposal emissions. Locally sourced material usage is one way of lowering transport emissions while at the same time stimulating the local economy (Kibert, 2016). Collectively, these criteria help ensure that flooring choices align with sustainable building objectives and environmental stewardship.

2.3.5. Functional Factors

Flooring material should meet high-performance requirements to provide comfort, safety, and overall functionality within a constructed environment. Comfort largely influenced by the thermal and acoustic properties of the flooring, which contribute to occupant wellbeing. The materials include carpeting and cork which are both great sound absorbers and have excellent thermal insulation capabilities and are thus ideal for use in spaces where noise attenuation and warmth are required. Conversely, harder surfaces such as concrete and tile might need more underlayment to make it a softer surface (Yates, 2001).

Safety is another critical consideration, particularly in public and commercial buildings where high foot traffic increases the risk of accidents. Essential safety features include slip resistance, fire resistance, and impact resistance. Flooring materials with textured surfaces such as slip resistant vinyl or rubber are especially effective in enhancing safety in areas that frequently exposed to moisture or spills (Yates, 2001). Addressing these functional criteria ensures that the flooring contributes to a safe, comfortable, and user-friendly environment.

2.3.6. Stakeholder Preferences

Flooring material selection further influenced by building owners', designers', and end-users' preferences. Two key factors influencing flooring material selection are user preferences and local availability. User preferences the ultimate selection often follows user requirements, with personal lifestyle demands, cultural considerations, and beauty preferences influencing the decision. Subjective requirements force the stakeholders to make their choices according to individual or project-related values. Local availability is also of critical importance as the cost and location of supplies in the Addis Ababa market will be a key factor in determining selection choices. Imported goods are potentially of superior quality or diverse specifications but are generally more costly and present procurement issues and logistic complexities (Assefa, 2017).

These factors highlight the importance of balancing personal or cultural preferences with practical market conditions in the selection process.

The selection of flooring materials requires balancing economic, technical, aesthetic, environmental, functional, and stakeholder considerations. In Addis Ababa, affordability and local market availability play a decisive role, with decision-makers seeking cost-effective yet durable materials. As sustainability becomes a growing priority in the construction industry, the demand for environmentally friendly flooring materials expected to increase.

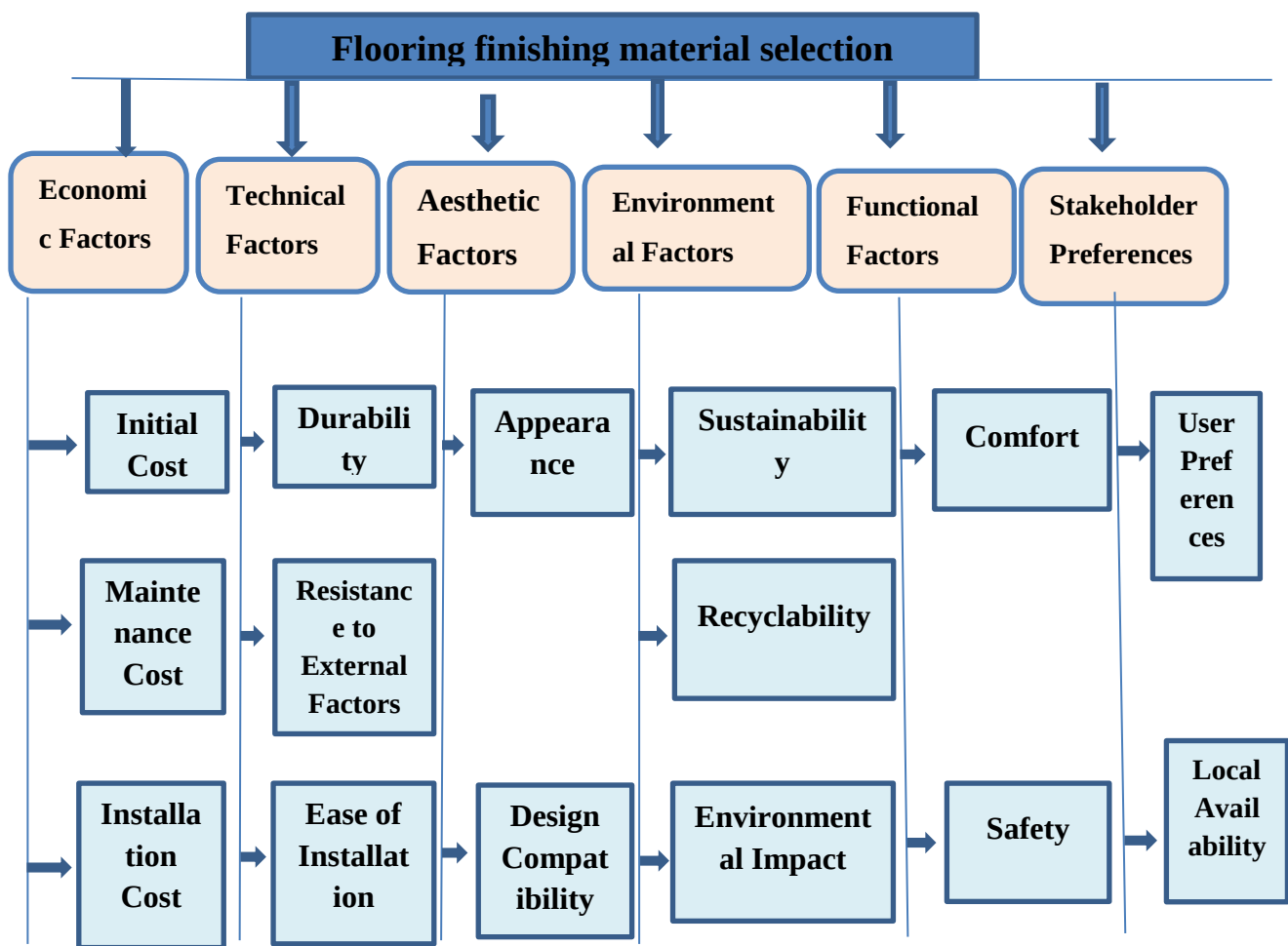


Figure 2.1. Criteria Hierarchy

2.4. Flooring Material Alternatives

Flooring material selection is an essential aspect of building design with numerous parameters affecting the choice, including durability, cost, maintenance needs, environmental factors, and appearance. Each flooring material has both merits and demerits, thus one needs to compare them against each other based on their functional and economic traits. This chapter discusses

the most prevalent flooring materials in commercial and public premises, their major characteristics, and the consequences for choice (Ashby M. , 2013).

2.4.1. Porcelain and Ceramic Tiles

Porcelain and ceramic tiles are among the most popular flooring options because they are hard, resistant to water, and require minimal maintenance. The properties render them ideal for wet areas like bathrooms and kitchens (Pacheco-Torgal, 2012). Porcelain tiles, as opposed to regular ceramic tiles, have a reduced water absorption property and are highly resistant to stains, abrasion, and hence longer lasting. However, they are hard and cold to the touch when walked upon, depriving home and business comfort (Chen, 2012). Additionally, their production process involves high-energy consumption, raising concerns about environmental sustainability.

2.4.2. Natural Stone Flooring (Marble and Granite)

Natural stone floors such as marble and granite are highly prized for their beauty and durability. The products have extensive applications in upscale commercial and public premises because of the high-quality appearance that they deliver and contribute to adding value to the property (Zhang, 2015). Although they are highly beneficial, natural stone floors also come with exorbitant installation and maintenance costs because they have sealed periodically to avoid the entry of water and stains. In addition, stone processing and quarrying are major contributors to the carbon footprint and environmental degradation (Ahmad, 2018). As a result, the sustainability of natural stone flooring has been a subject of debate in the construction industry.

2.4. 3. Concrete-Based Flooring (Polished, Colored, Micro cement)

Concrete flooring also extensively used in public and commercial buildings because of its flexibility, durability, and minimal maintenance needs. Concrete flooring can stained, colored, or polished to produce different finishes, hence being a viable option for different applications (Ahmad, 2018) Concrete flooring is also very durable and cost-effective throughout its life cycle. Despite all its advantages, one of the greatest drawbacks of concrete floors is its impact on the environment since cement production is among the largest producers of greenhouse gases worldwide (Assefa, 2017). In a bid to reduce these problems, scientists and producers are designing more sustainable concrete, including micro cement and green concrete blends, to mitigate the negative environmental effects.

2.4. 4. Wood Flooring (Hardwood)

Hardwood flooring is also famous for its natural charm, attractiveness, and strength. It also offers great insulation qualities, leading to indoor comfort in the home as well as commercial

environments (Chen, 2012) Wood flooring can also damage by water, and regular care is necessary to avoid warping and scratching. Additionally, concerns about deforestation and the environmental impact of hardwood production have led to increased demand for certified sustainable wood products, such as those accredited by the Forest Stewardship Council (FSC) (Assefa, 2017).

2.4.5. Engineered Wood Flooring (Laminate & Wood-Plastic Composite - WPC)

Engineered wood flooring, such as laminate and wood-plastic composite (WPC), is now very commonly used as a substitute for solid hardwood. Engineered to resemble natural wood but offering greater resistance to moisture and longevity (Zhang et al., 2015). Engineered wood flooring is cheaper than traditional hardwood and simpler to install. However, it has a shorter lifespan and there are some of them containing synthetic chemicals and adhesives that are environment-friendly issues (Ahmad, 2018). Despite all these limitations, sustainable materials and adhesives-related technologies are enhancing the environmental qualities of engineered wood flooring.

2.4.6. Vinyl Flooring (Luxury Vinyl Tiles - LVT & Vinyl Composite Tiles - VCT)

Vinyl flooring, comprising Luxury Vinyl Tiles (LVT) and Vinyl Composite Tiles (VCT), is also very common because it is not very costly, it is easy to install, and it can be water-resistant. They are also very flexible in pattern and very commonly used in public areas like offices, malls, and hospitals (Cabeza, 2014). Nevertheless, vinyl flooring has traditionally been faulted as an environmentally unfriendly product since it is mostly made of polyvinyl chloride (PVC), which is not easily recyclable and volatile organic compounds VOCs to the indoor air (Zhao, 2007). The production of more environmentally friendly vinyl flooring such as phthalate-free and recyclable vinyl flooring has been ongoing in the market.

2.4.7. Rubber Flooring (Including Recycled Rubber)

Rubber flooring appreciated because of its slip resistance, impact resistance, and durability, which makes it most suited in high use facilities like hospitals, gyms, and schools (Cabeza, 2014). Recycling of rubber flooring materials is part of sustainability attempts in the way that waste from used tires and other rubber materials is used. However, some of the rubber floor coverings have an odor as they contain volatile organic compounds. It may influence indoor air quality. Design restrictions and aesthetic limitations also lower its demand in some architectural uses.

2.4.8. Terrazzo Flooring

Terrazzo is a hybrid material made up of marble, quartz, granite, or glass chips in an inert cement or resin matrix. Terrazzo is extremely durable, long lasting, and low maintenance and favored by commercial structures, schools, and airports (Zhao, 2007). While its initial installation price is quite expensive, terrazzo flooring is an affordable flooring option in the long term because it is very durable and requires little maintenance. Moreover, the new compositions of terrazzo use recycled materials, making the sustainability of this flooring type even better.

2.4.9. Epoxy Flooring

Epoxy flooring is a seamless-looking resinous floor system that is resistant to chemicals and is strong. It has extensively employed in industrial, commercial, and heavy-duty areas because it is strong and can withstand spills (Cabeza, 2014). Epoxy coatings are stretchy and can tailored with pigments and decorative aggregates for aesthetic beauty. Yet, certain epoxy systems emit VOCs during curing, posing indoor air quality and environmental issues. Emerging technologies for low-VOC epoxy systems attempt to mitigate such issues without compromising on the material's durability and performance.

2.5. Multi-Criteria Decision-Making Models

Construction project decision-making normally entails numerous conflicting criteria, which addressed using systematic methodologies to guarantee objectivity, transparency, and consistency. Multi-Criteria Decision-Making (MCDM) models have been used in the construction sector to enable systematic decision-making through the incorporation of qualitative as well as quantitative considerations These models enable decision-makers to rank and rank alternatives based on several criteria for selection to guarantee rational decision-making in real-world situations (Vaidya, 2006).

2.5.1. Overview of MCDM Methods in Construction

Various MCDM methods introduced and implemented in construction decision-making. The methods guide stakeholders with regard to choosing best options by viewing numerous factors logically. Some of the most popularly applied MCDM models in the construction sector are:

1. Analytic Hierarchy Process (AHP) a structured approach that breaks down decision-making into a hierarchy of alternatives and criteria, based on pairwise comparisons to determine relative weights and rank alternatives (Saaty T. L., Decision making with the analytic hierarchy process, 2008).

2. Technique for Order Preference by Similarity to Ideal Solution (TOPSIS) A ranking technique that chooses the optimal alternative as a function of proximity to the ideal solution with the largest distance from the worst solution (Wang, 2007).
3. Fuzzy Logic-Based Models These models incorporate linguistic variables and fuzzy numbers to handle uncertainty in decision-making, making them particularly useful when criteria involve subjective judgments (Wang, 2007).
4. Elimination and Choice Expressing Reality (ELECTRE) An outranking technique that ranks alternatives in line with given performance limits, removing undesirable alternatives from consideration (Cheng, 2002).
5. Simple Multi-Attribute Rating Technique (SMART) a decision-making approach that assigns numerical values to criteria and alternatives, simplifying the ranking process based on expert evaluations (Vaidya, 2006).

Each of these techniques offers a systematic approach to complex construction-related decision-making. The suitable MCDM model chosen based on considerations like data availability, participation of the decision-maker, and the level of complexity in the evaluation process.

2.5.2. Role of MCDM in Construction Decision-Making

MCDM models have been widely applied in construction decision-making as a consequence of their capacity to analyze alternatives in a systematic manner with respect to trade-offs in between conflicting factors (Vaidya, 2006). Economic, technical, environmental, aesthetic, and functional issue decision-making models are in demand in the construction industry because these concerns are ingrained in material selection, supplier assessment, project planning priorities, and the evaluation of risk.

In material selection, MCDM models allow decision-makers to reconcile cost-effectiveness and technical performance with sustainability and stakeholders' requirements. Such approaches offer a structured process of evaluation to minimize subjectivity and ensure the chosen materials meet project requirements. Use of MCDM strengthens transparency and consistency, especially in massive construction projects with a high number of stakeholders (Cheng, 2002).

Additionally, MCDM methods improve efficacy by providing a formal ranking of alternatives, which makes material selection decisions easier to explain using quantifiable criteria. As the complexity of construction operations increases and sustainability issues arise, using MCDM in ensuring data-driven and rational decision-making will become more critical (Cheng, 2002).

2.5.3. MCDM in Flooring Material Selection

Flooring material choice is a multi-criteria decision-making problem involving assessment of alternatives against a list of interrelated criteria covering cost, sustainability, environmental impact, appearance, and functionality. Due to the inherent complexities in flooring material choice, MCDM models play an important role in ranking materials that satisfy project-based needs in terms of constraints related to budget, availability in the area, and acceptability by stakeholders (Zavadskas, 2007).

In making the choice of flooring material, Multi-Criteria Decision-Making (MCDM) models are critical in ranking alternatives according to various dimensions encompassing objective and subjective criteria. Among these are economic criteria such as initial cost, installation cost, and maintenance cost, which have immediate impacts on the economic viability of material alternatives. Technical factors are also essential, encompassing aspects like durability, resistance to external conditions (e.g., moisture or wear), and ease of installation. Environmental factors take into account the sustainability, recyclability, and life cycle environmental impact of the material. In addition, aesthetic factors including the material's appearance, texture, and compatibility with the overall design are crucial, particularly in projects emphasizing visual appeal. Functional factors address functional performance aspects like underfoot comfort, safety (e.g., slip-resistance), and acoustics performance. Finally, preference related factors include the availability of materials in the local market and the preferences of key stakeholders such as architects, contractors, and end-users. Together, these dimensions provide a comprehensive framework for informed decision-making in flooring material selection (Wu, 2011).

Decision-makers are able to compare floor materials in a structured manner and select the most appropriate option for a given building project by means of MCDM-based decision-making systems. Structuring MCDM avoids partiality and inconsistency in material selection choices (Saaty T. L., Decision making with the analytic hierarchy process, 2008).

MCDM models yield a logical decision-making method for obtaining complex selection solutions in construction, such as flooring material selection. MCDM models combine quantitative and qualitative elements, with attendant transparency, objectivity, and effectiveness of material selection process. MCDM's systematic evaluation method improves decision reliability, and it is a useful decision support tool for the selection of flooring materials by stakeholders according to project objectives (Vaidya, 2006).

2.6. Application of AHP in Flooring Material selection

The Analytic Hierarchy Process is a well-established Multi-Criteria Decision-Making process throughout the globe that supports systematic decision-making by breaking down the issues of a higher complexity into a hierarchy of a goal, criterion, and alternative (Saaty T. L., Decision making with the analytic hierarchy process, 2008). The method supports decision-makers in performing pairwise comparisons between decision elements to determine relative importance weights, optionally with the help of the facility to test the consistency ratios for rational and consistent decision-making. AHP used extensively in construction to select suppliers, prioritize projects, assess risks, and choose materials ((Cheng, 2002); (Vaidya, 2006)).

Material selection is a very important area in construction that affects the overall performance, sustainability, and cost of a project. Numerous studies have shown how AHP used to perform systematic and rational material selection activities. For instance, (Shen, 2017). Employed AHP to select sustainable building materials by incorporating environmental, economic, and social sustainability criteria. Their study highlighted the potential of AHP in guiding decision-makers toward environmentally friendly and cost-effective choices. Similarly, applied AHP in evaluating green materials in construction projects, reinforcing its role in promoting sustainable practices and optimizing resource utilization.

The choice of floor material is highly complicated by the large number of floor material types and the variety of factors that affect decision-making. AHP offers a well-structured and defined approach of assessing floor material options through consideration of critical factors like initial cost, maintenance cost, installation cost, durability, resistance to external factors, ease of installation, aesthetic appeal, environmental impact, safety, recyclability, and user preference (Khoshnava, 2018). The relative significance of these factors depends on the usage and placement of the building. For example, for residential constructions, comfort and beauty are more important, while durability, maintenance, and safety are more important for industrial and commercial constructions (Hussain, 2020) .

A number of studies have explored the use of AHP in the procurement of floor material. (Jato-Espino, 2014) Conducted a comparative analysis of traditional and modern pavement materials using AHP, considering factors such as life cycle cost, sustainability, and performance. The research underscored the significance of logical decision-making in search of the optimum material selection, (Shariq, 2021)utilized AHP Applied AHP to compare health care building floor materials, where sanitation, slip resistance, simplicity of maintenance, and durability were

of utmost concern. These findings reveal the versatility of AHP in accepting various selection criteria in various building types and functional needs.

In the Addis Ababa climate, choice of flooring material in relation to particular climatic, economic, and cultural conditions. . AHP can be applied here since it will enable decision-makers to rank flooring options in a systematic way and considering local factors such as temperature variations, water resistance, cost, and raw material availability (Tadesse G. &., 2017). The increasing emphasis on sustainable construction in Ethiopia further underscores the need for an approach that integrates environmental impact assessments into the material selection process (Gebreegziabher, 2019). With the application of AHP, Addis Ababa building professionals such as architects, engineers, and developers are able systematically examine different flooring material choices and pick the most suitable based on a comprehensive evaluation of performance, cost-effectiveness, and sustainability. With the growing construction sector in Addis Ababa, application of AHP in the choice of floor materials is a potential to improve decision-making effectiveness, maximize use of available resources, and enable environmentally friendly practice of construction.

2.7. Challenges in Flooring Material selection in Addis Ababa

The Addis Ababa construction market has numerous challenges that complicate the determination of the appropriate material for flooring. The most important one is the uncertainty of material prices, which makes it challenging to estimate and budget for developers and contractors. Prices that are subject to inflation, exchange rates, and supply chain disruptions, particularly since most quality materials are imported (Tesfamariam, 2013).

Another significant challenge is the unavailability of quality and sustainable materials. Although Ethiopia gifted with extensive natural resources including stone and concrete, processing and producing flooring materials hindered by inefficient production processes, untimely quality control, and supply chain issues (Araya, 2021) Locally available materials may thus be of inferior quality for industrial application, and there greater reliance on imported alternatives that is costly and environmentally taxing. Suboptimal material options for flooring occur due to insufficient technical knowledge among decision-makers. Most building professionals, such as architects, engineers, and construction managers, may lack easy access to current information regard to material behavior, lifecycle analysis, or long-term performance testing. Lack of computer-based decision-support tools and standardized selection frameworks

results in material choices for flooring made according to project-specific constraints or experience versus complete, data-driven evaluation (Ashby M. F., 2005).

In addition, the absence of local research and scientific selection processes has been to blame for the use of subjective selection procedures. The majority of studies present evidence that Ethiopian construction projects do not put a lot of effort into long-term factors such as climatic suitability, lifecycle performance, and sustainability during material selection (Araya, 2021). This is mostly true in the case of Addis Ababa, where temperature, moisture content, and urban growth come into consideration during material selection for suitable flooring. Without the ordered approaches like the Analytic Hierarchy Process or other multi-criteria decision theories, material selection is random and subject to inefficiency (Cabeza, 2014).

Furthermore, sustainability concerns are increasingly shaping global construction trends, yet Ethiopia has been slow to implement policies that mandate the use of environmentally friendly and recyclable materials (UN-Habitat., 2020). Many flooring materials commonly used in Addis Ababa, such as vinyl and epoxy, have significant environmental footprints due to their production processes and disposal challenges. Without stricter regulations and incentives for sustainable building practices, decision-makers may continue to prioritize short-term cost savings over long-term environmental benefits.

In conclusion, addressing all these issues need multi-dimensional interventions entailing policy reforms, institution building, increased research, and strict application of decision-making methods such as AHP. By taking into account economic, environmental, as well as technical aspects, the construction industry in Addis Ababa can move towards sustainable and efficient flooring material selection compliant with local as well as international industry standards.

2.8. Research Gaps and Future Directions

In spite of extensive utilization of the AHP and other MCDM in materials selection across the world, there is an extraordinary research gap in material selection of flooring material in the particular case of Addis Ababa. The majority of construction material selection research can be either lack spatial specificity or neglect specific issues of the building construction industry of Ethiopia such as local climatic conditions, culture, and economic limitations (Tafesse, 2021).

One of the most evident gaps identified in the literature is that no localized decision-making models exist which take into account the wide social, environmental, and economic parameters of Addis Ababa. To fill this gap, future research must aim to develop localized decision-making

models, which take into account the uniqueness of the Ethiopian building environment. The models would make sure that material selection processes take the local climatic conditions, cultural directions, and economic considerations into account. By considering these aspects, decision-making models can more effectively assist stakeholders in Addis Ababa make material selections that achieve the best balance between cost-effectiveness, performance, and sustainability.

In addition to this, integration of Building Information Modeling (BIM) with Multi-Criteria Decision Making (MCDM) models such as AHP is another potential field for future studies. BIM is a digital model that encompasses the physical and functional attributes of the building, and if combined with MCDM models, it can make real-time material selection. Such integration would permit construction professionals to modify material choices in response to changing project needs, e.g., budget limitations, project schedule, or shifting material availabilities. Such a dynamic and adaptive process could enhance overall effectiveness in material selection, with the assurance of decision-making under changing conditions during the project lifecycle (Jalaei, 2015).

In conclusion, there is a clear need for research that adapts multi-criteria decision-making models, such as AHP, to the specific needs of the Ethiopian construction industry. By considering technological advancements such as BIM, future studies can provide more efficient, flexible, and data-driven solutions for material selection. These approaches will not only enhance the quality of construction in Addis Ababa but also contribute to the global conversation on sustainable and context-sensitive building practices.

Identified Research Gap	Description	Status in This Study	Justification
Lack of localized research on flooring material selection in Addis Ababa	Existing studies often lack focus on specific regions, especially Addis Ababa	Addressed	This study focuses on flooring material selection specifically within the context of Addis Ababa, using data collected from local stakeholders.
Limited consideration of local climatic, economic, and cultural conditions	Most decision-making models do not reflect Ethiopia's unique construction environment	Addressed	The research includes control variables such as climate, budget, and cultural preferences specific to Addis Ababa.
Absence of decision-making frameworks tailored to the Ethiopian construction industry	General models are not customized to local needs	Addressed	The AHP model in this study developed using local expert input and reflects the realities of the Ethiopian construction context.
Lack of MCDM frameworks developed for Addis Ababa flooring material selection	Few studies apply structured models like AHP for local flooring decisions	Addressed	This study applies a structured AHP-based framework for selecting flooring materials relevant to Addis Ababa.
Lack of integration between BIM and MCDM models like AHP	There is limited research combining BIM with AHP for material selection	Not Addressed	The current research does not incorporate BIM. Future studies can explore integrating BIM with AHP to support dynamic and real-time decisions.
Lack of adaptive, data-driven models that respond to changes during project execution	Models should allow flexibility based on project updates like cost or availability	Partially Addressed	While the AHP model uses structured data and reflects stakeholder input, it does not dynamically adjust during project execution.
Limited contribution to global research on sustainable, context-sensitive practices	Local research is needed to support global best practices	Addressed	This study provides context-sensitive insights and promotes sustainable decision-making, adding value to international research efforts.

Table 2.1. Identified Research Gaps from literature and Coverage in This Study

Identified Research Gap	Source from Literature Review
Lack of localized research on flooring material selection in Addis Ababa	Section 2.8 of the literature review clearly states this gap. Quote: “There is a notable gap in research focusing on flooring material selection in the specific context of Addis Ababa.” Supported by: (Tafesse, 2021; Tadesse, 2018 ; Araya, 2018)
Limited consideration of local climatic, economic, and cultural conditions	Section 2.8 and 2.7 mention tat many material selection studies ignore local climatic and cultural factors. Supported by: (Araya, 2018; Tesfamariam, 2013) , discussing Ethiopian context constraints
Absence of decision-making frameworks tailored to the Ethiopian construction industry	Section 2.8 again notes the lack of localized frameworks. Also discussed in 2.6 where you mention that existing models (AHP) rarely applied in Addis Ababa. Studies cited: (Gebreegziabher, 2019; Tadesse , 2018)
Lack of MCDM frameworks developed for Addis Ababa flooring material selection	Section 2.6 specifically discusses AHP as a powerful MCDM tool, but notes limited local application. Quote: “in Addis Ababa, the selection of appropriate flooring materials influenced by unique climatic, economic, and cultural factors.”
Lack of integration between BIM and MCDM models like AHP	Explicitly mentioned in Section 2.8: “The integration of Building Information Modeling (BIM) with MCDM models like AHP represents another promising direction for future research.” Cited: (Jalaei, 2015)
Limited contribution to global research on sustainable, context-sensitive practices	Mentioned in Section 2.8 and 2.7, which call for Addis Ababa-based research to contribute to international sustainable construction practices. Supported by: (Gebreegziabher, 2019; UN-Habitat. , 2020),

Table 2.2.Source of research gap from Literature review

CHAPTER THREE

METHODOLOGY

3.1. Introduction

This chapter describes the methodology utilized to assess the selection criteria of flooring finishing materials in public and commercial buildings in Addis Ababa through the Analytical Hierarchy Process (AHP), a Multi-Criteria Decision-Making (MCDM) model. The research applies a Quantitative approach, in order to have a deep understanding of the complex decision-making process. Information gathered through questionnaires for assessing and ranking flooring materials on technical, economic, aesthetic, environmental, functional, and stakeholder considerations. AHP chosen because of its strict capability to consider multiple conflicting factors and its ability to transform qualitative judgments into quantitative weights

3.2. Research study area

The research is centered on Addis Ababa, in the city of Ethiopia, which is currently experiencing rapid urbanization and large-scale construction development, especially commercial and public Building. The increasing need for good quality, durable, and sustainable building materials makes Addis Ababa a suitable place to research flooring material selection processes. The site characterized by some challenges and opportunities that influence material selection, such as climatic conditions in the country, economic status, and material availability in the local market.

The study focuses particularly on commercial building above G+10 floors and public buildings above G+6 floors. These types of buildings demand sophisticated decision-making due to their functional requirements, long-term performance requirements, and higher concerns of safety and aesthetic requirements. Focusing on these types of buildings, the study gives an integrated perspective of flooring material selection in mega-sized urban development.

3.3. Research Design and Approach

3.3.1. Research Design

This research employs a descriptive and analytical research design to guide the development of a decision-support system for flooring finishing material selection in Addis Ababa utilizing the Analytical Hierarchy Process (AHP). The design can accommodate both describing current material selection practice and systematic evaluation of various criteria affecting such decisions. The descriptive component entails determining the way flooring materials selected in actual construction projects, finding prevailing practices, tastes, and decision-makers. The

analytical part makes use of a formal decision-making model (AHP) to rank criteria and alternatives based on expert input and numerical comparisons. This design ensures the research not only declares the existing state at present but also gives a methodical solution towards a betterment decision-making in practice.

3.3.2. Research Approach

The research utilizes a quantitative research methodology, which is appropriate given the formal, numerical nature of the AHP model. AHP uses pairwise comparisons derived from Saaty's base scale to compute weights and priorities among decision factors. Through the collection of numerical data using formalized questionnaires and statistical analysis, the research converts the expert view to objective and actionable knowledge. The implication is that the resulting framework remains data-driven, transparent, and reproducible essential requirements for construction industry decision-support tools.

3.4. Population and Sampling

3.4.1. Population

The population for the study is 98 high-rise buildings (78 Building above G+10 floors for commercial building and 20 Building above G+6 floors for Public Building) in Addis Ababa, Ethiopia. The selection of buildings for this study guided by specific inclusion criteria to ensure the relevance, validity, and applicability of the research findings. First, building height was a key criterion: only commercial buildings with more than G+10 floors and public buildings with more than G+6 floors were included. This threshold was set to focus on large-scale construction projects, where flooring material choices are typically more economically significant and have a substantial impact on the overall project outcome.

Second, the function type of buildings considered. Both commercial and public buildings purposively selected to enable a meaningful comparison across different functional categories and to enhance the generalizability of the study results to similar construction contexts in Addis Ababa. Lastly, the stage of the project taken into account. Only those buildings that had reached or passed the flooring installation phase selected. This criterion ensured that real and deliberate material choices had already made, allowing for a practical assessment of flooring selection decisions within actual construction projects.

Among the commercial and public buildings involved are those, which have flooring material selection or are in the process of selecting flooring material. Also included in the study

population are significant construction experts who engage in the selection process, including architects, project managers, contractors, and owners of the buildings.

These buildings chosen due to their complex design and performance demands, which make flooring decisions particularly significant in terms of cost, durability, aesthetics, and sustainability. The high diversity of materials types and choice-making activities included in these buildings increase the richness and diversity of the database.

3.4.2. Sampling Technique

Purposive sampling method applied to ensure selection of a representative sample of buildings and stakeholders that most accurately capture the purpose and context of the study. This sampling method selected to ensure assurance of participants with the most relevant experience and involvement in selecting flooring material process. Building selection based on two main criteria. Firstly, only buildings that have reached or surpassed the flooring installation stage considered, to ensure that actual material choice decisions made and can meaningfully evaluated. Second, each chosen building must have had a minimum of three professionals who directly engaged in the flooring material selection process. This standard recognized that flooring selection in the case of large projects is a complex and multi-dimensional decision, not limited to personal choice. In order for the data to be valid and reliable, each of the participating professional was also required to have at least three years of experience in the industry of construction, specifically with respect to materials selection.

In relation to stakeholders, the respondents selected on two most significant bases: their direct involvement in the decision-making process of flooring materials and at least three years of experience in flooring decision process in the construction sector of Addis Ababa. On combining these bases, 54 stakeholders selected to participate in the questionnaire survey, among whom three qualified respondents from each of the 18 buildings was part of the research. This method ensured that the data gathered would represent informed, realistic, and scientifically grounded decision-making practices.

3.4.3. Sample Size and Composition

For this study, eighteen buildings purposively selected from a population of ninety-eight high-rise buildings in Addis Ababa, comprising fourteen commercial buildings and four public buildings. This sample size was determined to strike a balance between depth of analysis and feasibility within the constraints of time and resources. The purposive sampling approach used to make sure that the chosen participants and buildings had certain, predetermined criteria

relevant to research objectives, as detailed under the sampling method. The selection made specifically to ensure proportionate representation of the public and commercial structures, focusing on information-dense cases that provide depth, insight, and contextual relevance. While probabilistic sampling aims towards statistical representativeness, this research focused on purposive sampling to gain a better understanding of the complex decision-making processes used in flooring material choice. Targeting trained professionals in carefully chosen projects, the research could explore the multi-criteria decision-making dynamics in a manner that captures pragmatic realities and highly informed professional decisions, and not merely on randomness or statistical representativeness alone.

Type	Population	No. of sample Building	Description
Commercial Building	78	14	Includes offices, hotels, shopping centers (above G+10 floors)
Public Building	20	4	Includes government offices, schools, hospitals (above G+6)
TOTAL	98	18	

Table3.1 sample composition by building type

3.4.4. Sampling Procedure

The procedure involves the following steps:

1. Identification of fourteen eligible buildings from Addis Ababa City Administration Construction Permit and Control Authority for commercial building and four eligible buildings from Ethiopia Construction Authority for Public Building.
2. Contact the respondent
3. Distribution of structured AHP surveys to participants via Kobo Toolbox or email.

3.5. Variables and Operational Definitions

The research covers three categories of variables: independent, dependent, and control variables. All the variables defined based on the role performed within the decision-making process and assigned with appropriate indicators to be measured and analyzed through the AHP model.

3.5.1. Dependent Variable

The dependent variable in the present study is the optimal finishing material, determined through a systematic evaluation of multiple criteria. AHP provides weighted values for each factor and finally generates composite values for each flooring option. The top-ranked option in the resultant AHP aggregation operationally defined as optimal and employed as the dependent variable of this study. This approach ensures a rigorous, quantifiable, and transparent methodology for material selection, minimizing subjective bias and enhancing decision reliability.

3.5.2. Independent Variables

The independent variables in this research are the choice criteria and comparison criteria for judging various flooring finishing materials. The criteria systematically grouped into six primary dimensions, each standing for one of the most important elements that determine the best flooring. In order to remain objective and measurable, each criterion researched through appointed measurable indicators. The six dimensions and their respective operationalized criteria are as follows:

Dimension	Criteria	Indicator/Measurement
Economic Factors	Initial Cost	ETB per square meter (material cost)
	Maintenance Cost	ETB per m ² annually (maintenance, cleaning)
	Installation Cost	ETB per square meter (labor + accessories)
Technical Factors	Durability	Expected lifespan (years)
	Resistance to External Factors	Moisture, scratch, and load resistance (qualitative scale 1–5)
	Ease of Installation	Expert judgment (ranked 1–5 based on difficulty)
Aesthetic Factors	Appearance	Stakeholder rating on color, texture, style (Likert scale)
	Design Compatibility	Expert opinion on harmony with building design
	Sustainability	% renewable or recycled content

Environmental Factors	Environmental Impact	Estimated carbon footprint
	Recyclability	Yes/No
Functional Factors	Comfort	Thermal/acoustic performance (Likert rating)
	Safety	Slip resistance and fire rating (qualitative scale)
Stakeholder Preference	User Preference	Survey rating of user choice
	Local Availability	Market presence/accessibility (Yes/No+ difficulty level)

Table 3.2 Operationalization of Independent Variables

3.5.3. Control Variables

To maintain consistency and improve the validity of the findings, this study applied specific control variables. Firstly, the geographical scope was limited to Addis Ababa, Ethiopia, to reflect the local construction context, including market availability, climate conditions, and regulatory factors influencing flooring material choices. Secondly, only commercial and public buildings considered, excluding residential and industrial projects. This control ensures the research addresses material selection priorities relevant to high-traffic and functionally demanding environments. Third, the study focused on high-rise buildings with a minimum height of G+10 for commercial building and height of G+6 for public building, where flooring decisions are more likely influenced by structural, durability, and maintenance considerations typical of vertical developments.

Finally, the selection of respondents was restricted to key decision-makers such as architects, contractors, building owners, and material suppliers. Controlling for professional background ensured responses came from individuals directly involved in flooring material decisions.

Conceptual Framework for Flooring Finishing Materials Selection Criteria in Addis Ababa Building Projects

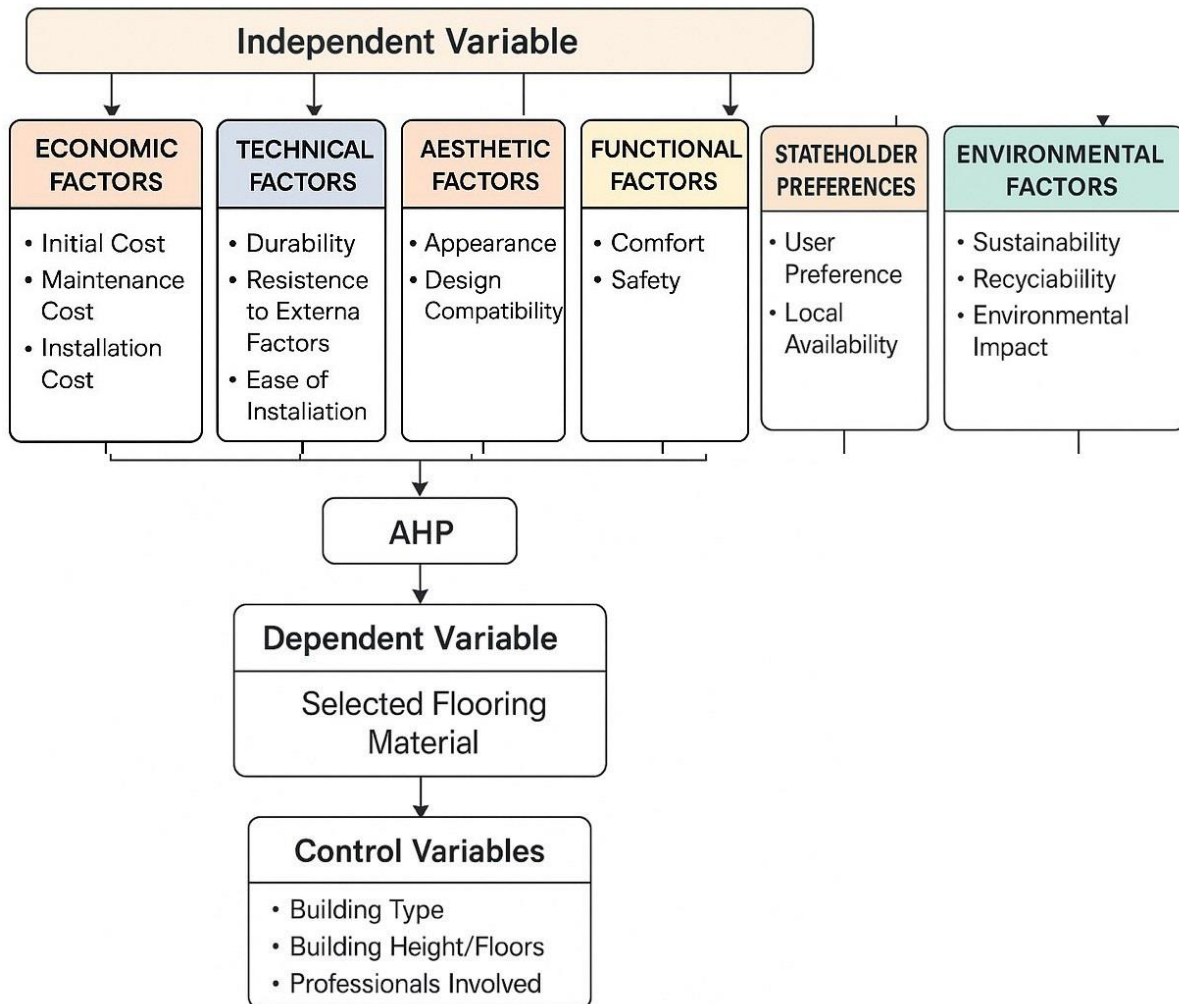


Figure 3.1. Conceptual framework

3.6. Data Collection Methods and Tools

3.6.1. Data Collection Methods

The research used a quantitative research approach in which data gathered through structured questionnaire whose aim was to evaluate the selection criteria for flooring finishing materials in Addis Ababa's high-rise public and commercial buildings. The questionnaire gathered based on the Analytical Hierarchy Process (AHP), which is a multi-criteria decision-making process that offers a chance for ranking alternatives through pairwise comparisons. The logical planning of the questionnaire enabled logical gathering of similar and consistent data from all

the respondents, hence enabling quantitative analysis of stakeholder priorities and flooring material preferences.

The structured questionnaire acted as the only data collection tool and retrieved from Kobo Toolbox, an electronic platform highly appropriate for use in structured surveys. The questionnaire asked the respondents to give pairwise comparisons between nine flooring material alternatives under fifteen evaluation criteria using Saaty's basic scale (1, 3, 5, 7, 9, and their reciprocals). Although some of the respondents answered independently, others were engaged in an interviewer-conducted process. Wherever possible, the research team read out the questionnaire in a standardized and unbiased tone, and the answers entered directly into Kobo Toolbox. This helped ensure all responses quantitative design as well as to overcoming different levels of technology access and literacy.

Respondents selected based on purposive sampling, where the purpose was to pick professionals directly engaged in material selection decisions in construction in buildings. They were architects, engineers, and contractors with practical experience and expertise regarding high-rise commercial and public buildings in Addis Ababa. Architects gave design and aesthetic decisions, engineers provided technical advice regarding material performance, and contractors provided practical decision-making regarding cost, installation, and market availability. Their varying experience of working guaranteed a broad acquaintance with the determinants for selecting flooring materials.

With the objective to strengthen the validity and reliability of the data collection tool, pilot testing done among a small group of industry experts who were outside the main study. The pilot process feedback employed to recast and redefine some items to strengthen clarity, consistency, and respondent understanding. Apart from pilot testing, the academically peer-reviewed questionnaire that was also tried and evaluated by experienced practitioners to determine its content validity, appropriateness, congruence with the study aim, and sound methodology. This validation process helped ensure that the tool effectively captured accurate and meaningful data for analysis.

Aside from primary data, the research employed secondary sources of data as well to support and triangulate results. Secondary data collected from available literature, project reports, and case studies of flooring material use and specification in the context of commercial and public buildings. Relevant sources comprised academic journal articles, construction specifications, government reports, and industry standards, especially those that are representative of the

Ethiopian construction context. These reports previously used to determine dominant trends and validate criteria employed in practice, and to inform the construction of the main data collection instruments. Secondary data were also giving contextual insight into material performance, environmental effects, and cost considerations, which assisted with conceptualization of the analysis and interpretation of the primary data captured from stakeholders.

3.6.2. Data Collection Tools

For ease of collection and organization of data, the research made use of Kobo Toolbox, a popular computerized program solely developed for field data collection. With Kobo Toolbox, the researcher could design electronic questionnaires, thus enabling data collection efficiently and in real-time from the respondents. The platform selected on the grounds of the ease of its interface, offline use, and the capability of making the organization and exportation of data convenient. This instrument assisted in reducing errors that accompany data entry and ensured overall reliability and uniformity of data collected. The questionnaire developed from the research goals and aimed at obtaining quantitative views from interested stakeholders.

3.6.2.1. Kobo Toolbox Data Collection Process

The data collection process using Kobo Toolbox used a systematic order to yield clarity, accuracy, and completeness. It began with questionnaire formulation according to the research objectives, piloting, distribution, and monitoring. Kobo Toolbox provided a secure and efficient environment for the collection, storage, and exportation of the responses for analytical purposes.

Step	Description
1. Questionnaire Design	Developed structured questions aligned with the research objectives, using Kobo Toolbox's form builder
2. Pilot Testing	Conducted a 5 trial to test clarity, flow, and functionality of the questionnaire
3. Revision	Revised the questionnaire based on feedback from the pilot test.
4. Deployment	Shared the final questionnaire with targeted respondents via online links or mobile devices.

5. Data Collection	Collected data both online and offline, using Kobo Toolbox's mobile data collection capability.
6. Monitoring	Monitored response progress and ensured completeness of submissions.
7. Data Export	Exported the collected data in suitable formats (e.g., Excel, CSV) for analysis.

Table 3.3 Kobo Toolbox's Data Collection Process

<https://ee.kobotoolbox.org/x/yEoj6yiM>

<https://ee.kobotoolbox.org/x/WElfNSUK>

3.7. Data Collection Procedures

To ensure rigor, reliability, and consistency in the data gathering process, the current study employed a structured and systematic strategy. The point of departure was the purposive selection of 18 high-rise buildings in Addis Ababa 14 commercial (above G+10 floors) and 4 public (above G+6 floors) carefully chosen based on their applicability to the context of flooring material selection. The key stakeholders who were directly involved in material selection decisions, such as architects, engineers, contractors, and material suppliers and building owners, who identified and invited to participate.

In the second step, the data collection instruments were prepared. The questionnaire finalized after conducting a pilot test and incorporating expert feedback to ensure clarity and validity. The survey instruments included pairwise comparison matrices based on Saaty's fundamental scale for the AHP model and Likert-scale items, both deployed using Kobo Toolbox to enable efficient and secure online data collection.

During the third step, data collection implemented by distributing the online questionnaires to approximately 54 professional respondents via Kobo Toolbox links, SMS, or email. Each participant was asked to complete AHP pairwise comparisons across 15 evaluation criteria and 9 flooring material alternatives, resulting in an estimated 27,000 pairwise responses for alternatives and 5,250 responses for inter-criteria comparisons.

In the fourth step, all submitted responses downloaded and organized in Excel format to facilitate further processing. The final step involved rigorous data quality checks. Questionnaire responses reviewed for completeness and consistency, and AHP consistency ratios (CR) calculated, ensuring that only responses with $CR \leq 0.10$ retained for analysis.

Additionally, the AHP findings were cross-validated with qualitative insights obtained from case studies to strengthen the validity of the results.

3.8. Identification of Evaluation Criteria

Based on a critical review of scholarly literature, expert consultations within the construction industry, and an assessment of the local project context in Addis Ababa, this study identifies fifteen evaluation criteria as essential for the selection of flooring finishing materials. These criteria categorized into six overarching dimensions: economic, technical, aesthetic, environmental, functional, and stakeholder preference.

The economic criteria initial cost, maintenance cost, and installation cost are widely recognized for their influence on both short-term project budgets and long-term operational expenses, especially in resource-constrained environments such as Ethiopia Including Ashby M. F, (2005), and Kibert,(2016). Technical factors such as durability, resistance to external factors (e.g. Moisture or impact), and ease of installation, are all-key to floor performance upkeep minimization of lifecycle disturbances Including Zhao, (2007), Yates, (2001), and Kibert,(2016). The aesthetic dimension, including visual look and design compatibility, is especially applicable in informing user perception and enhancing cultural and architectural tastes in building design Including Assefa, (2017), and Gebremariam,(2016).

Environmental factors; sustainability, recyclability, and environmental impact are all indicators of increasing interest in sustainable building practice and the necessity to reduce the carbon footprint of materials, especially through the incorporation of locally sourced or recyclable content Including Kibert, (2016), and Zhao,(2007). Functional criteria such as comfort (thermal and acoustic performance) and safety (slip resistance, fire resistance) are fundamental in enhancing usability and occupant well-being, especially in public and commercial buildings (Yates, 2001). Finally, stakeholder preferences, including user preferences and local availability, are vital in ensuring that the selected materials align with project realities and market accessibility, particularly in the context of Addis Ababa where imported materials are costly and often subject to supply chain challenges (Assefa, 2017).

Together, these fifteen criteria provide a comprehensive framework for flooring material evaluation and reflect a balance between cost-effectiveness, performance, environmental stewardship, and contextual appropriateness. Their inclusion in this study supported by extensive prior research and aligns with the structured principles of Multi-Criteria Decision

Making (MCDM) methodologies, particularly the Analytic Hierarchy Process. Including Saaty T. L, (2008), and Vaidya,(2006).

3.9. Identification of Flooring Material Alternatives

Flooring material selection during construction work is an intricate decision that involves the Comprehensive analysis to all of the functional, economic, aesthetic, and environmental factors. Based on thorough literature review, this study has detect nine commonly utilized flooring materials as potential substitutes for public and commercial buildings in Addis Ababa:

Porcelain/ceramic tiles, natural stone flooring (granite and marble), concrete-based flooring (including micro-cement, colored, and polished), hardwood floors, engineered wood floors (laminate and wood-plastic composite), vinyl flooring (LVT and VCT), rubber flooring, terrazzo flooring, and epoxy flooring. Their choice based on both their prevalence in comparable urban construction situations and their varied performance over significant selection factors including cost, longevity, security, sustainability, and maintenance simplicity.

Ceramic and porcelain tiles, renowned for durability, resistance to moisture, and minimal maintenance, perfectly suitable for high-traffic and wet environments, even with their cold and hard nature under and energy-intensive production process Including Pacheco, (2021), and Chen,(2012). Natural stone materials such as marble and granite offer superior durability and aesthetic appeal, often used in premium construction projects, although they are associated with high costs and significant environmental impacts due to extraction and processing Zhang, (2015), and Ahmad,(2018). Concrete-based flooring, including polished and micro-cement finishes, is valued for its strength, low maintenance, and versatility, though it's environmental footprint remains a concern due to cement production Assefa, (2017), and Ahmad,(2018).

Hardwood flooring offers natural warmth and aesthetic richness but is sensitive to moisture and must maintained, raising environmental issues regarding deforestation unless manufactured in a sustainable way Assefa, (2017), and Chen,(2012). Engineered wood flooring, consisting of laminate and wood-plastic composites (WPC), is an economic alternative for hardwood with improved dimensional stability and simpler installation, even if with shorter lifecycles and chemical emissions Zhang, (2015), and Ahmad,(2018). Vinyl flooring, particularly luxury vinyl tiles (LVT) and vinyl composite tiles (VCT), is widely used for its affordability, ease of installation, and water resistance; however, it raises environmental and indoor air quality issues due to its PVC content Cabeza, (2014), and Zhao,(2007). Rubber flooring, such as recycled rubber products, is greatly valued in safety-critical use for slip

resistance, impact absorption, and durability, but design limitations and possible VOC emissions can limit its broader use Cabeza, (2014). Terrazzo flooring, composed of marble, quartz, or recycled glass chip aggregate impregnated in a cement or resin binder, is asserted for long life and low maintenance needs, which makes it an economic choice over time with its greater initial cost Zhao, (2007). Lastly, epoxy flooring, a resinous finish, has superior chemical and abrasion resistance for heavy-traffic and commercial use and is increasingly being enhanced with low-VOC versions to better serve environmental and health issues (Cabeza, 2014).

These nine alternatives selected based on their relevance to the functional demands and market conditions of Addis Ababa, where factors such as local availability, cost constraints, climate conditions, and sustainability goals significantly influence material choices. Their inclusion supported by multiple studies that have analyzed flooring materials using structured evaluation methods such as AHP and other MCDM models in comparable urban construction contexts including Jato-Espino, (2014), Shariq,(2021). Tadesse G,(2018). and Gebreegziabher,(2019). As such, the selected alternatives provide a comprehensive and context-sensitive basis for comparative analysis using the Analytic Hierarchy Process.

3.10. Data Analysis Techniques

This study employed quantitative data gathered from structured AHP questionnaires. Data analysis meant to rank and prioritize flooring finishing materials by using expert viewpoints. The AHP, a prevalent MCDM tool, served to simplify the breakdown of complicated decisions into a systematic process of logic. The analysis done altogether in Microsoft Excel, which was flexible in calculations, matrix operations, and ranking.

3.10.1. Bases for selecting AHP

AHP provides a well-tested multi-Criteria decision model (MCDM) method that allows building analysts to consider multiple, sometimes conflicting attributes of alternatives when making decisions (Saaty T.L, 1994). Since this research is concerned with developing a material selection framework with which has many levels of decisions with complex dimensions, The Analytic Hierarchy Process (AHP) was selected as the preferred multi-criteria decision-making (MCDM) model for this research due to its proven effectiveness in handling complex decision environments involving numerous, often conflicting, criteria. AHP is particularly well suited for studies like this one, where the evaluation of flooring finishing materials requires consideration of both qualitative and quantitative factors across multiple

dimensions. One of the primary strengths of AHP lies in its structured approach to decomposing a complex problem into a hierarchical model of goals, criteria, sub-criteria, and alternatives, allowing for greater clarity and focus in the analysis.

Moreover, AHP facilitates pairwise comparisons of alternatives, enabling respondents to make judgments about the relative importance of one factor over another using a standardized scale. This process supports both objective assessments and subjective judgments, recognizing that intuition and expert experience are essential in construction-related decisions. Another important advantage is AHP's efficient weighting mechanism, which translates these judgments into a priority scale through an eigenvalue-based calculation, ensuring mathematical consistency and transparency.

Importantly, AHP maintains manageability even with a large number of evaluation criteria, due to its hierarchical structure, which simplifies complex problems and reduces cognitive overload for respondents. Its flexibility, user-friendliness, and wide applicability have made AHP one of the most widely used tools in MCDM research across various disciplines, including engineering, construction management, and materials selection. For these reasons, AHP is deemed both methodologically appropriate and practically effective for guiding flooring material selection in high-rise building projects in Addis Ababa.

3.10.2. AHP Analysis Process

3.10.2.1. Determination of Criteria Priority Weights

Step 1: Building the Decision Hierarchy

The decision problem broken down into a three-level hierarchy:

Goal: Choose the best flooring finishing material.

Criteria/Sub-Criteria: As described in Figure 3.1 (economic, technical, aesthetic, etc.).

Alternatives: The nine flooring material alternatives.

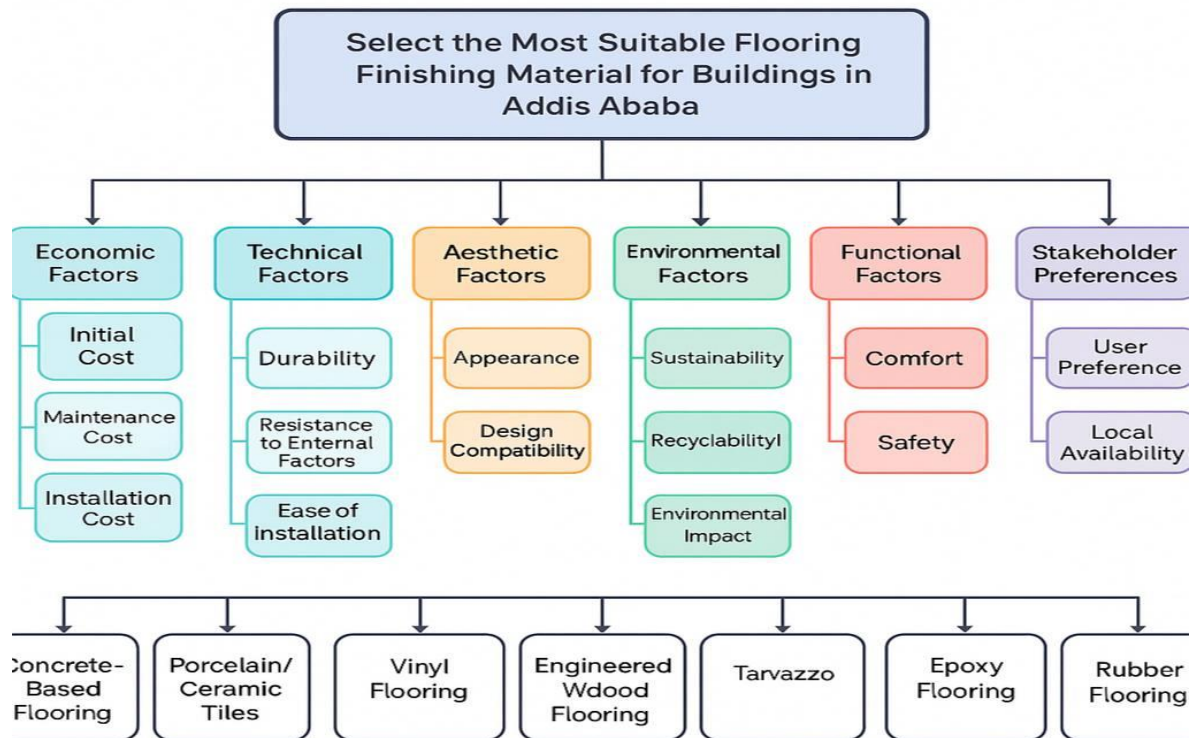


Figure 3.2 AHP Criteria hierarchy diagram

Step 2: Conducting Pairwise Comparisons

Formally completed questionnaire in the AHP format, where experts who asked to compare each pair of criteria on Saaty's 9-point basic scale. Number of pairwise comparisons needed for 15 criteria computed as:

$$\frac{n(n-1)}{2} = \frac{15 \times 14}{2} = 105 \text{ Comparisons}$$

Each one of these selected experts made 105 comparisons. Total number of responses returned was $105 \times 50 = 5250$ comparisons

Intensity of Importance	Definition	Reciprocal	Definition of reciprocal
1	Equal Importance	1	Equal Importance
3	Moderate Importance	1/3	Moderate Importance of the other
5	Strong Importance	1/5	Strong Importance of the other
7	Very Strong Importance	1/7	Very Strong Importance of the other
9	Extreme Importance	1/9	Extreme Importance of the other

Table 3.4. Saaty scale

Step 3: Aggregating Respondent Data

Each of the 50 respondents provided pairwise comparisons:

- The 15 flooring selection criteria,

Because AHP requires a single judgment matrix per decision level, individual responses aggregated into a group matrix using the geometric mean method. This method maintains the multiplicative properties of the AHP scale and gives equal weight to all expert inputs. The geometric mean for each pairwise comparison calculated as:

$$a_{ij}group = (\prod_{k=1}^n a_{ijk})^{1/n} = \sqrt[n]{X1 * X2 * \dots * Xn}$$

a_{ij} is the comparison value from respondent k

n is the number of respondents $n=50$

This resulted in one final pairwise comparison matrix per criterion and one for the criteria themselves

Step 4: Constructing the Pairwise Comparison Matrix

For each pairwise comparison matrix whether it criteria to criteria or alternatives to alternatives under a specific criterion a square matrix format is arranged. Each matrix populated using the geometric mean of judgment obtained in step 3. These geometric mean values represent the aggregated relative preferences across respondents and used to fill the corresponding cells of the comparison matrix.

Step 5: Normalizing the Matrix

Divide each column of the pairwise matrix by column sum, and then sum each column of the pairwise matrix. This normalization ensures all values scaled proportionally

$$a_{ij} \text{Normalized} = \frac{a_{ij}}{\sum_{i=1}^n a_{ij}}$$

Step 6: Calculating the Priority Vector (Weights)

During the acquisition of the relative weight or significance of each item, the mean value of every row of the matrix that has been normalized taken. This provided the priority vector, which provides the relative significance of every item in relation to others.

$$W_i = \frac{\sum_{j=1}^n a_{ij} \text{Normalized}}{n}$$

Averaging the normalized values across each row to estimate the priority vector.

Calculating the average value of normalized value across each row

$$W_i = \frac{\sum_{j=1}^n a_{ij} \text{Normalized}}{n}$$

Step 7: Consistency Check

Since human judgments can be inconsistent, a consistency ratio (CR) calculated to verify the reliability of the responses.

Deriving the principal eigenvalue

Deriving the principal eigenvalue ($\lambda_{\max}$) and corresponding eigenvector. The resulting eigenvector provides the final priority weights for each criterion, indicating their relative importance in the flooring material selection process.

$$\lambda = \frac{\sum \text{weighted sum}}{\text{priority vector that row}}$$

$\lambda_{\max}$ was calculated: the maximum value of lambda calculated for each criteria $\lambda_{\max} = 15.6565$

To assess the logical consistency of the expert judgments, the Consistency Index (CI) and Consistency Ratio (CR) were calculated. The consistency index obtained as:

$CR = CI/RI$ RI= Random index n = number of criteria

$$CI = \frac{\lambda_{\max} - 15}{n - 1} =$$

RI=1.59 for n=15 this value is based on saaty's random index table 3.5

$$CR = CI/RI$$

Where RI is the Random Index for a 15×15 matrix, which is 1.59. A CR value less than 0.10 (10%) is considered acceptable.

Matrix size	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Random index	0	0	0.58	0.9	1.12	1.24	1.32	1.41	1.45	1.49	1.51	1.48	1.56	1.57	1.59

Table 3.5 Random index value

Step 8: Ranking the Alternatives

After calculating priority weights for all flooring materials under each criterion, a ranking was established. These weights used to identify which materials are preferred in each evaluation dimension (e.g., cost, durability, appearance, etc.). Combined with the weight of each criterion, the final ranking supported decision-making for flooring selection in high-rise buildings in Addis Ababa.

3.10.2.2. Determination of Criteria Priority Weights

Step 1: Conducting Pairwise Comparisons

A structured questionnaire designed following the AHP format, where experts asked to compare each pair of Alternatives under each criteria using Saaty's 9-point fundamental scale. The number of pairwise comparisons required for 9 Alternatives calculated as:

$$\frac{n(n-1)}{2} = \frac{9 \times 8}{2} = 36 \text{ Comparisons}$$

Each of the selected experts completed 36 comparisons. The number of responses collected was 36*50=1800 comparisons. Flooring alternatives compared under each criterion so we have 15 criteria. The total number of responses = 1800*15=27000 pairwise comparison of alternatives

Determination of Alternative Priority Weights under Initial Cost

Thirty-six pairwise comparisons conducted for the initial cost criterion, with responses collected from 50 professionals.

Step 2 Aggregation of Expert Judgments

To synthesize the responses from multiple experts into a single pairwise comparison matrix, the geometric mean method used. This is the standard method for aggregating individual judgments in-group AHP, as recommended by Saaty (1980). For each criterion pair (i,j), the aggregated value was calculated using the following formula:

$$a_{ij} = (\prod_{k=1}^n a_{ijk})^{1/n} = \sqrt[n]{X1 * X2 * . . * Xn}$$

a_{ij} is the comparison value from respondent k

n is the number of respondents n=50

Step 3: Constructing the Pairwise Comparison Matrix

For each pairwise comparison matrix alternatives to alternatives under a specific criterion, a square matrix format arranged. Each matrix populated using the geometric mean of judgment obtained in step 2. These geometric mean values represent the aggregated relative preferences across respondents and used to fill the corresponding cells of the comparison matrix.

Step 4: Normalizing the Matrix

Divide each column of the pairwise matrix by column sum, and then sum each column of the pairwise matrix. This normalization ensures all values scaled proportionally

$$a_{ij} \text{Normalized} = \frac{a_{ij}}{\sum_{i=1}^n a_{ij}}$$

Step 5. Averaging the normalized values across each row to estimate the priority vector.

$$W_i = \frac{\sum_{j=1}^n a_{ij} \text{Normalized}}{n}$$

Step 7: Consistency Check

Since human judgments can be inconsistent, a consistency ratio (CR) calculated to verify the reliability of the responses.

First, the weighted sum vector found by multiplying the original matrix by the priority vector.

Then, $\lambda_{\max}$ was calculated:

$$\lambda_{\max} = \frac{\sum (\text{weighted sum} / \text{priority vector})}{n}$$

$\lambda_{\max}$ = maximum eigenvalue of the pairwise comparison matrix

From this, the Consistency Index (CI) and Consistency Ratio (CR) computed:

$$CI = \frac{\lambda_{\max} - n}{n - 1} \quad CR = \frac{CI}{RI}$$

CI = Consistency index

CR = Consistency Ratio

RI = Random Index

Step 8: Ranking the Alternatives

After calculating priority weights for all flooring materials under each criterion, a ranking was established. These weights used to identify which materials are preferred in each evaluation dimension (e.g., cost, durability, appearance, etc.). Combined with the weight of each criterion,

the final ranking supported decision-making for flooring selection in high-rise buildings in Addis Ababa.

3.10.2.3. Determination of Global Priority Weights

To calculate the overall (global) priority weight of each flooring material alternative across all evaluation criteria, the following steps followed:

Step 1: Criteria and Alternatives Priority Weights

The AHP pairwise comparisons conducted to derive local priority weights for the 15 selection criteria. Similarly, for each criterion, pairwise comparisons among the 9 flooring material alternatives were performed, and local priority weights of alternatives were determined under each criterion.

Step 2: Constructing the Weighted Matrix

- A 15×9 matrix constructed where:
- Each row represents one of the 9 flooring material alternatives.
- Each column represents one of the 15 selection criteria.
- For each criterion (column), the local weight of the criterion multiplied by the local weight of each alternative under that specific criterion.

Mathematically: $GW_{ij} = C_i * A_{ij}$

Where:

- GW_{ij} is the global weight of alternative j under criterion i,
- C_i is the local weight of criterion i,
- A_{ij} is the local weight of alternative j under criterion i.

Step 3: Aggregation to Global Weights

After filling in the full matrix, the sum of each row (i.e., sum across all criteria for each alternative) was calculated. This row-wise sum gives the global priority weight of each flooring material alternative.

Step 4: Interpretation

The global weights reflect the overall ranking of flooring alternatives, considering all criteria simultaneously. Alternatives with higher global priority weights considered more suitable based on the aggregated judgments.

3.10.3. Tools Used

All steps, including geometric mean aggregation, matrix normalization, weight calculation, and consistency checks, implemented using Microsoft Excel. Excel allowed for accurate, repeatable calculations and made it easy to track and adjust formulas across 15 criteria and 9 alternatives.

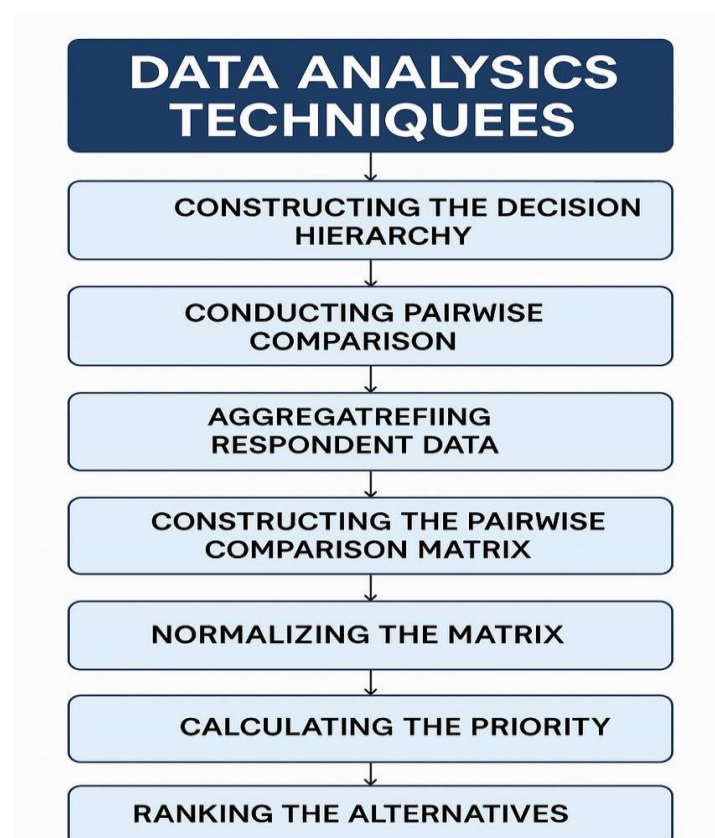


Figure 3.2 data analysis techniques step

3.11. Validity and Reliability of Instruments

For ascertaining that the data collection instruments applied in the course of this research provide accurate and factual information, validity and reliability tests performed. Such tests are pivotal in ensuring the credibility of AHP results as well as the general stability of the research findings.

3.11.1. Validity

Validity refers to the extent to which the data collection instruments accurately measure what they are intended to measure. In the context of this study, validity is crucial to ensure that the

questionnaire and other tools reliably capture the factors influencing flooring material selection in Addis Ababa's commercial and public building projects. To enhance content and face validity, the following strategies employed:

a) Expert Review

With the objective of ensuring the relevance and appropriateness of the content of the questionnaire, expert review was undertaken. Draft questionnaire provided to experts who are presently working in the construction industry, such as architects, engineers, contractors, and academic advisers. These experts reviewed whether the questionnaire captured the technical and practical realities of flooring material selection criteria or not. Their opinion proved to be very vital for streamlining the language, format, and limits of the questions so that they are contextually adequate and comprehensive to the Addis Ababa construction industry.

b) Pilot Testing

Following expert review, pilot testing with 5 to 10 sample construction professionals. The main aim was to test the clarity, relevance, and coherence of questionnaire items. In answering at this point, respondents requested to add comments to any items that they found confusing, unclear, or irrelevant. Changes made accordingly, based on their feedback. These included rephrasing ambiguous questions, reordering the sequence for Enhanced flow, and condensing vocabulary to ensure clear understanding and precision. Together, pilot testing and expert review processes played a significant role in making the content validity of the research instruments stronger to suit the collection of reliable data relevant to the study goals.

c) Content and Construct Validity

Additionally, enhance the validity of the measurement tools, content and construct validity properly addressed. Content validity guarantees that the questionnaire and interview items are completely depict the entire concept under investigation here, the determinants of flooring material selection. Construct validity addresses whether the instrument is measuring the theoretical constructs it sought to measure.

3.11.2. Reliability of the Research Instrument

a) Internal Consistency (Cronbach's Alpha)

The quality of a research instrument is primarily concerned with determining if the test creator was correct in expecting a certain set of items to provide interpretable statements regarding

individual differences. Cronbach's alpha is a method that determines the average correlation of items in a survey instrument to determine the internal consistency of a research instrument. Cronbach's alpha coefficients vary from 0 to 1, with alpha coefficients greater than 0.70 indicating acceptable reliability (Bonett, 2014).

Internal consistency as the proportion of the test variance that can assigned to a group of items, which used to calculate the reliability coefficient alpha;

$$\alpha = \left(\frac{K}{K-1} \right) \left(1 - \frac{\sum s^2y}{S^2X} \right)$$

Where: K is the number of test items

$\sum s^2y$ is sum of the variance of each item

S^2x is the variance associated with the observed total scores

A high Cronbach's alpha score indicates that the construct has a higher internal consistency. The greater the linear relationship between the tested variables, the higher the coefficient, and hence the higher the internal consistency. As a result, Cronbach's alpha coefficient is the most generally used objective measure of reliability, and the internal consistency of the data scale (data gathered via questionnaire) validated using this coefficient before the analysis in this study. If the number of variables to examine increased, the Cronbach alpha result will grow as well. A minimal number of things, on the other hand, results in a low alpha value.

b) Reproducibility and Repeatability

- Similar results from multiple respondents analyzed for coherence using standard deviation and variance in AHP priorities.
- Simulated AHP responses used to test whether the model produces consistent rankings across different random inputs with the same underlying target weights.

3.12. Research Ethics

This research conducted in accordance with strict ethical standards to protect the rights, dignity, and privacy of all participants. Institutional ethical review procedures followed, along with internationally accepted principles for research involving human subjects. Before data collection, participants given a clear explanation of the study's purpose, procedures, potential risks, and expected benefits. Informed consent obtained, and participants assured that their

voluntary participation. Informed them of the right to withdraw from the study at any time without penalty. Absolutely ensured confidentiality and anonymity. Personal identifiers not added to the collected data nor published, and all data stored in secure encrypted digital forms available only to the researcher. Not forced or coerced to participate, and participants never compelled to answer any individual questions.

The researcher was fully open throughout the research, disclosing the purpose and methods openly to all participants. All information gathered and presented honestly, without falsification, fabrication, or selective reporting. Since the research entailed interviews, questionnaires, and document examination, it was not highly risky for participants. They informed them that they could skip any questions they felt intrusive or uncomfortable, or withdraw from participation at all if they so desired to accomplish this assignment. These steps ensured that the study carried out ethically, responsibly at all steps

CHAPTER FOUR

DATA ANALYSIS & DISCUSSION

4.1. Introduction

This chapter presents the analysis and discussion of the data gathered to assist in the choice of appropriate finishing materials for flooring that used on Addis Ababa's commercial and public buildings. The data analyzed using the Analytical Hierarchy Process (AHP) methodology, which is a systematic multi-criteria decision-making method that enables comparison among alternatives based on quantitative factors. Two main types of data collected: 5,250 pairwise comparison responses for evaluating the relative importance of the selection criteria, and 27,000 responses for comparing flooring material alternatives under each criterion. These inputs provided a robust basis for generating reliable priority weights and consistency ratios in line with Saaty's AHP methodology.

Microsoft Excel as the main program for tabulating pairwise comparison matrices, calculating local and global weights, and consistency measurement. The final aim of the analysis is to select the optimal flooring material based on different evaluation characteristics, in accordance with professional evaluations and specifications of the specific project. In addition, the survey offers input data for the use of the Analytical Hierarchy Process (AHP), a multi-criteria decision aid technique employed herein to rank the discovered selection criteria through expert judgment and actual circumstances. Under this setup, the study aims to develop a decision-support system that will aid building professionals like architects, contractors, and building owners in making clear, knowledgeable, and justifiable decisions regarding issues concerning the selection of floor finishing material.

Based on these goals, the survey created to answer certain specific research questions:

- i. What are the existing trends and practices of floor-finishing material selection in Addis Ababa building construction?
- ii. What are the most influential factors in the decision process?
- iii. How best AHP model can be used to prioritize these criteria from expert opinions and contextual data?
- iv. Which decision-support model can allow practitioners to make effective and reliable material decisions?

The answers collected from experts with like experience in building construction are quantitative in form. Quantitative information on which such answers are based are the foundation for data interpretation, model calibration, and finally the creation of an actionable and situational decision-support tool suitable for the Addis Ababa building construction industry.

4.2. Overall survey response level rate

As presented in the previous chapter, using criteria to select the building as sample from target population and criteria to select the professionals who was working selected building as Architect, Engineer, and Contractor. The total number of sample size required for the questionnaire survey of this research is Fifty-Four (54).

Eighteen buildings selected as the sample for this study, consisting of 14 commercial buildings and 4 public buildings. To ensure balanced representation from key stakeholders involved in flooring material selection decisions, three respondents chosen from each building, specifically targeting contractors and consultants. For the public buildings, in 2 of the 4 buildings, 2 respondents were selected from the consultant side and 1 from the contractor side. In the other 2 buildings, 2 respondents were selected from the contractor side and 1 from the consultant side. Similarly, for the commercial buildings, the sample was evenly split: in 7 of the buildings, 2 consultants and 1 contractor were selected, while in the remaining 7 buildings, 2 contractors and 1 consultant were selected. This distribution ensured a fair and comprehensive inclusion of both contractor and consultant perspectives. As a result, the total number of respondents included 27 consultants and 27 contractors. Of these distributed 54 questionnaires, four of them not used on the research for not filled with adequate type professionals. Construction professionals those who can understand the meanings and types of alternative Flooring finishing materials, and have at least 2 years of experience in the material selection position are valid respondents for the survey. As a result, 50(92.3%) of the questioners were taken as valid. Of 27 questionnaires distributed to contractors 26(96.3%) are valid and from 27 questionnaires distributed to consultant companies, 24(88.9%) of them are valid.

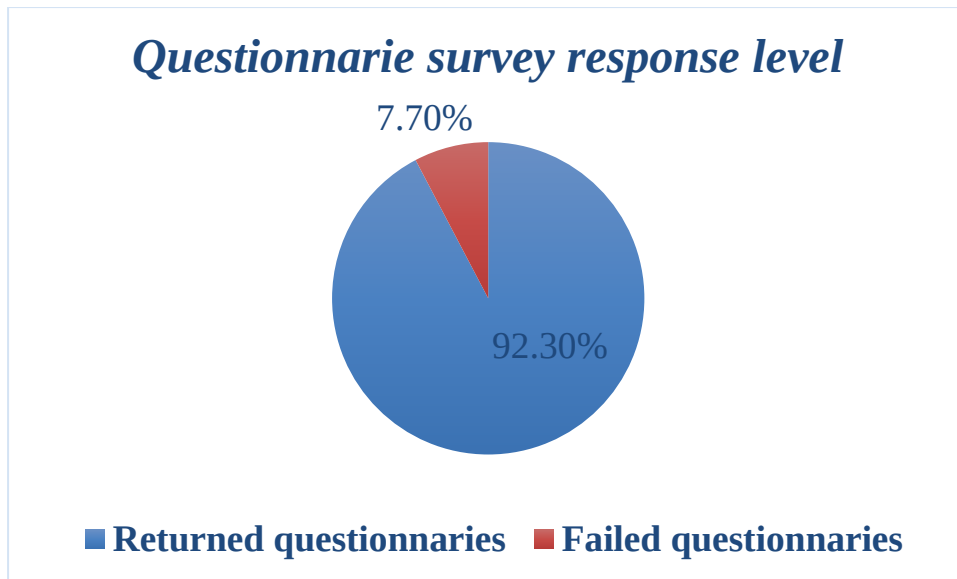


Figure 4.1 Questionnaire survey response level

4.3. Respondent Profile

4.3.1. Respondents' education level

The research has limited its respondents as construction professionals those who have experience in flooring material selection and working in a site.

Thus all of the respondent's education level is 1st degree and above.

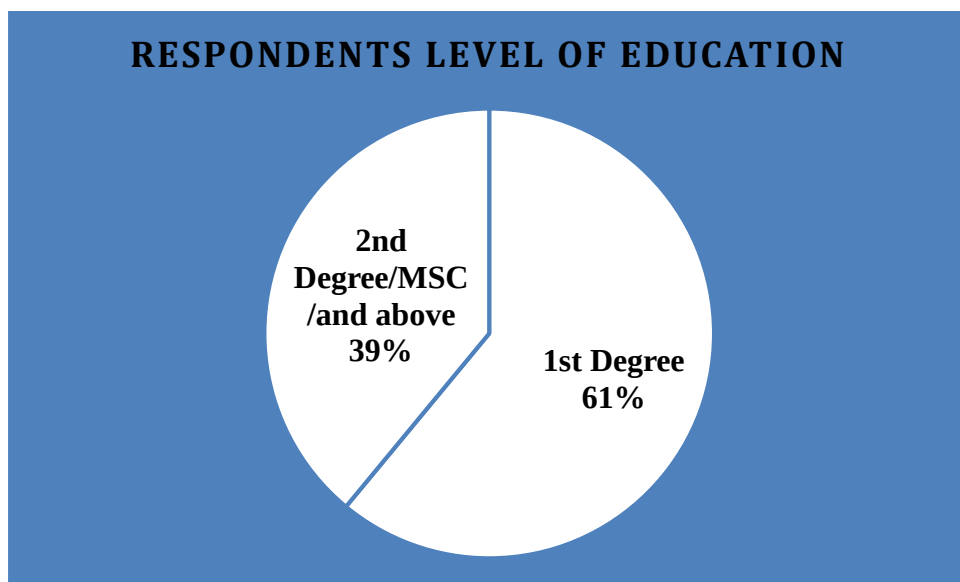


Figure 4.2: Respondents level of education

4.3.2. Respondents total experience in the construction industry

The questionnaire survey requires construction professionals who have been working in the Ethiopian construction industry for at least two years. As a result, respondents experience presented in the following figure.

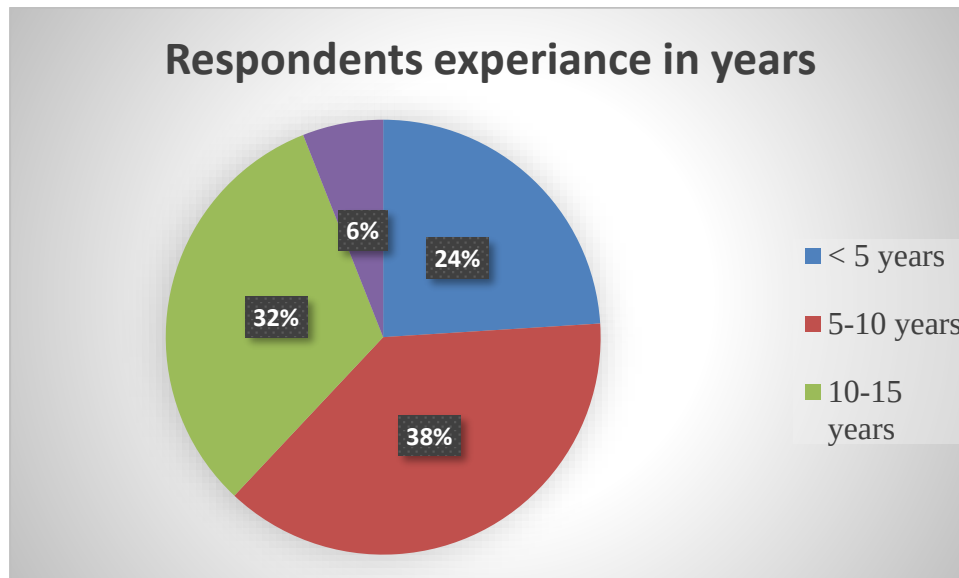


Figure 4.3: Respondents experience years

4.4. Questionnaire data reliability and Consistency

For establishing the reliability of the question data collected in this study, there was an initial reliability test done with Cronbach's Alpha. Cronbach's Alpha is a well-established statistical estimate for checking the internal consistency of a group of items that were supposed to measure a single construct. It used for testing Likert-scale items in survey items. These general perception items of the survey such as respondents' perception regarding the importance or use of different selection criteria of the different floors material scored with the help of this method. The derived Cronbach's Alpha coefficient was [value, for example, 0.87] that indicates high reliability since higher values of above 0.70 are mostly acceptable in social science research.

However, one must bear in mind that Cronbach's Alpha cannot examine the pairwise comparison data utilized in the Analytic Hierarchy Process (AHP). The reason being that there are inherent differences between the nature, objective, and assumption of the two methods. On the other hand, AHP methodology based on the building of reciprocating pairwise comparison matrices in which decision-makers compare two entities at once on a ratio scale (usually 1 to 9) to indicate relative importance. The matrices are not rating scales for items but a formal format for gathering relative priority weights. There is a focus in AHP neither on consistency of items for internal response, nor on logical consistency of judgments by all respondents.

Hence, Cronbach's Alpha cannot be used to estimate the reliability of AHP pairwise comparison matrices. However, AHP possesses its own consistency check indexes, i.e., Consistency Index (CI) and Consistency Ratio (CR), both introduced by Saaty (1980). Consistency Ratio (CR) measures the level of consistency in a pairwise comparison matrix compared to the Random Index (RI), the average CI of randomly generated matrices of the same order. A CR ratio of 0.10 (10%) or less is generally acceptable and means that judgments are consistent enough to be used in decision-making.

The Consistency Ratio (CR) does not directly measure data reliability. As much as it filters out logical consistency of pairwise comparisons during the AHP process, it does not test for internal consistency or stability of data across several items or subjects. Reliability, in the case of survey data, generally measured with Cronbach's Alpha, which checks for response consistency across similar items. The CR not be equated with measures of reliability

S.No	Pairwise comparison	Consistency Ratio %
1	Criteria Comparison	2.95
2	Alternatives Comparison for the Initial Cost Criterion	4.2
3	Alternatives Comparison for the Maintenance Cost Criterion	2.3
4	Alternatives Comparison for the Installation Cost Criterion	8.3
5	Alternatives Comparison for the Durability Criterion	3
6	Alternatives Comparison for the Resistance to External Factors Cost Criterion	2.6
7	Alternatives Comparison for the Ease of Installation Criterion	2.4
8	Alternatives Comparison for the Appearance Criterion	1

9	Alternatives Comparison for the Design Compatibility Criterion	6.37
10	Alternatives Comparison for the User Preference Criterion	1.1
11	Alternatives Comparison for the Local Availability Criterion	1.85
12	Alternatives Comparison for the Comfort Criterion	9.86
13	Alternatives Comparison for the Safety Criterion	8.2
14	Alternatives Comparison for the Sustainability Criterion	1.5
15	Alternatives Comparison for the Recyclability Criterion	2.3
16	Alternatives Comparison for the Environmental Impact Criterion	8.53

Table 4.1 Consistency Ratio of criteria and alternative for each criterion pairwise comparison

4.5. Current Practices in Flooring Finishing Material Selection

This section discusses and analyzes the findings to the initial research objectives: To analyze the current practices of selecting flooring finishing materials in construction works in Addis Ababa. Analysis of data from 50 experts such as architects, engineers, and contractors through a pre-set questionnaire distributed through the Kobo Toolbox platform. The questionnaire was conducted in 14 commercial structures (G+10 and above) and 4 public structures (G+6 and upwards) in Addis Ababa. The conclusions correspond with both the choice criteria employed within current practice and decision-making strategies adapted by practitioners.

4.5.1. Selection Criteria Used in Practice

The survey utilized the Analytic Hierarchy Process (AHP) to assess the relative importance of 15 flooring material selection criteria. Respondents performed pairwise comparisons, and the results aggregated to calculate priority weights and rankings for each criterion. Table 4.2 presents the resulting priority weights.

	CRITERIA	Priority weights %	Total weights %
Economic factor	Initial Cost	14.8	
	Maintenance Cost	10.37	
	Installation Cost	6.8	31.97
Technical Factor	Durability	8.8	
	Resistance to External Factors	7.8	
	Ease of Installation	6.04	22.64
Aesthetics Factors	Appearance	7.16	
	Design Compatibility	6.12	13.28
	Local Availability	4.94	
Stakeholder preferences	User Preference	6.61	11.55
	Safety	5	
	Comfort	6.05	11.05
Functional Factor	Sustainability	4.03	
	Recyclability	3.1	
	Environmental Impact	2.43	9.56

Table 4.2: Criteria for Flooring Material Selection and Their Priority Weights

The results clearly show that economic considerations are the most influential, with Initial Cost and Maintenance Cost ranked first and second, respectively. Durability and Resistance to External Factors, both part of the technical category, also ranked highly. In contrast, environmental criteria such as Recyclability and Environmental Impact received the lowest priority, indicating limited concern for sustainability in current flooring decisions.

4.5.2. Current Decision-Making Practices

Although AHP has been used here for analytical purposes, the experts during the questionnaire expressed that, in real project practice, floor coverings are usually chosen on personal experience, informal intuition, and cost-preference consideration. Formal decision-support tools i.e., AHP or other Multi-Criteria Decision-Making (MCDM) techniques, are not being applied in routine project operations. Rather, decisions are guided by Familiarity of particular products, past project history, short-run cost orientation and Client preferences.

This unofficial, experiential approach is not consistent and can result in suboptimal selection of materials, especially for long-term performance, life-cycle cost, or environmental impacts not comprehensively considered.

4.5.3. Discussion of Findings

The results address the realities and limitations of professionals within the construction industry in Addis Ababa. The ranking priority of Initial Cost (14.8%) and Maintenance Cost (10.37%) addresses the heavy focus on budget limitations, a feature widespread in construction projects within urban settings of developing cities.

Technical performance of materials such as Durability (8.80%) and Resistance to External Factors (7.80%) also receives attention, addressing the focus on lifespan and toughness in the context of urban building. Appearance and Design Compatibility are of moderate relative importance, indicating that aesthetics are taken into account but not at the expense of functionality and cost.

The fact that Sustainability (4.03%), Recyclability (3.10%), and Environmental Impact (2.43%) received limited weighting is particularly noteworthy. The outcome shows that the environment is not yet the priority in flooring material choices in Addis Ababa. This goes against global best practice, wherein green building certification programs and green building textbooks significantly emphasize environmental concerns in materials choices.

Furthermore, the leaning toward depending on experience and unstructured methods, as indicated by the majority respondents, reveals that no clear-cut decision-support tools exist in the domestic market. Such rule-of-thumb approaches might be suitable for some instances, but they are likely to be biased and inconsistent, and they do not lend themselves to the complexities of multi-party projects. Application of methods such as AHP or other MCDM tools would enhance transparency, replicability, and alignment with long-term performance objectives.

Finally, current practices in Addis Ababa predominantly shaped by economic and technical considerations, with little emphasis on environmental impact or formal decision models. While understandable given the constraints, this presents a significant opportunity for improvement in sustainable and performance-based material selection.

4.6. Determination of Criteria Priority Weights Using AHP

4.6.1. Criteria Priority Weights

This part explains the systematic procedure undertaken to establish the priority weights of the fifteen criteria used in considering flooring finishing materials for high-rise public and commercial buildings in Addis Ababa. The Analytical Hierarchy Process (AHP) model, a work of Saaty (1980) that employed in carrying out the multi-criteria analysis. It is a systematic procedure, which performs pairwise comparison of the criteria using expert judgment and calculates their relative importance (priority weights) by following a systematic and orderly procedure.

To determine the relative importance of the selection criteria, pairwise comparisons conducted using the Analytical Hierarchy Process (AHP) based on Saaty's fundamental scale. These comparisons between expert opinions captured with the use of standard questionnaires. The principal objective of this step was to understand the importance stakeholders place on each criterion when choice of flooring material for public and commercial building in Addis Ababa. The consistency of pairwise comparisons quantified by the Consistency Ratio (CR), and the total CR value of 2.95%, which is well below the acceptable maximum value of 10%. This indicates that the judgments provided by the experts were logically consistent and reliable for use in subsequent analysis.

The final computed priority weights of the criteria presented in Table 4.3 These weights subsequently used to assess and rank the flooring material alternatives.

CRITERIA	Priority Weights %	RANK
Initial Cost	14.8	1
Maintenance Cost	10.37	2
Durability	8.8	3
Resistance to External Factors	7.8	4
Appearance	7.16	5
Installation Cost	6.8	6
User Preference	6.61	7
Design Compatibility	6.12	8
Comfort	6.05	9
Ease of Installation	6.04	10
Safety	5	11
Local Availability	4.94	12
Sustainability	4.03	13
Recyclability	3.1	14
Environmental Impact	2.43	15

Table 4.3: Final Priority Weights of Criteria for Flooring Material Selection

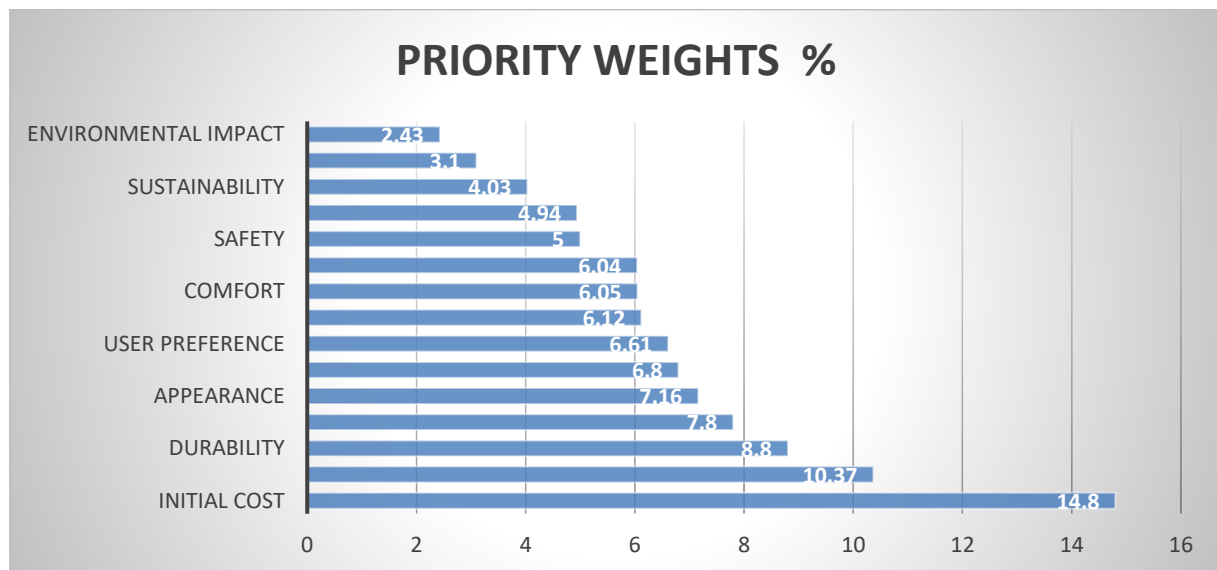


Figure 4.4 Final Priority Weights of Criteria for Flooring Material Selection

CRITERIA		Priority weights %	Total weights %
Economic factor	Initial Cost	14.8	31.97
	Maintenance Cost	10.37	
	Installation Cost	6.8	
Technical Factor	Durability	8.8	22.64
	Resistance to External Factors	7.8	
	Ease of Installation	6.04	
Aesthetics Factors	Appearance	7.16	13.28
	Design Compatibility	6.12	
	Local Availability	4.94	
Stakeholder preferences	User Preference	6.61	11.55
	Safety	5	
	Comfort	6.05	
Functional Factor	Sustainability	4.03	9.56
	Recyclability	3.1	
	Environmental Impact	2.43	

Table 4.4 Main Criteria Priority Weights

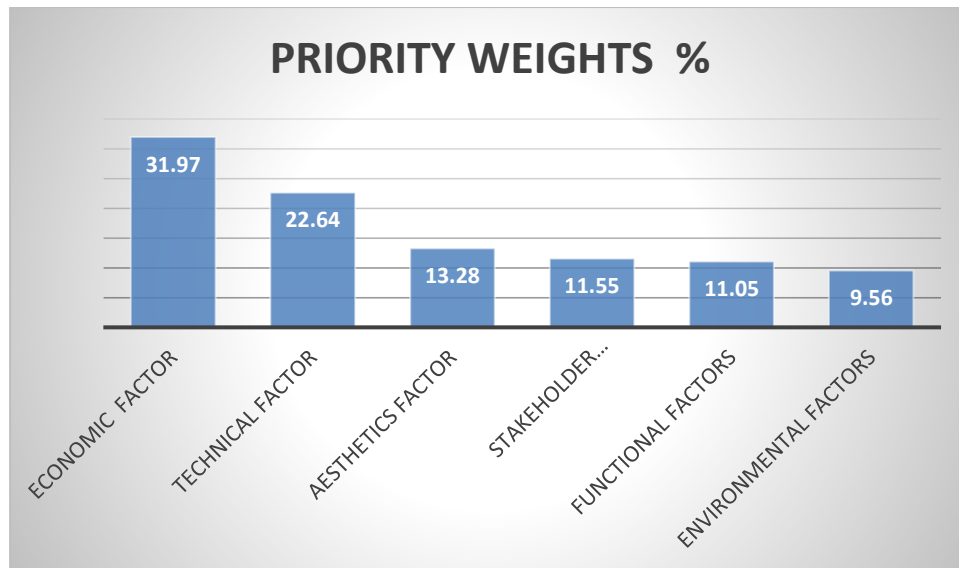


Figure4.5 Main Criteria Priority Weights

4.6.2. Discussion and Interpretation of Criteria Weights

The Analytic Hierarchy Process (AHP) results provided a prioritized list of the fifteen criteria considered in the selection of flooring finishing materials for high-rise commercial and public buildings in Addis Ababa. These priorities reflect the aggregated judgments of expert respondents, including architects, contractors, building owners, and engineers involved in the construction sector. The next subsection addresses the relative significance of each criterion and explores the implications of the results within the context of the research.

4.6.2.1. Economic and Technical Criteria as Primary Drivers

The three most important criteria with highest weights are Initial Cost (14.80%), Maintenance Cost (10.37%), and Durability (8.80%), in priority order. The three together account for nearly 34% of the total weight, reflecting cost-effectiveness and long-term material performance to be the most influential considerations in flooring material choice. The dominance of Initial Cost reflects that budgetary considerations remain one of the top concerns for both private and public projects. Decision-makers are extremely sensitive to the initial expenditures involved in material acquisition, possibly because project budgets are limited and they have a need to optimize spending.

Maintenance Cost, ranked second, reflects an increasing awareness of life-cycle cost implications. Flooring materials that require minimal upkeep are favored, particularly in high-traffic environments such as commercial buildings, where long-term operational costs are significant.

Third in importance is durability, which emphasizes selecting materials that are wear-resistant, impact, and over-use over long periods. For multi-story buildings with higher occupancy rates, durability is a priority to reduce replacements, repairs, and associated downtime.

4.6.2.2. Secondary Importance of Technical and Aesthetic Qualities

The parameters Appearance (7.16%), Resistance to External Factors (7.80%), and Installation Cost (6.80%) constitute a second level of priority. These parameters constitute a concern with functional performance attributes apart from cost and durability. Resistance to External Factors stipulates the ability of the material to resist environmental stressors like moisture, abrasion, and chemical exposure. The relatively high ranking indicates functional resilience issue, particularly in areas that experience heavy use or cleaning chemicals.

Appearance, although not among the top three, remains significant, especially for projects that emphasize interior design and visual appeal. This suggests that aesthetic considerations integrated but not prioritized over economic and functional criteria.

Installation Cost, ranking sixth, signals the influence of labor and installation logistics. However, it weighted less than lifecycle and performance attributes, possibly because professional installation generally expected for high-rise buildings, where quality control and compliance standards are stricter.

4.6.2.3. Moderate Emphasis on Stakeholder Preferences and Comfort

The middle-order determinants are User Preference (6.61%), Design Compatibility (6.12%), and Comfort (6.05%). They reflect common stakeholder views and experiential determinants of the flooring material. User Preference reflects the importance given to stakeholder involvement, such as building owners', tenants', or designers' wishes. Its middle-order ranking reflects that although user view considered, they are not the determining factor in the final material choice. Design Comfortability and Compatibility are matters of visual incorporation with architectural designs and thermal or acoustical characteristics, respectively. These, while especially pertinent, seen as extra rather than inherent standards.

4.6.2.4. Lower Priority of Environmental and Regulatory Considerations

The lowest ranks among the criteria are Ease of Installation (6.04%), Safety (5.00%), Local Availability (4.94%), Sustainability (4.03%), Recyclability (3.10%), and Environmental Impact (2.43%). Although Ease of Installation is crucial operationally, the lower weight indicates that stakeholders leverage specialist installer availability or assess installation difficulty not a significant hindrance. The low weight given to Safety is interesting. This can

attributed to the presumption that all material chosen is subject to minimum safety standards and regulations, hence being a non-separator criterion of material choice.

Local Availability, while no doubt to be more prevalent in the Ethiopian environment in light of potential supply chain shortages, came in at twelfth. The outcome may reflect that materials are generally imported, or procurement planning suppresses availability as an issue. Environmental factors Sustainability, Recyclability, and Environmental Impact allocated lowest weights. Combined, they cover only approximately 9.5% of the overall decision weight, suggesting that environmental factors currently undervalued materials selection processes in Addis Ababa. The reason was due to the absence of enforcement of green building regulations, cost pressures, or a lack of awareness regarding environmental impacts.

4.6.2.4. Summary of Implications

In summary, the results indicate that economic and performance-based criteria dominate the decision-making process, while environmental and subjective considerations perceived as less critical. This pattern reflects the current priorities in the Addis Ababa construction sector, where cost control and reliability are essential due to market pressures and resource constraints. The relatively low importance assigned to environmental criteria highlights a potential area for policy intervention, awareness building, and capacity development in sustainable construction practices.

4.7. Determination of Alternative Priority Weights under Each Criterion

The following section offers the outcomes of the Analytical Hierarchy Process (AHP) used to calculate priority weights of the alternatives of flooring materials based on each one of the fifteen choice criteria that listed in this research. Pairwise comparisons between nine flooring alternatives for each criterion based on Saaty's basic scale used in AHP, and information gathered from expert-building industry stakeholders in Ethiopia. Relative importance weights of priority for each alternative obtained from pairwise comparisons utilized to develop comparison matrices. Each matrix's consistency tested against the Consistency Ratio (CR) and with values, less than 0.10 deemed acceptable as per AHP best practice (Saaty T. , 1980).

The subsequent sub-sections provide each of the alternative priority weights within one criterion that is the basis of multi-criteria decision-making for the selection of commercial and public high-rise building flooring materials in Addis Ababa.

4.7.1. Alternatives under Initial Cost criterion

The final computed priority weights of the Alternatives under Initial Cost criterion presented in Table 4.4.

Alternatives	PRIORITY WEIGHTS %	RANK
Concrete-Based Flooring	23.24	1
Epoxy Flooring	15.62	2
Porcelain/Ceramic Tiles.	15.39	3
Vinyl Flooring	11.69	4
Terrazzo Flooring	9.71	5
Rubber Flooring	7.46	6
Engineered Wood Flooring	6.20	7
Wood Flooring	5.68	8
Natural Stone Flooring	5.02	9

Table 4.5 Final Priority Weights of Alternatives under Initial Cost Criterion

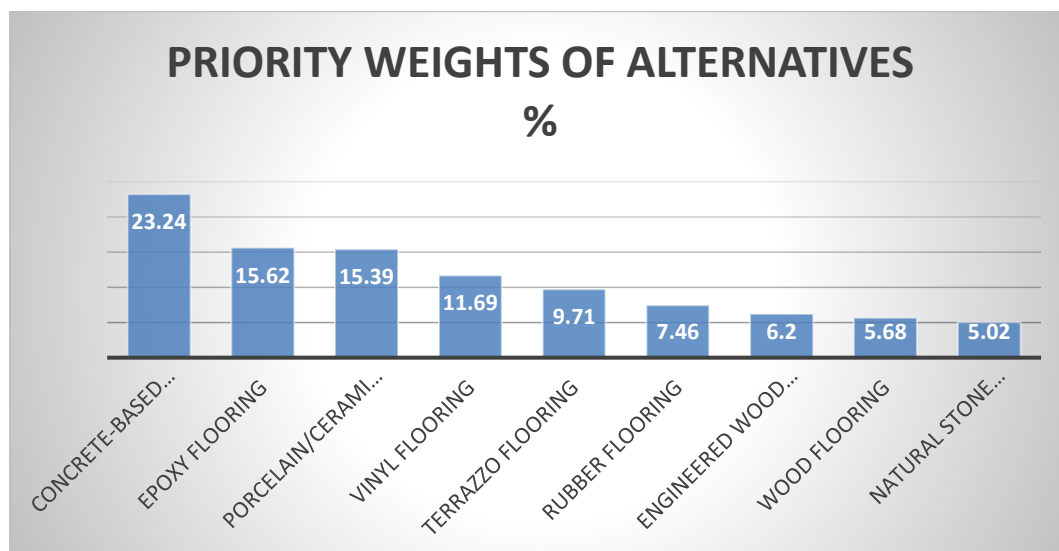


Figure 4.6. Final Priority Weights of Alternatives under Initial Cost Criterion

Discussion of Final Priorities under Initial Cost Criterion

Table 4.4 presents the priority weights of flooring options under the Initial Cost criterion overall. The findings are that Concrete-Based Flooring is the highest with the overall priority weight of 23.24% and hence is the preferred choice when cost is a concern. This is an implication that the stakeholders find the concrete-based materials as being cost saving, particularly for commercial and public works of goliath size where the area of flooring covers large space. Porcelain/Ceramic Tiles (15.39%) and Epoxy flooring (15.62%) come in at second and third, respectively. With the scores that close, these two of the materials that found to be economically sound, with relatively moderate initial outlays in proportion to their performance and availability. Terrazzo (9.71%) and Vinyl flooring (11.69%) are of medium cost. Utilize not the cheapest to be sure, but those where special functional or aesthetic requirements warrant the higher price.

Lower-ranked materials include Rubber Flooring (7.46%), Engineered Wood (6.20%), Wood Flooring (5.68%), and Natural Stone (5.02%) assigned the lowest weights. This indicates the impulse to buy perception that these materials are comparably costly to acquire and install, thus less favorable options regard to the cost aspect, particularly for cost-constrained projects.

In summary, the ranking demonstrates that cost remains a primary determinant in flooring selection, with a clear preference for materials that balance affordability with adequate performance. More expensive or premium options tend to deprioritized when initial budget constraints are a key concern.

4.7.2. Determination of Alternative Priority Weights under Maintenance Cost

To maintain clarity and avoid redundancy, only one representative alternative comparison (under the Initial Cost criterion has been discussed in detail to illustrate the systematic procedure followed during the AHP analysis. This example encompasses all stages, including the construction of the pairwise comparison matrix, application of Saaty's fundamental scale, consistency verification (CR calculation), and priority vector derivation. The same process of methodology held rigorously for every one of the other flooring material alternatives under the other categories. Since the Analytical Hierarchy Process (AHP) requires a uniform process for comparability as well as reliability, the same steps adopted to analyze each of the alternatives to ensure methodology and outcomes validity.

Under the maintenance cost criterion, expert respondents completed 36 pairwise comparisons. The priority weights derived from the matrix presented in Table 4.5. The CR value was 0.0229, confirming the reliability of the data

Alternatives	PRIORITY WEIGHTS %	RANK
Porcelain/Ceramic Tiles.	23.7	1
Concrete-Based Flooring	20.3	2
Natural Stone Flooring	14.6	3
Epoxy Flooring	8.9	4
Terrazzo Flooring	8.1	5
Vinyl Flooring	7.8	6
Rubber Flooring	6.4	7
Engineered Wood Flooring	5.5	8
Wood Flooring	4.8	9

Table 4.6 Final Priority Weights of Alternatives under Maintenance Cost Criterion

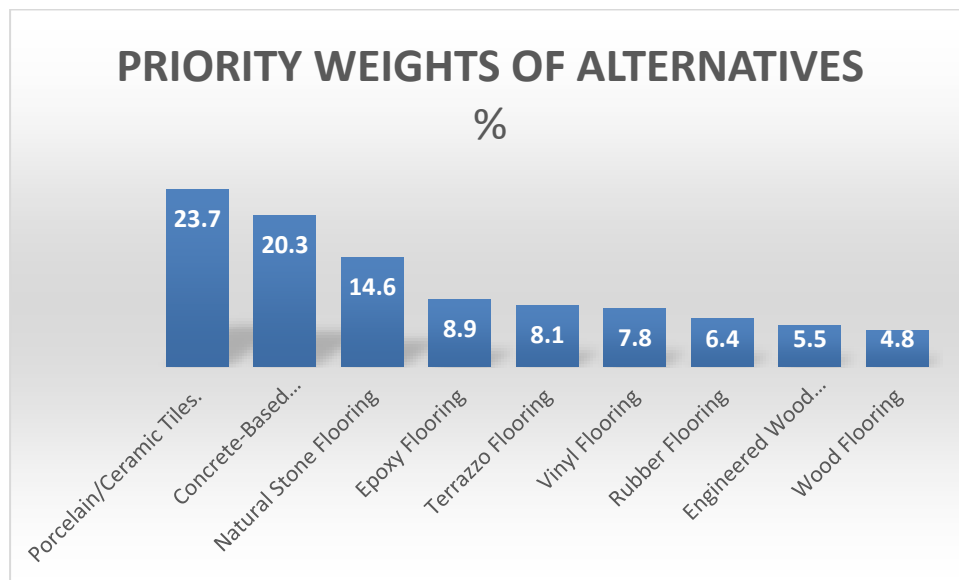


Figure 4.7. Final Priority Weights of Alternatives under Maintenance Cost Criterion

Discussion of Final Priorities under Maintenance Cost Criterion

Maintenance cost is an important component in long-term economic evaluation of flooring material as it directly influences operational cost and users' convenience. Evidence shows that Porcelain/Ceramic Tiles are the most economical to maintain, with 23.7% stakeholder

preference. They are low maintenance and simple to clean, with great suitability in both public and business environments. Concrete-Based Flooring follows closely at 20.3%, as it is favored due to its minimal maintenance needs and durability, although it may at times require sealing to preserve its surface integrity. Natural Stone Flooring, naturally very resistant, takes the third spot at 14.6%, merely because it will occasionally need to seal to preserve its look and functionality. Epoxy Flooring, at 8.9%, is favored due to resistance against chemicals and heavy loads, but it will over time need re-coating. Terrazzo, 8.1%, is also very long lasting but has to polish to maintain its appearance. Vinyl flooring (7.8%) is cheap but wear and tear-prone, causing more maintenance throughout its lifespan. 6.4% belongs to Rubber Flooring, whose maintenance intensity arises from the requirement of special cleaning processes. Engineered Wood Flooring (5.5%) and Wood Flooring (4.8%) have the highest maintenance cost to share. Engineered wood damaged by moisture, whereas natural wood needs to be refinished repeatedly and is typically less durable under extensive use. Such a preference is indicative of the need to choose flooring materials that fall within maintenance capacity and long-term facility management objectives

4.7.3. Determination of Alternative Priority Weights under Installation Cost

Under the Installation cost criterion, expert respondents completed 36 pairwise comparisons. The priority weights derived from the matrix presented in Table 4.6. The CR value was 0.083, confirming the reliability of the data

Alternatives	PRIORITY WEIGHTS %	RANK
Vinyl Flooring	22.8	1
Concrete-Based Flooring	16.8	2
Epoxy Flooring	13.3	3
Porcelain/Ceramic Tiles.	12.3	4
Engineered Wood Flooring	11.1	5
Wood Flooring	7.2	6
Rubber Flooring	6.8	7
Terrazzo Flooring	4.99	8

Table 4.7 Final Priority Weights of Alternatives under Installation cost Criterion

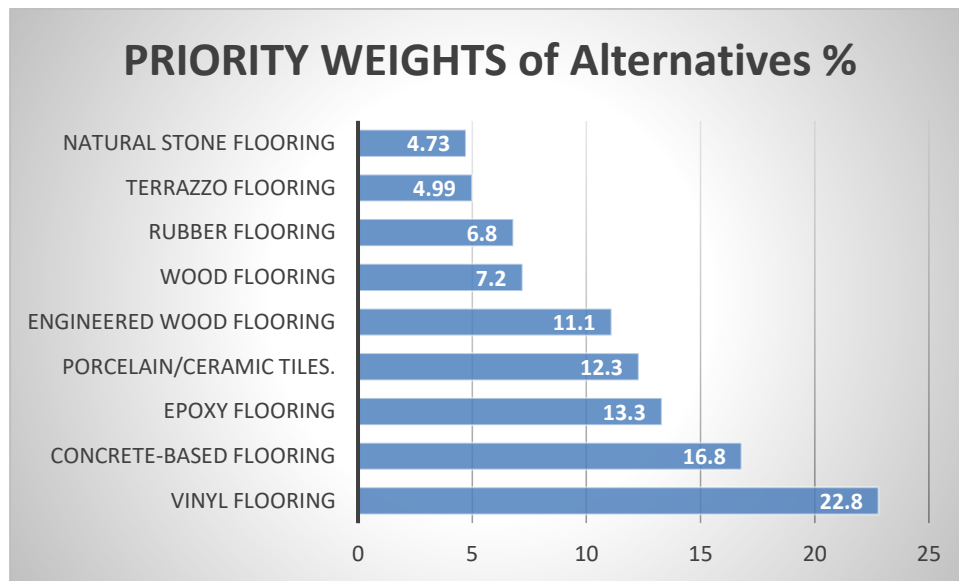


Figure 4.8. Final Priority Weights of Alternatives under Installation cost Criterion

Discussion of Final Priorities under Installation Cost Criterion

Installation cost is an important factor in material selection, where labor and time are issues. Vinyl Flooring is at the top with cost-effectiveness at 22.8%, with less labor and simplicity of installation. Concrete-Based Flooring is second at 16.8%, with moderate installation cost. Epoxy Flooring is third at 13.3%, which is moderately costly although needing skilled application. Porcelain/Ceramic Tiles is fourth at 12.3%, needing skilled labor but still affordable. Engineered Wood Flooring (11.1%) is easier to install than solid wood. Wood Flooring (7.2%) and Rubber Flooring (6.8%) are higher because they need professional fitting and special adhesives, respectively. Terrazzo (4.99%) and Natural Stone Flooring (4.73%) are the lowest as they both have long and complex installation.

4.7.4. Determination of Alternative Priority Weights under Durability

Under the Durability criterion, expert respondents completed 36 pairwise comparisons. The priority weights derived from the matrix presented in Table 4.7. The CR value was 0.0299, confirming the reliability of the data

Alternatives	PRIORITY WEIGHTS %	RANK
Natural Stone Flooring	30.15	1
Concrete-Based Flooring	19.4	2
Porcelain/Ceramic Tiles.	18.3	3
Epoxy Flooring	8.6	4
Terrazzo Flooring	6.8	5
Rubber Flooring	5.21	6
Vinyl Flooring	4.7	7
Wood Flooring	3.6	8
Engineered Wood Flooring	3.3	9

Table 4.8 Final Priority Weights of Alternatives under Durability Criterion

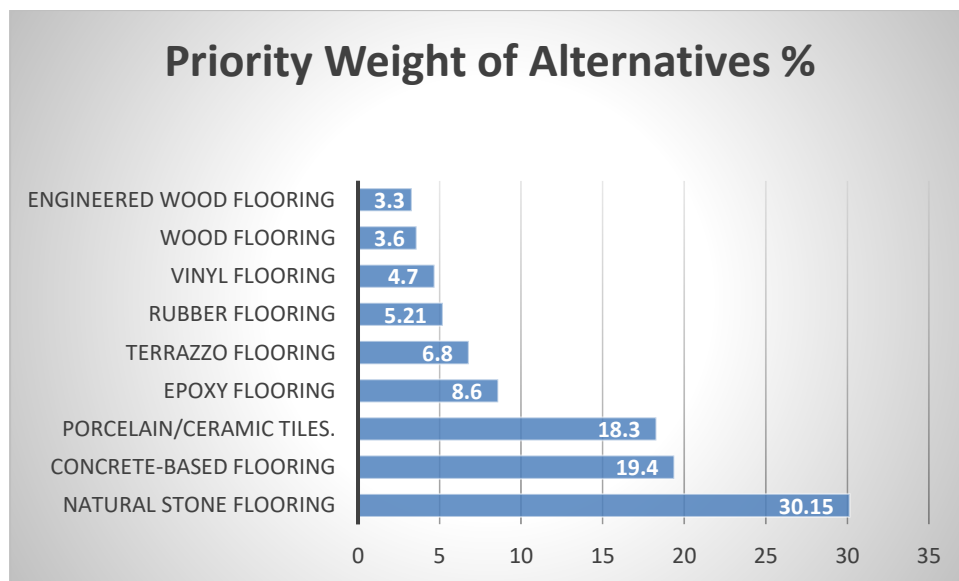


Figure 4.9. Final Priority Weights of Alternatives under Durability Criterion

Discussion of Final Priorities under Durability Criterion

Durability is an important technical consideration in determining flooring, especially for heavy and long-term use. Natural Stone Flooring has the highest score of 30.15%, with great durability and wear resistance. Concrete-Based Flooring has a second highest score of 19.4%, and it provides good durability but sometimes cracks. Porcelain/Ceramic Tiles (18.3%) are

popular because they have scratch resistance and are long lasting. Epoxy Flooring, 8.6%, is chemical- and wear-resistant but deteriorates with the passage of time. Terrazzo (6.8%) is robust but susceptible to cracks. Rubber flooring (5.21%) is shock absorbing but deteriorates with use. Vinyl flooring (4.70%) is less resistant, scratch-prone. Wood Flooring (3.6%) and Engineered Wood Flooring (3.3%) are least resistant, impact- and moisture-resistant.

4.7.5. Determination of Alternative Priority Weights under Resistance to External Factors

Under the Resistance to External Factors criterion, expert respondents completed 36 pairwise comparisons. The priority weights derived from the matrix presented in Table 4.8. The CR value was 0.02575, confirming the reliability of the data

Alternatives	PRIORITY WEIGHTS %	RANK
Natural Stone Flooring	18.1	1
Porcelain/Ceramic Tiles.	17.5	2
Concrete-Based Flooring	15.4	3
Epoxy Flooring	12.8	4
Terrazzo Flooring	11.9	5
Rubber Flooring	9.3	6
Vinyl Flooring	7.7	7
Wood Flooring	4.4	8
Engineered Wood Flooring	3.96	9

Table 4.9 Final Priority Weights of Alternatives under Resistance to External Factors Criterion

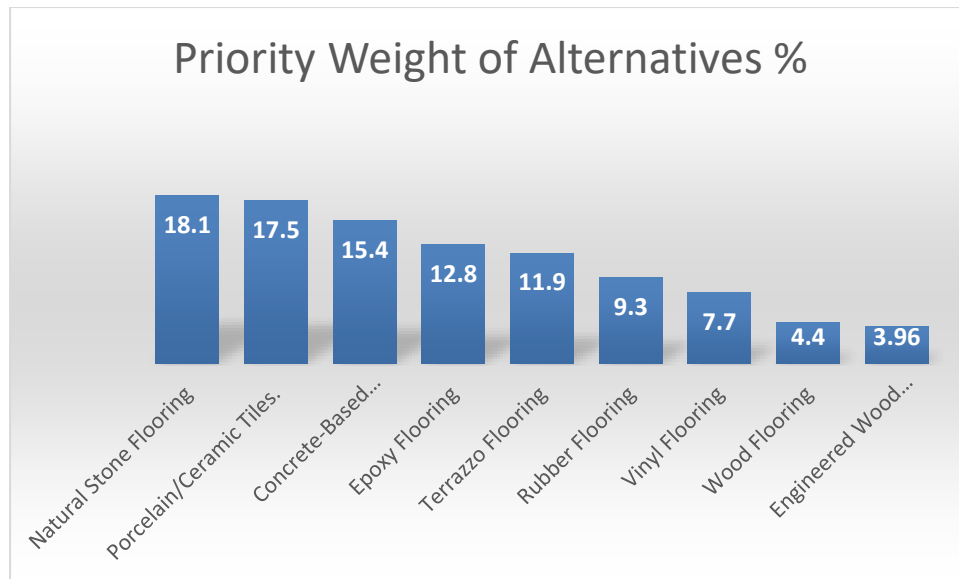


Figure 4.10. Final Priority Weights of Alternatives under Resistance to External Factors

Discussion of Final Priorities under Resistance to External Factors Criterion

Resistance to external factors like water, heat, and physical aggression is critical to achieving flooring performance in extreme conditions. Natural Stone Flooring has the highest rating of 18.1%, which has the best protection for all types of environmental conditions. Porcelain/Ceramic Tiles come second with 17.5%, having water and scratch resistance. Concrete-Based Flooring comes in at 15.4%, being tough but cracking under pressure. Epoxy Flooring, 12.8%, is good but not scratch-resistant. Terrazzo (11.9%) is good in terms of durability but susceptible to crack. Rubber flooring (9.3%) is elastic but chemical-sensitively weak. Vinyl flooring (7.7%) is waterproof but scratch-prone. Wood Flooring (4.4%) and Engineered Wood Flooring (3.96%) are the most vulnerable, being moisture-sensitive and less likely to thrive in harsh conditions.

4.7.6. Determination of Alternative Priority Weights under Ease of Installation

Under the Ease of Installation criterion, expert respondents completed 36 pairwise comparisons. The priority weights derived from the matrix presented in Table 4.9. The CR value was 0.0239, confirming the reliability of the data

Alternatives	PRIORITY WEIGHTS %	RANK
Vinyl Flooring	20.2	1
Engineered Wood Flooring	17.6	2
Epoxy Flooring	15.2	3
Rubber Flooring	12.3	4
Wood Flooring	9.9	5
Porcelain/Ceramic Tiles.	8.6	6
Concrete-Based Flooring	7.01	7
Terrazzo Flooring	5.03	8
Natural Stone Flooring	4.13	9

Table 4.10 Final Priority Weights of Alternatives under Ease of Installation Criterion

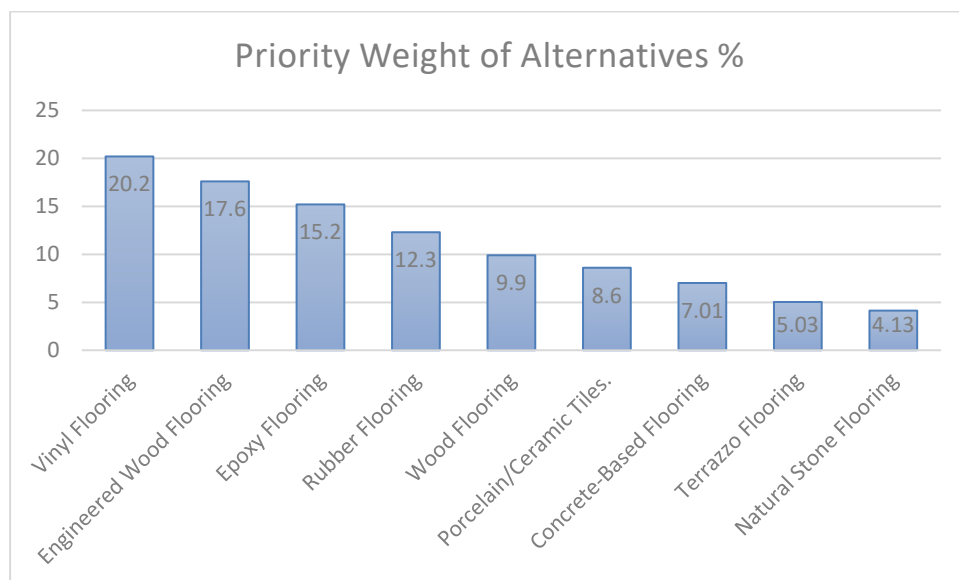


Figure 4.11 Final Priority Weights of Alternatives under Ease of Installation Criterion

Discussion of Final Priorities under Ease of Installation Criterion

Ease of installation is a useful practical consideration in choosing floor coverings where there is a shortage of labor and time. Vinyl Flooring is the biggest at 20.2%, prized for its easy and rapid installation. Engineered Wood Flooring is second at 17.6%, helped by convenient, snap-

together configurations. Epoxy Flooring is 15.2%, needing surface preparation but relatively simple to install. Rubber Flooring is of moderate difficulty at 12.3%, which usually requires adhesive application. Wood Flooring is low at 9.9% because professional installation is required. Porcelain/Ceramic Tiles and Concrete-Based Flooring are both skill- and labor-intensive at 8.6% and 7.01%, respectively, with curing also required for concrete. Terrazzo and Natural Stone Flooring are the most difficult to install, requiring special skill and extensive labor at 5.03% and 4.13%, respectively.

4.7.7. Determination of Alternative Priority Weights under Appearance

Under the Appearance criterion, expert respondents completed 36 pairwise comparisons. The priority weights derived from the matrix presented in Table 4.10. The CR value was 0.009, confirming the reliability of the data

Alternatives	PRIORITY WEIGHTS %	RANK
Natural Stone Flooring	22.9	1
Wood Flooring	19.2	2
Engineered Wood Flooring	15.1	3
Terrazzo Flooring	11.9	4
Porcelain/Ceramic Tiles.	9.4	5
Concrete-Based Flooring	7.4	6
Vinyl Flooring	5.8	7
Rubber Flooring	4.6	8
Epoxy Flooring	3.7	9

Table 4.11 Final Priority Weights of Alternatives under Appearance Criterion

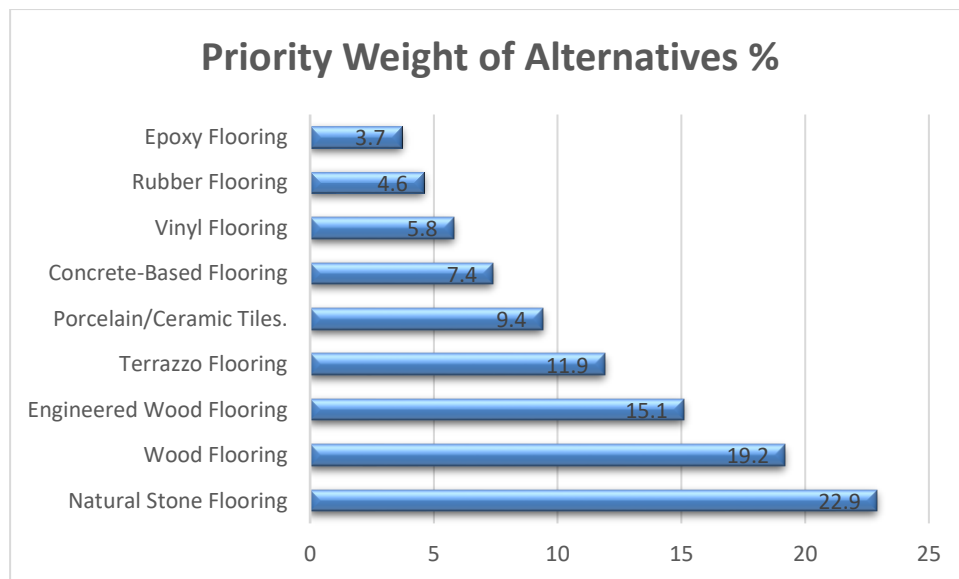


Figure 4.12 Final Priority Weights of Alternatives under Appearance Criterion

Discussion of Final Priorities under Appearance Criterion

Appearance is an important aesthetic factor in flooring material choice, particularly where appearance adds to design value in a general sense. Natural Stone Flooring paces the group at 22.9%, thanks to its regal looks and organically unique patterns. Wood Flooring ranks second at 19.2%, with its classic, cozy, and high-end looks. Engineered Wood Flooring is third at 15.1%, embodying natural wood's essence with the advantage of contemporary finishes. Terrazzo (11.9%) is particularly worth its while for its color customization and decorative value. Porcelain/Ceramic Tiles (9.4%) offer extensive leeway for designing, but are sensed as being more generic in character. Concrete-Based Flooring (7.4%) is most valued for its contemporary, industrial look. Vinyl flooring (5.8%) imitates more up-scale products but is not authentic. Rubber flooring (4.6%) generally chosen according to application rather than aesthetics, while Epoxy Flooring, at 3.7%, has a shiny smooth finish but is found to be the most unattractive because of its industrial character.

4.7.8. Determination of Alternative Priority Weights under Design Compatibility

Under the Design Compatibility criterion, expert respondents completed 36 pairwise comparisons. The priority weights derived from the matrix presented in Table 4.9. The CR value was 0.0637, confirming the reliability of the data

Alternatives	PRIORITY WEIGHTS %	RANK
Porcelain/Ceramic Tiles.	23.2	1
Engineered Wood Flooring	15.4	2
Wood Flooring	14.9	3
Epoxy Flooring	11.9	4
Vinyl Flooring	11.1	5
Natural Stone Flooring	8.5	6
Rubber Flooring	5.9	7
Concrete-Based Flooring	5.4	8
Terrazzo Flooring	3.8	9

Table 4.12. Final Priority Weights of Alternatives under Design Compatibility Criterion

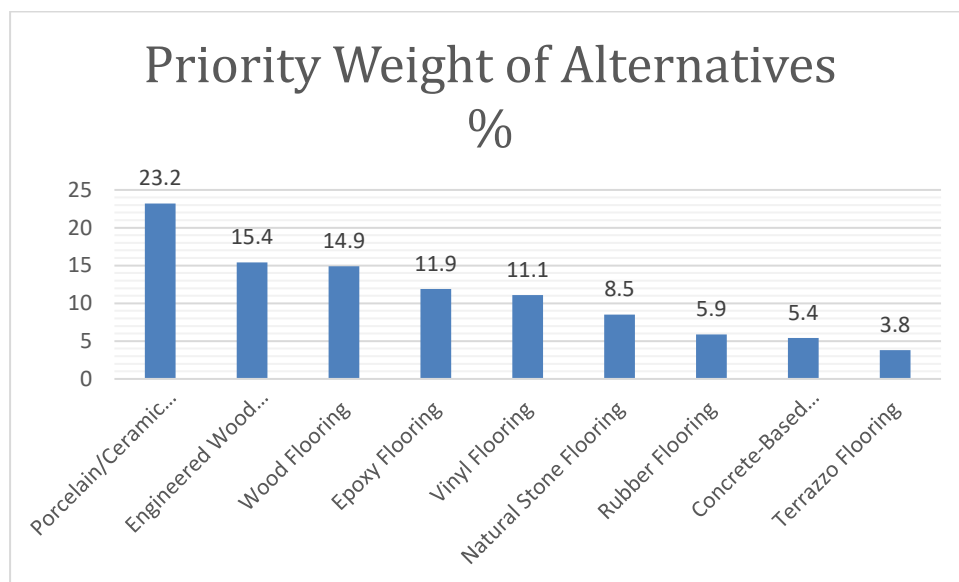


Figure 4.13 Final Priority Weights of Alternatives under Design Compatibility Criterion

Discussion of Final Priorities under Design Compatibility Criterion

Design compatibility is how much a floor surface is compatible with different architectural and interior designs. Porcelain/Ceramic Tiles is first at 23.2%, prized for its extensive palette of colors, textures, and finishes fitting both contemporary and classical designs. Engineered Wood

Flooring is second at 15.4%, whose clean, modern look versatile for different design conditions. Wood Flooring is third at 14.9%, renowned for its classic, natural appearance complementing other interiors. Epoxy flooring (11.9%) is a clean industrial appearance, appropriate for modern and functional environments. Vinyl flooring (11.1%) is stylistically versatile with mixed patterns but lacking the luxury feel of more expensive ones. Natural Stone Flooring (8.5%) is luxurious but perhaps not for all styles. Rubber flooring (5.9%) and Concrete-Based Flooring (5.4%) are very functional with little great stylistic versatility. Terrazzo, 3.8%, is unique in appearance but less universally compatible and usually best suited to specialty or niche applications.

4.7.9. Determination of Alternative Priority Weights under Sustainability

Under the Sustainability criterion, expert respondents completed 36 pairwise comparisons. The priority weights derived from the matrix presented in Table 4.10. The CR value was 0.01478, confirming the reliability of the data

Alternatives	PRIORITY WEIGHTS %	RANK
Concrete-Based Flooring	21.9	1
Porcelain/Ceramic Tiles.	18.3	2
Terrazzo Flooring	13.3	3
Natural Stone Flooring	11	4
Vinyl Flooring	10.1	5
Engineered Wood Flooring	7.6	6
Epoxy Flooring	6.2	7
Wood Flooring	6.02	8
Rubber Flooring	5.5	9

Table 4.13. Final Priority Weights of Alternatives under Sustainability Criterion

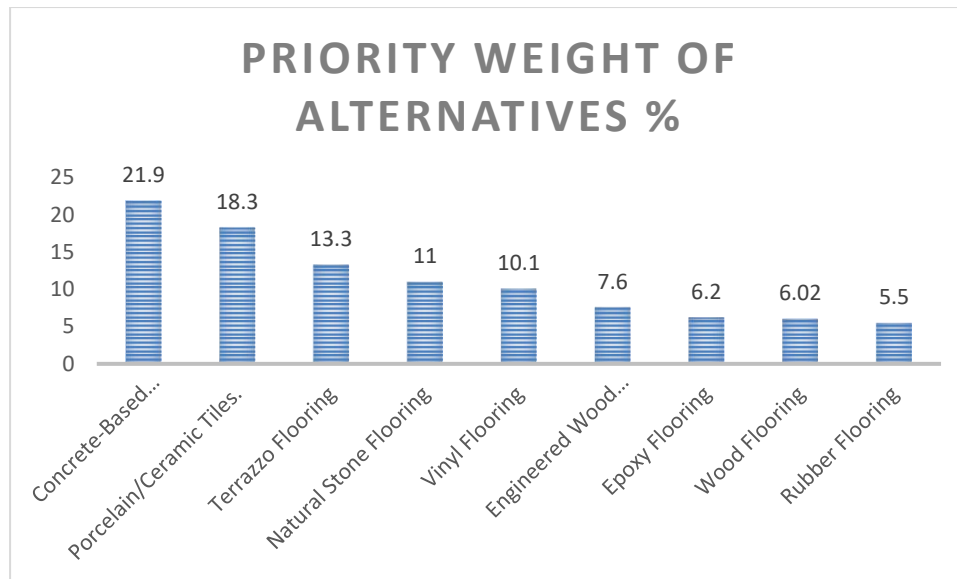


Figure 4.14 Final Priority Weights of Alternatives under Sustainability Criterion

Discussion of Final Priorities under Sustainability Criterion

The AHP results show that Concrete-Based flooring (21.9%) ranks highest in sustainability, likely due to its durability, local availability, and potential use of recycled materials. Porcelain/Ceramic Tiles (18.3%) and Terrazzo (13.3%) follow, both known for long lifespans and eco-friendly production options.

Natural Stone (11%) and Vinyl (10.1%) fall in the middle—stone is natural but resource-intensive, while vinyl is affordable but less recyclable. Lower-ranked materials include Engineered Wood (7.6%), Epoxy (6.2%), Wood (6.02%), and Rubber (5.5%), mostly due to limited recyclability, synthetic content, or environmental concerns in sourcing and production. Overall, the results reflect a preference for durable, locally available, and potentially recyclable flooring options.

4.7.10. Determination of Alternative Priority Weights under Recyclability

Under the Recyclability criterion, expert respondents completed 36 pairwise comparisons. The priority weights derived from the matrix presented in Table 4.11. The CR value was 0.02306, confirming the reliability of the data

Alternatives	PRIORITY WEIGHTS %	RANK
Porcelain/Ceramic Tiles.	20.97	1
Concrete-Based Flooring	16.4	2
Terrazzo Flooring	15.97	3
Natural Stone Flooring	14.0	4
Vinyl Flooring	8.8	5
Rubber Flooring	6.25	6
Engineered Wood Flooring	6.19	7
Epoxy Flooring	6.04	8
Wood Flooring	5.37	9

Table 4.14. Final Priority Weights of Alternatives under Recyclability Criterion

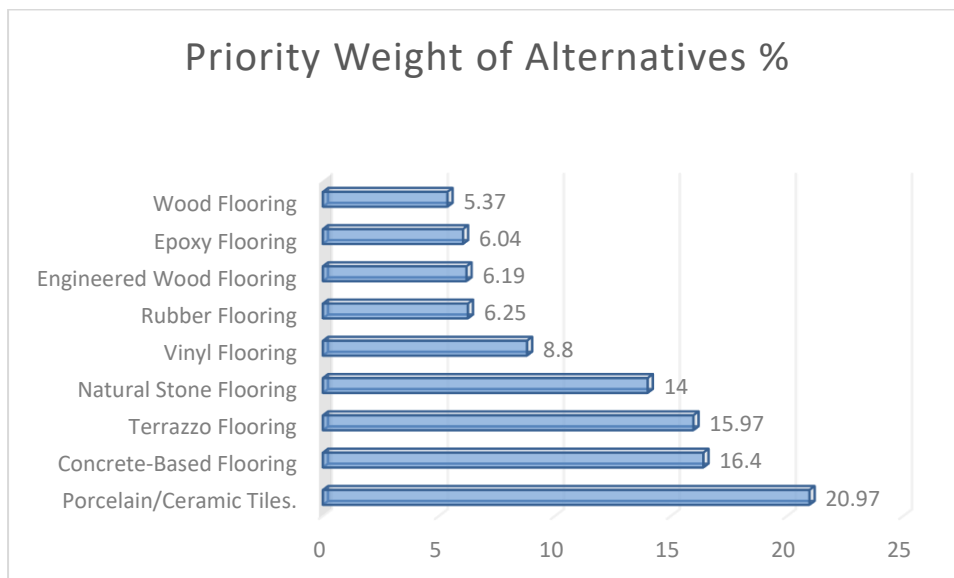


Figure 4.15. Final Priority Weights of Alternatives under Recyclability Criterion

Discussion of Final Priorities under Recyclability Criterion

Recyclability is a key environmental indicator measuring material reuse and waste minimization potential. Porcelain/Ceramic Tiles have the highest with 20.97%, since they are reusable and crushable and used in road construction, thus easily recyclable. Concrete-Based

Flooring has a ranking of 16.4%, often recycled in construction firms. Terrazzo (15.97%) consists of aggregates that provide reusability or recyclability. Natural Stone Flooring (14%) can be recycled but is difficult to work with because it is heavy and bulky. Vinyl flooring (8.8%) is difficult to recycle, and the possibility depends on the exact type. Rubber flooring (6.25%) is also not easy to recycle in large quantities. Engineered Wood Flooring (6.19%) and Wood Flooring (5.37%) are both recyclable but chemical treatment and the state of the wood can make it problematic. Epoxy Flooring, being 6.04%, is the lowest to be recycled and will typically be waste owing to its chemical makeup.

4.7.11. Determination of Alternative Priority Weights under Environmental Impact

Under the Environmental Impact criterion, expert respondents completed 36 pairwise comparisons. The priority weights derived from the matrix presented in Table 4.12. The CR value was 0.0853, confirming the reliability of the data

Alternatives	PRIORITY WEIGHTS %	RANK
Porcelain/Ceramic Tiles.	24.7	1
Terrazzo Flooring	14.5	2
Concrete-Based Flooring	13.9	3
Natural Stone Flooring	12.9	4
Vinyl Flooring	10.4	5
Engineered Wood Flooring	7.8	6
Wood Flooring	6.1	7
Rubber Flooring	4.9	8
Epoxy Flooring	4.8	9

Table 4.15.Final Priority Weights of Alternatives under Environmental Impact Criterion

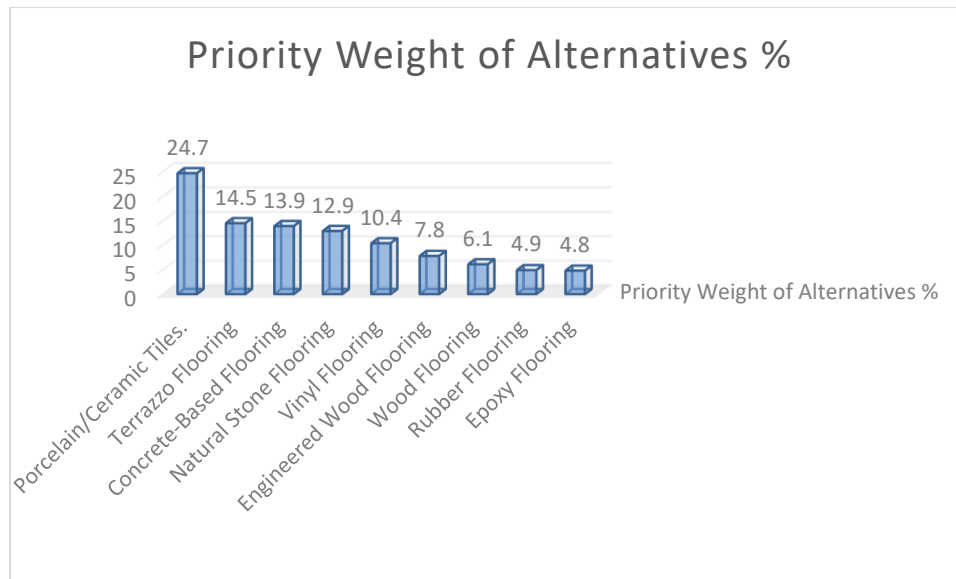


Figure 4.16. Final Priority Weights of Alternatives under Environmental Impact

Discussion of Final Priorities under Environmental Impact Criterion

Environmental impact is the examination of flooring materials' ecological footprint from cradle to grave. Porcelain/Ceramic Tiles has the lowest rating of 24.7%, partly because they manufactured with recycled content, although energy-intensive in production. Terrazzo is second with 14.5%, using recycled aggregates but still loaded with cement-related emissions. Concrete-Based Flooring (13.9%). locally manufactured but loads the environment with cement manufacture. Natural Stone Flooring (12.9%) is tough but entails high-impact quarrying and transportation processes. Vinyl Flooring (10.4%) has huge production energy requirements and waste disposal issues. Engineered Wood Flooring (7.8%) depends on woodland sourcing methods, with possible sustainability issues. Wood Flooring (6.1%) has the potential to be sustainable if responsibly harvested, though deforestation is a concern. Rubber flooring (4.9%) and Epoxy Flooring (4.8%) have the most contribution towards environmental impact through disposal problems and chemical content.

4.7.12. Determination of Alternative Priority Weights under Comfort

Under the Comfort criterion, expert respondents completed 36 pairwise comparisons. The priority weights derived from the matrix presented in Table 4.13. The CR value was 0.099, confirming the reliability of the data

Alternatives	PRIORITY WEIGHTS %	RANK
Rubber Flooring	22.8	1
Wood Flooring	21.2	2
Engineered Wood Flooring	16	3
Vinyl Flooring	11.7	4
Concrete-Based Flooring	8.1	5
Terrazzo Flooring	7.2	6
Porcelain/Ceramic Tiles.	6	7
Natural Stone Flooring	4	8
Epoxy Flooring	3	9

Table 4.16. Final Priority Weights of Alternatives under Comfort Criterion

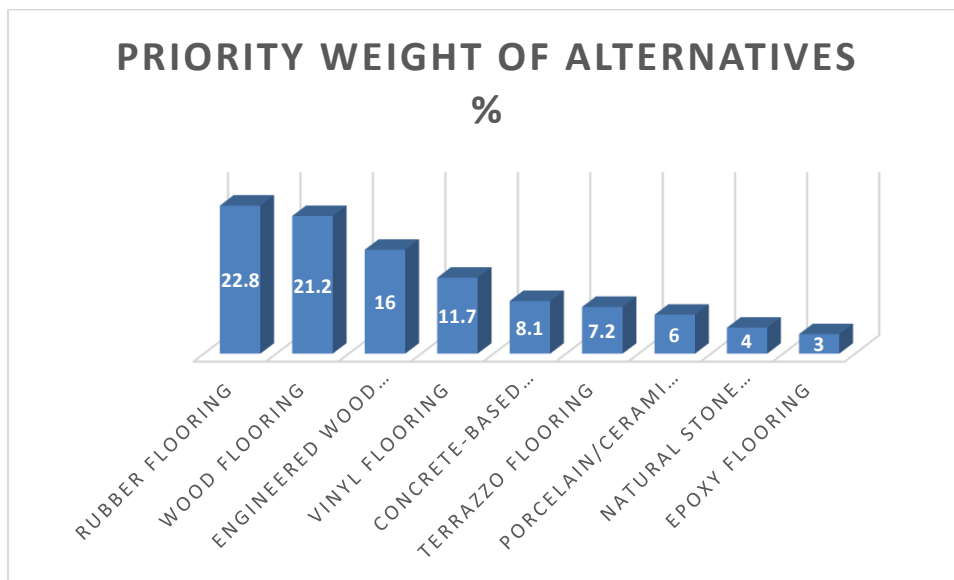


Figure 4.17. Final Priority Weights of Alternatives under Comfort Criterion

Discussion of Final Priorities under Comfort Criterion

Comfort is an important functional characteristic, especially in areas that involve extended standing or foot traffic. Rubber Flooring is top at 22.8%, commended for its gentle, shock-absorbing surface that eases fatigue. Wood Flooring is second at 21.2%, with a natural warmth

and comfort underfoot feel. Engineered Wood Flooring (16%) offers comparable comfort levels with the bonus of dimensional stability. Vinyl Flooring, at 11.7%, is reasonably comfortable since it has some give to it compared to harder surfaces. Terrazzo (7.11%) and Concrete-Based Flooring (8.1%) are not so comfortable since they are cold and hard even though they have a smooth texture. Natural Stone Flooring (4%) and Porcelain/Ceramic Tiles (6%) are at the lower end since they are hard and cold surfaces. Epoxy Flooring, at 3%, is least comfortable since it provides a firm, industrial-quality surface with minimal give.

4.7.13. Determination of Alternative Priority Weights under Safety

Under the Safety criterion, expert respondents completed 36 pairwise comparisons. The priority weights derived from the matrix presented in Table 4.14. The CR value was 0.0816, confirming the reliability of the data

Alternatives	PRIORITY WEIGHTS %	RANK
Rubber Flooring	23.4	1
Porcelain/Ceramic Tiles.	18.8	2
Natural Stone Flooring	14.4	3
Vinyl Flooring	10.7	4
Concrete-Based Flooring	9.5	5
Wood Flooring	6.9	6
Terrazzo Flooring	5.8	7
Engineered Wood Flooring	5.5	8
Epoxy Flooring	5.1	9

Table 4.17 Final Priority Weights of Alternatives under Safety Criterion

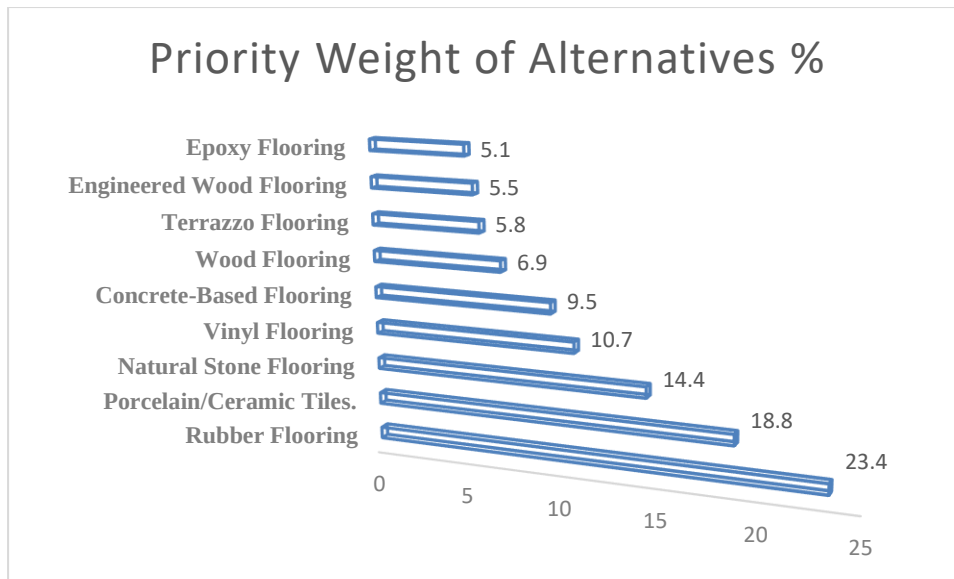


Figure 4.18. Final Priority Weights of Alternatives under Safety Criterion

Discussion of Final Priorities under Safety Criterion

Safety comes first among all flooring options, especially in public and high-traffic areas where accidents from slips and falls need avoided. Rubber Flooring takes the lead with 23.4%, with enhanced slip resistance and shock absorption via cushioning. Porcelain/Ceramic Tiles take the second spot with 18.8%, particularly when textured or coated to resist slips. Third is Natural Stone flooring with 14.4%, having a good grip when well finished. Vinyl flooring (10.7%) is moderately slippery with softer impact response. Concrete-Based Flooring (9.5%) is hard but wet and slippery. Wood Flooring (6.9%) and Terrazzo (5.8%) are slippery, especially when polished. Engineered Wood Flooring (5.5%) has the same problems with better stability. Epoxy Flooring ranks last at 5.1% because of its smooth texture, especially when wet.

4.7.14. Determination of Alternative Priority Weights under User Preference

Under the User Preference criterion, expert respondents completed 36 pairwise comparisons. The priority weights derived from the matrix presented in Table 4.15. The CR value was 0.0111, confirming the reliability of the data

Alternatives	PRIORITY WEIGHTS %	RANK
Porcelain/Ceramic Tiles.	23.4	1
Concrete-Based Flooring	17.4	2
Vinyl Flooring	14.7	3
Natural Stone Flooring	10.8	4
Engineered Wood Flooring	9.8	5
Wood Flooring	7.05	6
Rubber Flooring	6.2	7
Terrazzo Flooring	5.8	8
Epoxy Flooring	4.9	9

Table 4.18 Final Priority Weights of Alternatives User Preference Criterion

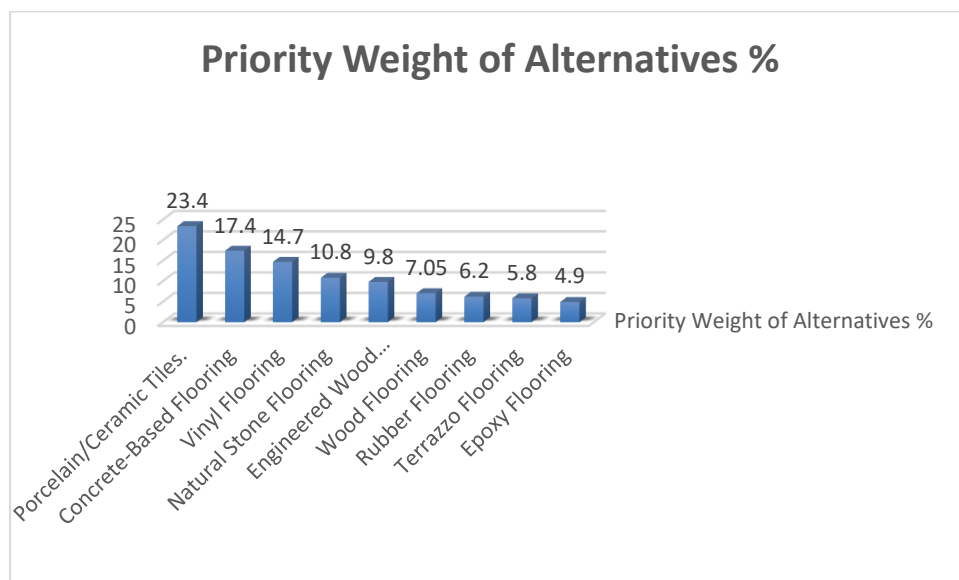


Figure 4.19. Final Priority Weights of Alternatives User Preference Criterion

Discussion of Final Priorities under User Preference Criterion

User preference ratings indicate Porcelain/Ceramic Tiles as the top choice at 23.4% due to flexibility, durability, and appearance. Concrete-Based Flooring comes in second place at 17.4%, selected for affordability and visual diversity. Vinyl Flooring is third at 14.7%,

appreciated for affordability and durability variety. Natural Stone Flooring (10.8%). specified on high-end projects but is not as prevalent overall. Engineered Wood Flooring (9.8%) is more suited for trendy looks on a limited budget, whereas Wood Flooring (7.05%) is retro in appearance but high maintenance. Rubber flooring (6.2%) is largely specialized application, Terrazzo (5.8%) is specialty, and Epoxy Flooring (4.9%) is the least used, largely industrial application

4.7.15. Determination of Alternative Priority Weights under Local Availability

Under the Local Availability criterion, expert respondents completed 36 pairwise comparisons. The priority weights derived from the matrix presented in Table 4.16. The CR value was 0.0186, confirming the reliability of the data

Alternatives	PRIORITY WEIGHTS %	RANK
Concrete-Based Flooring	23.9	1
Porcelain/Ceramic Tiles.	14.97	2
Vinyl Flooring	14.7	3
Terrazzo Flooring	11.3	4
Wood Flooring	8.5	5
Rubber Flooring	7.8	6
Epoxy Flooring	7.6	7
Engineered Wood Flooring	6	8
Natural Stone Flooring	5.3	9

Table 4.19. Final Priority Weights of Alternatives Local Availability Criterion

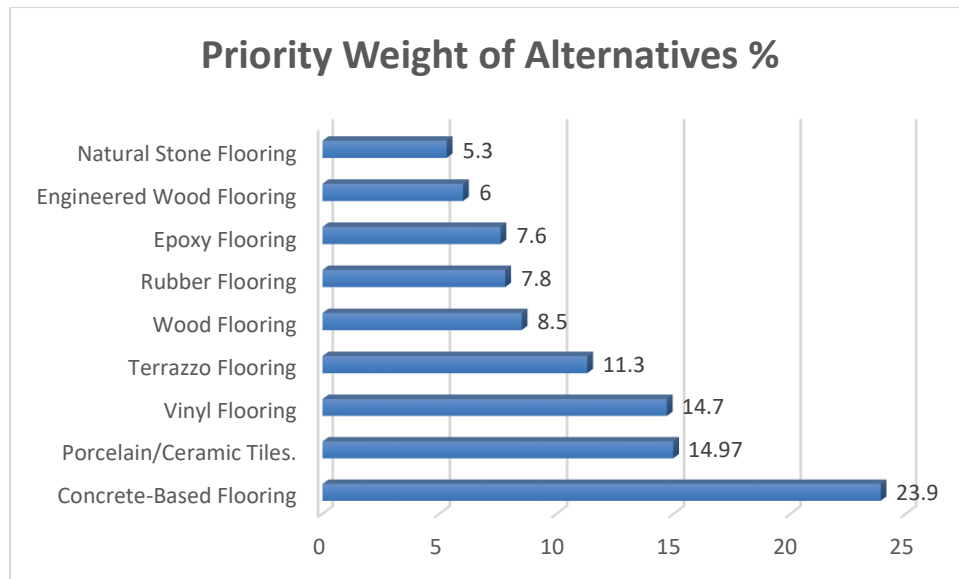


Figure 4.20. Final Priority Weights of Alternatives Local Availability Criterion

Discussion of Final Priorities under Local Availability Criterion

Concrete-Based Flooring (23.9%) is the biggest, which means it is the most common flooring material within the local market. As one can expect, concrete materials frequently manufactured and utilized in Ethiopian construction, especially high-rise buildings. Porcelain/Ceramic Tiles (14.97%) and Vinyl Flooring (14.7%) trail very closely. These usually carried by local stockiest and easily imported, and therefore for use on most projects in Addis Ababa. Terrazzo floor (11.3%) comes fourth, possibly due to the presence of local manufacturing or being composed of local aggregates, although installation reunites the skills of specialist workers. Wood Flooring (8.5%), Rubber Flooring (7.8%), and Epoxy Flooring (7.6%) are in the middle category. They may be moderately available on the market but less distributed and locally manufactured. Engineered Wood Flooring (6%) and Natural Stone Flooring (5.3%) are lowest. These materials are not as easily available or normally imported at a higher cost, rendering them unavailable to most of the projects in Addis Ababa.

4.8. Overall Priority Calculation of Flooring Alternatives Based on weighted criteria

After determining the local priority weights of flooring material alternatives under each selection criterion, and the global priority weights of the criteria themselves, the final step in the AHP process involved synthesizing these values to derive the overall priority scores for each alternative. This synthesis done by multiplying the local weight of each alternative under a given criterion by the global weight of that criterion, then summing across all criteria.

	Porcelain/Ceramic Tiles	Natural Stone	Concrete-Based	Wood	Engineered Wood	Vinyl	Rubber	Terrazzo	Epoxy
Initial Cost	0.023	0.007	0.034	0.008	0.009	0.017	0.011	0.014	0.023
Maintenance Cost	0.026	0.016	0.022	0.005	0.006	0.008	0.007	0.009	0.010
Installation Cost	0.008	0.003	0.011	0.005	0.007	0.015	0.005	0.003	0.009
Durability	0.016	0.026	0.017	0.003	0.003	0.004	0.005	0.006	0.007
Resistance to External Factors	0.014	0.014	0.012	0.003	0.003	0.005	0.007	0.009	0.010
Ease of Installation	0.005	0.002	0.004	0.006	0.011	0.012	0.007	0.003	0.009
Appearance	0.007	0.016	0.005	0.014	0.011	0.004	0.003	0.008	0.003
Design Compatibility	0.014	0.005	0.003	0.009	0.009	0.007	0.004	0.002	0.007
User Preference	0.015	0.007	0.011	0.005	0.006	0.010	0.004	0.004	0.003
Local Availability	0.007	0.003	0.012	0.004	0.003	0.007	0.004	0.006	0.004
Comfort	0.004	0.002	0.005	0.013	0.010	0.007	0.014	0.004	0.002
Safety	0.009	0.007	0.005	0.003	0.003	0.005	0.012	0.003	0.003
Sustainability	0.007	0.004	0.009	0.002	0.003	0.004	0.002	0.005	0.002
Recyclability	0.006	0.004	0.005	0.002	0.002	0.003	0.002	0.005	0.002
Environmental Impact	0.006	0.003	0.003	0.001	0.002	0.003	0.001	0.003	0.001
SUM	0.167	0.117	0.160	0.083	0.088	0.12	0.086	0.08	0.097

Table 4.20 overall score calculation or global priority

Overall Rank the Alternatives

Alternatives	Global Priority %	RANK
Porcelain/Ceramic Tiles.	16.66	1
Concrete-Based Flooring	16.03	2
Natural Stone Flooring	11.72	3
Vinyl Flooring	11.65	4
Epoxy Flooring	9.70	5
Engineered Wood Flooring	8.85	6
Rubber Flooring	8.61	7
Terrazzo Flooring	8.52	8
Wood Flooring	8.31	9

Table 4.21 Overall Rank of Alternatives

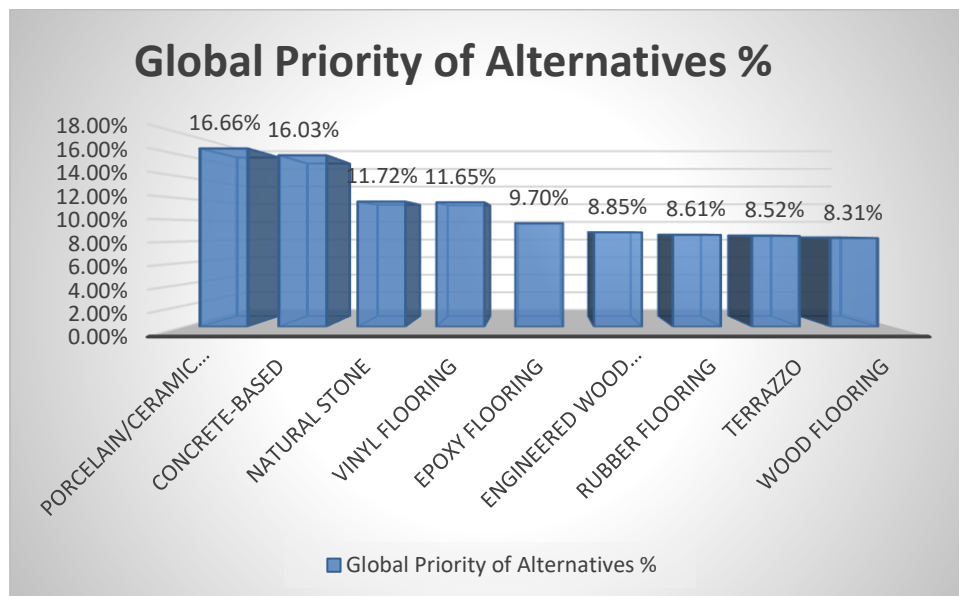


Figure 4.21. Overall Rank of Alternatives

4.8.1. Discussion and Interpretation: Overall Priority Calculation

The last step in the AHP was to combine local priorities for all the flooring materials under a common criterion with the global weights of the criteria themselves. This provided a set of global priority scores, which reflected how each alternative is doing on all the criteria together economic, technical, aesthetic, environmental, functional, and stakeholder-related.

Porcelain/Ceramic Tiles (16.66%) ranked highest, indicating they are the most balanced choice overall. They would have performed well in all facets of durability, appearance, maintenance, and availability and would be the favorite among public and commercial buildings.

Concrete-Based Flooring (16.03%), ranking second, is a close follower. Its near-domestic supply, affordability, and sustainability appeal make it a sensible and high-quality material, particularly ideal for mass-scale developments within Addis Ababa.

Natural Stone Flooring (11.72%) ranked third, driven by its higher durability and appearance, but slightly lower scores in cost and availability. It was used in projects where durability and beauty were more valued than cost. Vinyl flooring (11.65%) came fourth, reflecting higher scores for cost, installation, and availability, but lower scores for sustainability and durability that could have derailed its overall score. Epoxy (9.70%), Engineered Wood (8.85%), and Rubber Flooring (8.61%) are in between.

These products achieved medium performance on most of the criteria but failed to excel in any regard. They could be acceptable in some applications, e.g., industrial or health facilities, where certain functional attributes given priority. Terrazzo (8.52%) and Wood Flooring (8.31%) performed the worst overall. Terrazzo's low rating could be due to high installation fees and thin local expertise, and its sustainability and durability. Wooden flooring probably did not perform well because of the environment, maintenance, and local availability

The overall score reflects how well each material ranks on all significant factors of selection. Porcelain/Ceramic Flooring and Concrete-Based Floors are the most feasible substitutes for normal building operations in Addis Ababa, with a good combination of performance, availability, and worth. The findings form a sound foundation for evidence-based, well-informed material choice.

Decision Support Framework for Flooring Material Selection in High-Rise Buildings in Addis Ababa Using AHP

4.9. Decision Support Framework for Flooring Material Selection

4.9.1. Introduction

The selection of flooring materials in commercial and public high-rise buildings is a multifaceted Selection among numerous, and sometimes conflicting criteria. In order to assist stakeholders in this process, a structured Decision Support Framework (DSF) been developed. This framework employs the Analytic Hierarchy Process (AHP) technically rank flooring materials economic, aesthetic, functional, environmental, and stakeholder considerations.

4.9.2. Framework Objective and Scope

The main purpose of this DSF is to guide material selection decisions in high-rise commercial and public buildings in Addis Ababa through a measurable, reproducible assessment process. The tool is particularly useful in the design and planning process, helping architects, engineers, contractors, and building owners make well-informed decisions in accordance with project requirements and local circumstances.

4.9.3. Structure of the Decision Support Framework

The DSF organized into five interdependent modules:

1. Input Module

Inputs the project critical details like building type, functional use, building height, and stakeholder concerns. These inputs utilized to personalize the evaluation for unique project settings.

2. Criteria Module

Comprises 15 criteria for evaluation arranged in six principal dimensions:

- ✓ Economic: Initial Cost, Maintenance Cost, and Installation Cost
- ✓ Technical: Durability, Resistance to External Factors, and Ease of Installation
- ✓ Aesthetic: Appearance, Design Compatibility
- ✓ Functional: Comfort, Safety
- ✓ Environmental: Sustainability, Recyclability, and Environmental Impact
- ✓ Stakeholder Preferences: Local Availability, User Preference:

Weights for every criterion derived with expert pairwise comparisons through the AHP method. Total Consistency Ratio (CR) for comparison of criteria was 2.95%, a reasonable consistency of expert judgments.

3. Evaluation Engine

Uses the AHP method to:

- ✓ Conduct pairwise comparison between flooring options and criteria
- ✓ aggregate expert inputs by geometric mean
- ✓ normalizing scores and calculate local priorities
- ✓ Validate consistency of judgments using CR values (all <10%)

The performance of each flooring material evaluated under all 15 criteria.

4. Decision Engine

Computes global priority scores of all flooring materials by taking the product of its score under all criteria multiplied by the criterion weight. Lists and ranks options by global total priority.

5. Output Module

Generates a ranked list of flooring materials and their scores as the solution.

Adds a dashboard visualization and data summary to facilitate reporting and presentation.

Makes provision for feedback from stakeholders for re-evaluation in the event priorities change.

4.9.4. Application Workflow

The DSF application is in sequence:

1. Define Project Scope: Determine building type, functional use, and user need.
2. Engage Stakeholders: Obtain expert opinion through questionnaire.
3. Establish Criteria and Weighting: Perform pairwise comparison to find the relative importance of the 15 criteria.
4. Evaluate Alternatives: Compare floorings on each criterion.
5. Check Consistency: Verify CR values between acceptable ranges (CR < 10%).

6. Synthesize Results: Determine the global scores and rank the materials.

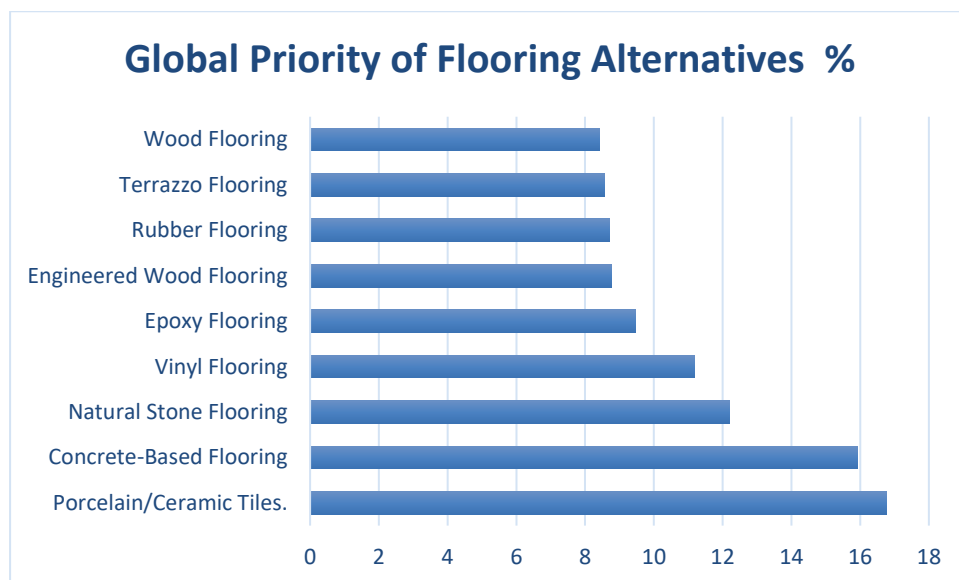
7. Document Decision: Prepare a report to read internally or externally.

8. Visualize Result: Utilize the dashboard to display results to stakeholder

4.9.5. Performance Results and Rankings

Based on the integrated evaluation of all 15 criteria and local performance global scores, the final ranking of flooring materials is as follows:

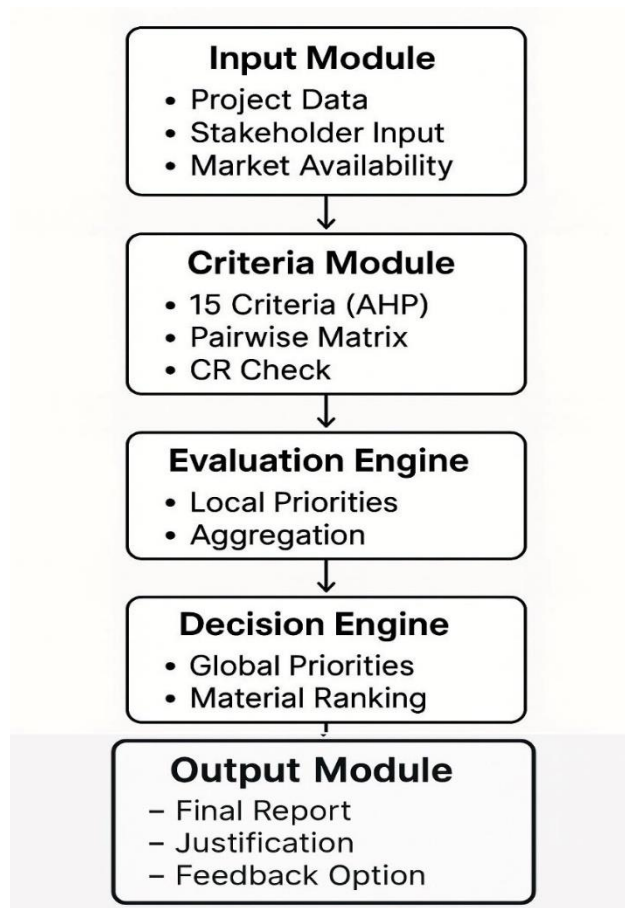
S. No	Alternative	Global Priority
1	Porcelain/Ceramic Tiles	0.166
2	Concrete-Based	0.160
3	Natural Stone	0.117
4	Vinyl	0.116
5	Epoxy	0.097
6	Engineered Wood	0.085
7	Rubber	0.086
8	Terrazzo	0.085
9	Wood	0.083



This ranking reflects an aggregated score that accounts for each material's strengths and weaknesses across all evaluation criteria.

4.9.6. Visual Framework Model

A diagram of the DSF architecture presented in Figure below It outlines the flow from project input to decision output, including criteria definition, AHP evaluation, global synthesis, and final ranking.



4.9.7. Excel-Based Tool Implementation and User Guide

For the framework to be applied practically and made workable, an Excel-based DSF tool was designed. The tool automatically calculates AHP computation and synthesizes the evaluation data to produce a ranked list of the floor materials.

Tool Features

The Excel tool contains five formatted sheets:

- ✓ Input Sheet: Captures project context (e.g., building type, stakeholder requirements).
- ✓ Criteria Weights: 15 AHP-generated criteria with percentage weights shown.
- ✓ Local Scores: Scoring of every material for each criterion.
- ✓ Global Scores & Ranking: Global scores and ultimate ranking calculated automatically.

- ✓ Dashboard: Ranking results displayed in graphical manner by means of a bar graph and table.

How to Use the Tool

1. Input Data: Examine project input context on the Input Sheet.
2. Review Criteria Weights: View or modify the 15 criteria weights on the Criteria Weights sheet.
3. Review Material Scores: See the performance of every material in the Local Scores sheet.
4. View Rankings: Go to Global Scoring & Ranking to see calculated global scores and ranks.
5. Use Dashboard: Display results on the Dashboard through bar charts and summary tables.

Flexibility and Customization

Adjust the tool by changing:

- a) Criteria weights for each project
- b) Material selections or criteria
- c) Dashboard format for reporting and presentation

This Excel implementation ensures the DSF is not only conceptually sound but also usable in real decision-making scenarios.

4.9.8. Summary

This Decision Support Framework provides a structured and validated approach for flooring material selection in Addis Ababa's high-rise building projects. By integrating expert input, AHP methodology, and a digital tool, it allows users to evaluate alternatives based on comprehensive, project-relevant criteria. The framework is adaptable and can be expanded in future studies to include life cycle cost analysis, BIM integration, or AI-based decision-making.

Case Study: Flooring Material Selection for Addis Tower Commercial Complex

Addis Tower is a 14-storey commercial building tower under construction in Bole, Ethiopia's capital city Addis Ababa. The building, designed for mixed-use commercial use, has retail space, offices, and multipurpose halls. When the project reached the finishing phase, choosing the flooring materials was a pivotal moment considering its long-term effects on building performance, user satisfaction, and lifecycle cost among others. Solve this influential decision, the developer engaged a team of skilled experts from different disciplines to research and provide suitable flooring material recommendations.

This actual case provides a perfect testbed for testing the Decision Support Framework (DSF) proposed in this study, based on the Analytical Hierarchy Process (AHP) in the Multi-Criteria Decision-Making (MCDM) methodology. The reason for applying the DSF here is to test its ability to consolidate expert opinions, rank applicable selection criteria, and facilitate evidence-based, clear flooring material choices in Addis Ababa construction projects. The panel of experts that convened for this case study consisted of six experienced experts from Addis Ababa's construction sector.

Their experience ranges through architecture, engineering, contracting, procurement, and project ownership subject to incorporating all major stakeholder viewpoints in the decision. Architect Meseret Tadesse, with leadership on the majority of commercial interior projects, provided firm input on design priorities, emphasizing the significance of durability and beauty in relation to the attraction and retention of tenants. Eyob Mekonnen, a senior structural engineer with more than two decades of practice in the construction of high- and mid-rise buildings, highlighted requirements for floor materials that possess high load-carrying capacity and moisture concerns in Ethiopia has varied climate.

Looking at buildings from a systems viewpoint, Hana Alemu, an MEP engineer who focuses on interior environmental control, highlighted safety and comfort. She emphasized thermal and acoustic performance, and slip resistance, particularly in high-traffic public spaces such as corridors and entrance halls. Abebe Zewdu, the general contractor on duty for the execution of the project, emphasized the cost of installation factor and labor efficiency. His experience in scheduling, materials handling, and subcontractor coordination was concerned with aspects such as ease of installation and availability of material. Rahel Tsegaye, the team's procurement

expert, brought additional in-depth knowledge of the local supply chain. She mentioned initial cost and local availability as the key determinants, with the intermittent disruptions of import supply chain and the benefits of buying the materials that exist in the Addis Ababa market. Completing the task force was Fitsum Getachew, representing ownership and long-term asset management goals for building ownership. He emphasized user preference and compatibility with the building's purpose and image in mind, wanting to choose materials that achieve a balance between performance, budget, and occupant satisfaction. Collectively, this team of experts identified and prioritized the flooring material selection criteria appropriate for this project. Their guidance informed by prior experience in projects, professional judgment, and project needs. The below table summarizes the final criteria set and respective weights as arrived at by the panel through formalized debate.

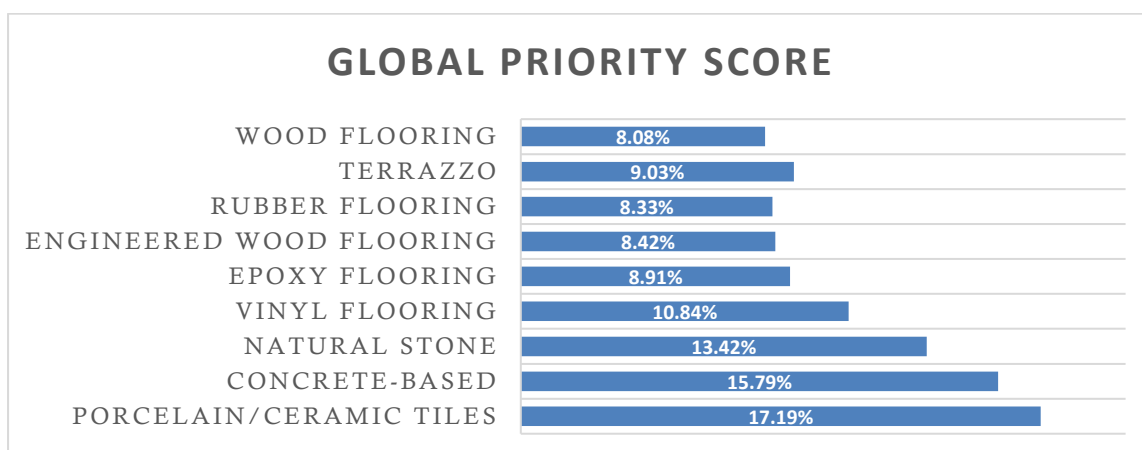
Criteria	Weight (%)
Initial cost	10
Maintenance cost	8
Installation cost	7
durability	12
Resistance to external factors	8
Ease of installation	5
Appearance	8
Design compatibility	5
User preference	5
Local Availability	6
comfort	4
safety	6
sustainability	5
Recyclability	3
Environmental impact	8

All the experts explained the justified weights. For example, Architect Meseret focused on durability and looks, mentioning the requirement for long-lasting and visually ornamental goods in commercial areas of high footfall. Structural Engineer Eyob focused on resisting external forces, particularly due to moisture and loading concerns in Addis Ababa's urban environment. MEP Engineer Hana gave safety and comfort to residents, particularly in spaces

such as lobbies and hallways. Contractor Abebe provided more focus on installation cost and ease of installation, bearing in mind labor constraints and scheduling problems. Procurement Specialist Rahel stressed the need to use locally available and cheap materials in order to prevent delays and escalating costs. Lastly, Owner Representative Fitsum highlighted user preference and design intent compatibility with the building as key drivers of long-term tenant satisfaction.

This case study can be solved by utilization of the DSF in this study that facilitates such matured opinions and context-dependent factors to consolidate into a structured AHP-based analysis process. The system will facilitate pairwise comparisons among flooring options, aggregate the judgments, and provide priority ratings. While this document does not include the decision output, the Addis Tower case will be an example used for validation purposes to determine how well the intended DSF directs consistent, rational, and transparent flooring material choice decisions in actual Addis Ababa construction projects.

Alternative	Global Priority Score	Rank
Porcelain/Ceramic Tiles	17.19%	1
Concrete-Based	15.79%	2
Natural Stone	13.42%	3
Vinyl Flooring	10.84%	4
Epoxy Flooring	8.91%	6
Engineered Wood Flooring	8.42%	7
Rubber Flooring	8.33%	8
Terrazzo	9.03%	5
Wood Flooring	8.08%	9



Discussion Based on the Case Study Results

Implementation of the Decision Support Framework (DSF) of AHP in Addis Tower case study created a distinct prioritization of flooring material options. As evident from the results, Porcelain/Ceramic Tiles was the highest ranked option with a global priority score of 17.19%, then Concrete-Based Flooring (15.79%) and Natural Stone Flooring (13.42%). The results as revealed under the criteria weights and expert opinions outlined during the assessment process.

The expert panel because they perform extremely well on multiple parameters especially durability, resistance to external conditions, and look which among the higher ranks the improved performance of Porcelain/Ceramic Tiles. Both Architect Meseret and Engineer Eyob eluted these aspects in their individual opinions, and their significance expressed in the total scoring. Besides, ceramic tiles are available easily in Addis Ababa's building construction and attain a relatively fair compromise between lifecycle performance and expense, which assisted the material into the top ranking.

Concrete-Based Flooring, second, was particularly favored because of its low cost and longevity two criteria firmly underscored by the contractor and buying specialist. While it will lack some of the visual charm of the other choices, its practical benefits in maintenance and strong performance under high traffic qualify it as a good choice for large-scale commercial buildings such as Addis Tower

Natural Stone Flooring, while being of a lower grade, prized for its luxurious appearance, high resistance, and positive market perception as a strong material. Yet its relatively larger price and installation complexity may have influenced its ultimate ranking despite favorable design and user preference dimensions ratings

Vinyl Flooring, ranking fifth (10.84%), received average ratings on some number of dimensions. It favored by ease of installation and lower initial cost, thus is easy from the contractor's perspective. It was; however, lower in perceived durability and environmental concern, decreasing its global priority score. Notably, Terrazzo, as it is more durable, more aesthetic, ranked fifth (9.03%), presumably because of high installation cost, and specialized labor requirement criteria overstated by some members of the panel but vitally picked apart by the contractor.

Lower-ranked options such as Epoxy Flooring (6th), Engineered Wood Flooring (7th), Rubber Flooring (8th), and Wood Flooring (9th) indicate a mix of lower preference in significant

factors such as long-term durability, local availability, or environmental factor. For instance, Wood Flooring, though much valued for its look, scored lowest (8.08%) based on factors related to its maintenance, cost, and adaptability to the local climate conditions. Likewise, Engineered Wood and Rubber Flooring also afflicted by availability and stakeholder acceptance, core to commercial activity aimed at long-term occupancy and operational efficiency.

The outcome confirms the Decision Support Framework correctly reflected the subtle priorities of the stakeholders. The framework enabled formal incorporation of qualitative and quantitative findings into the decision process, producing a ranking that aligns to both project requirement and expert judgment. This case study interestingly confirms the usability of the DSF in making multi-criteria flooring decision making decisions in high-rise Addis Ababa commercial developments. Its simplicity concerning ranking and justifying decisions helps ensure transparency, consensus among stakeholders, and long-term satisfaction with projects

CHAPTER FIVE

CONCLUSION AND RECOMMENDATION

5.1. Conclusion

The criteria for selecting finishing floor materials in construction projects in Addis Ababa, Ethiopia, studied and the Analytic Hierarchy Process (AHP) model utilized in ranking the criteria and assessing alternative materials. With urban building activity rising in the city, rational and systematic material selection decision-making has become vital in realizing cost-effectiveness, durability, user satisfaction, and sustainability.

Fifteen of the assessment criteria that categorized into six broad categories: economic, technical, aesthetics, stakeholders' preferences, functional, and environmental. Of these, economic ones were most crucial, occupying 31.97% of the total decision weight. Of these, initial cost was most significant (14.8%), consistent with the cost-consciousness of most local building works.

The results of this study suggest several implications: There is a need to raise awareness and build capacity in structured decision-making tools among construction professionals. Policy and institutional support could promote the integration of environmental and life-cycle performance criteria in material selection. Project documentation and procurement standards could be enhanced to include mandatory evaluation criteria beyond just initial cost.

The AHP model offered a systematic approach that enabled equal weighting of the criteria and scoring of the alternative materials. The final ranking of floor materials indicated porcelain/ceramic tiles placed in the first position, seconded by concrete-based floors and natural stone floors. These dominated other materials since they represented high performance in significant criteria like cost, durability, and maintenance. Conversely, the lowest ranked was wood flooring largely based on the lower technical and cost factors scores that render it less practical for its overall use under Addis Ababa conditions.

The research also highlighted some of the difficulties encountered while collecting the data. The experts were not prepared to spare their time for the survey, and it was challenging to procure reliable documents from government offices due to poor documentation practices. Such difficulties indicate the necessity for improved data management and stakeholders' participation in planning and research efforts in the future.

Finally, this research provides a practical and human-centered decision-support framework that can help construction professionals in Addis Ababa select floor finishing materials more effectively, balancing performance, cost, and long-term value.

5.2. Recommendation

Based on the findings and experiences gained throughout this study, the following recommendations suggest a way by which better decision-making can be supported when it comes to selecting floor finishing materials for building projects in Addis Ababa:

a) Encourage the Use of Structured Decision-Making Tools

Recommended that construction professionals such as architects, engineers, contractors, and project managers utilize structured decision-making models such as the Analytic Hierarchy Process (AHP). The method enables equitable consideration of numerous criteria to ensure the identification of materials guided by project objectives, context conditions, and performance priorities.

b) Put Focus on Project-Specific Priorities

While initial cost identified as being the most critical factor in general, material selection always has be considered in light of specific project needs. Material selection has be weighed, not just on cost, but also on durability, the environment, and user needs, so that effective and durable results provided.

c) Enhance Access to Construction Data and Documentation

Public and private sector agencies must make organization and sharing of material performance data and construction records more efficient. An open, centralized database would benefit practitioners, researchers, and policymakers by enabling more open, evidence-based decision-making.

d) Promote Awareness and Training

Short courses, workshops, and seminars that aim at exposing practitioners to decision-support tools such as AHP. These capacity-building interventions will provide construction stakeholders with ready practical skills and enhance the general quality of material selection decisions within the industry.

e) Increase Stakeholder Engagement

Greater active participation of influential stakeholders such as clients, end users, and facility managers recommended in the process of selecting the material. Their feedback is high in performance needs, comfort, and preference data, thus making more user-focused and context-dependent decisions.

f) Apply the Framework Flexibly Across Different Project Types

Although porcelain/ceramic tiles received the top ranking in this survey, the decision-support model is responsive to different prioritization of criteria by project type, size, or geography. This enables the model still be effective in a wide range of construction scenarios, residential to commercial or institutional structures.

g) Promote Additional Research and Model Development

Additional research can explore applications of the AHP model on other areas of construction, including wall finishes, roof coverings, or structural materials. In addition, integrating the AHP with other models like TOPSIS or fuzzy logic can further improve accuracy and thoroughness of analysis

Limitations and Future Research Directions

Limitations

While this study offers valuable insights into the selection of flooring finishing materials for high-rise buildings in Addis Ababa using the Analytical Hierarchy Process (AHP), several limitations should be acknowledged:

1. Restricted Building Typology

The study is limited to commercial high-rise buildings (above G+10) and public buildings (above G+6) within the city of Addis Ababa. Residential, industrial, and low-rise buildings were not included in the analysis. As a result, the findings may not reflect the priorities or conditions associated with other building categories.

2. Geographical Scope

The geographical focus is confined to Addis Ababa. Therefore, the results are context-specific and may not be directly applicable to other regions, particularly those with different environmental conditions, construction norms, market availability, or regulatory frameworks.

3. Exclusive Use of AHP

The research methodology employs AHP as the sole multi-criteria decision-making (MCDM) tool. While AHP is effective in structuring complex decision problems, it assumes consistency and rationality in judgments and does not inherently account for uncertainty or imprecision in expert input.

Future Research Directions

To address the limitations identified above and to enhance the depth and applicability of the research, future studies are encouraged to consider the following directions:

• Expansion to Other Building Types

Future research should include residential, industrial, and low-rise buildings to provide a more comprehensive understanding of flooring material selection across diverse construction typologies.

- **Integration of Fuzzy Logic**

Incorporating fuzzy logic or hybrid fuzzy-AHP approaches could improve the handling of subjective uncertainty in expert evaluations. This would allow for more flexible modeling of imprecise or linguistically expressed judgments.

- **Linking AHP with BIM Platforms**

The integration of AHP into Building Information Modeling (BIM) environments presents a promising avenue for enabling real-time and dynamic material selection. This would support data-driven decision-making during the design and construction phases, improving the alignment between material performance and project requirements.

REFERENCES

- Ahmad, S. A. (2018). Environmental impacts of flooring materials in commercial buildings. *Journal of Sustainable Architecture and Design*, 12(3), 45-58. .
- Akinlabi, E. T. (2025). Material selection in the construction industry: A systematic literature review on multi-criteria decision making. *Environment, Development and Sustainability*, . 27(3), 1-18 .
- Allen, E. &. (2019). *Fundamentals of Building Construction: Materials and Methods (7th ed.)*. Wiley.
- Araya, Y. &. (2021). Sustainable construction materials in Sub-Saharan Africa: Challenges and opportunities. *Resources, Conservation & Recycling*, , 164.
- Ashby, M. (2013). *.Materials and the Environmental: Eco-informed material choice 2nd ed.* . Butterworth-Heinemann.
- Ashby, M. F. (2005). *Materials Selection in Mechanical Design* . Elsevier.
- Ashby, M. J. (2012). *Engineering materials 1 :An Introduction to properries,Application, and Design*. Butterworth-heinemann.
- Ashworth, A. (2015). *Cost studies of buildings (6th ed.)*. . Routledge.
- Assefa, G. &. (2017). Building materials in Ethiopia: Market dynamics and sustainability challenges. *Journal of Cleaner Production*, , 147, 187–198.
- Behailu, W. ., (2022). A Study of Alternative Wall Making Materials Selection Using AHP Method. *Advanced International Journals of Research [AIJR]*.
- Bonett, D. G. (2014). Cronbach's alpha reliability: Interval estimation, hypothesis testing, and size planning. *Journal of organizational behaviour*.
- Cabeza, L. F. (2014). Low carbon and low embodied energy materials in buildings: A review. *. Renewable and Sustainable Energy Reviews*, 23, 536-542.
- Chen, Y. W. (2012). Comfort and thermal performance of flooring materials in commercial spaces. . *Building Materials and Performance Research*, , 6(2), 58-71.

- Cheng, E. W. (2002). Construction partnering process and associated critical success factors: Quantitative investigation. *Journal of Management in Engineering*, 18(4), 194–202.
- Gebreegziabher, T. &. (2019). Sustainable building practices in Ethiopia: Challenges and opportunities. . *Sustainable Cities and Society*, 47, 101–112.
- Gebremariam, A. F. (2020). Sustainable construction material selection in Ethiopia: A stakeholder perspective. *Sustainable Cities and Society*, 55.
- Hussain, R. K. (2020). Decision-making framework for flooring material selection in commercial buildings. *International Journal of Construction Engineering and Management*, , 9(1), 27-35.
- Jalaei, F. &. (2015). Integrating BIM and sustainability analysis tools for early-stage material selection. . *Journal of Construction Engineering and Management*,, 141(1), .
- Jato-Espino, D. C.-L.-H.-J. (2014). A review of application of Multi-Criteria Decision-Making methods in pavement material selection, . *Construction and Building Material*, 45, 151-162.
- Khoshnava, S. M. (2018). Sustainable material selection for building construction using the AHP method. *Journal of Building Engineering*, 20, 731-747.
- Kibert, C. J. (2016). *Sustainable construction: Green building design and delivery (4th ed.)*. Wiley.
- Kiflu, A. &. (2022). Awareness of sustainable building material selection among Ethiopian architectural and engineering offices. *American Journal of Construction and Building Materials*, 11(2), 1-9.
- Mehta, P. K. (2014). *Concrete: Microstructure, properties, and materials (4th ed.)*. McGraw-Hill Education.
- Ortiz, O. C. (2009). Sustainability in the construction industry: A review of methodologies. *Resources, Conservation and Recycling*, 53(4), 247-258.
- Pacheco-Torgal, F. &. (2012). Ceramic tiles in the context of sustainability: A review. . *Journal of Industrial Ecology*,, 16(5), 683–692.

- Saaty T.L. (1994). *Decision Making in Economic, Political, Social, and Technological Environments with the Analytic Hierarchy Proces.*
- Saaty, T. (1980). *the analytic Hierarchy process; plannin, priority setting, resource Allocation.* . new york: McGraw-Hill.
- Saaty, T. L. (1990). . How to make a decision: The Analytic Hierarchy Process. *European Journal of Operational Research*, , 48(1), 9-26.
- Saaty, T. L. (2008). *Decision making with the analytic hierarchy process.* RWS Publications.
- Shariq, M. K. (2021). A Multi-Criteria Decision-Making approach for selecting flooring materials in healthcare facilities. *Journal of Healthcare Engineering*, 2021, 1-12.
- Shen, L. Z. (2017). Using the analytic hierarchy process to investigate the functions of green building materials. *Journal of Cleaner Production*, 161, 1200–1211.
- Tadesse, G. &. (2017). Application of AHP for sustainable material selection in building construction: Case of Addis Ababa. . *Journal of Construction in Developing Countries*, , 22(3), 45–60.
- Tadesse, G. &. (2018). Evaluating Low-Cost Flooring Alternatives for Urban Housing in Ethiopia. *Journal of Construction in Developing Countries*, 23(2), 1–18.
- Tafesse, S. G. (2021). Multi-criteria decision-making for construction material selection in developing countries: A systematic review. *Journal of Building Engineering*, 44.
- Tesfamariam, S. &. (2013). Risk-based decision-making for sustainable materials in Ethiopian infrastructure. . *Journal of Infrastructure Systems*, 19(4), 395–405.
- UN-Habitat. (2020). *The State of Addis Ababa: Towards Sustainable Urban Development* . United Nations Publications.
- Vaidya, O. S. (2006). Analytic hierarchy process: An overview of applications. *European Journal of Operational Research*, 169(1), 1-29.
- Wang, J. &. (2007). A fuzzy group decision making approach for bridge risk assessment. *Computer-Aided Civil and Infrastructure Engineering*. 22(6), 423–436.

- Woldetensay, E. D. (2016). Assessment and Evaluation of Volcanic Rocks used as construction materials in Addis Ababa. *Momona Ethiopia journal of science*, 8(2).201-220.
- Wu, Z. &. (2011). Balancing priorities: Decision-making in sustainable supply chain management. . *Journal of Operations Management*., 29(6), 577-590.
- Yates, A. (2001). *Sustainability and materials selection in building design*. Routledge.
- Zavadskas, E. K. (2007). Multiple criteria evaluation of rural building's regeneration alternatives. . *Building and Environment*, 42(1), 436–451.
- Zhang, L. L. (2015). Natural stone flooring: A sustainable choice. *Green Architecture Journal*, 15(2), 32-48.
- Zhao, M. &. (2007). Flooring material performance under operational conditions: A technical review. . *Journal of Building Materials and Structures*, 9(1), 22-38.

APPENDICES

Questionnaires link

<https://ee.kobotoolbox.org/x/yEoj6yiM>

<https://ee.kobotoolbox.org/x/WElfNSUK>

Criteria comparison Questionnaire responses

RESPONDENT

Comparison	R01	R02	R03	R04	R05	R06	R07	R08	R09	R10	R11	R12	R13	R14	R15	R16	R17	R18	R19	R20	R21	R22
Initial Cost vs Maintenance Cost	1/3	1/3	1/3	3	1	3	5	7	3	5	7	3	3	1/3	3	1	1/3	1/3	1/3	5	3	5
Initial Cost vs Installation Cost	9	1	5	3	1	7	5	1	9	7	5	3	9	7	3	3	3	5	9	3	5	7
Initial Cost vs Durability	1/3	3	3	1/3	3	1	1/3	1/3	1/3	1	1	1	1/3	1/3	3	1/3	1	1/3	3	1	1	3
Initial Cost vs Resistance to External Factors	1	3	3	5	3	1/5	3	5	1	5	1/5	1	5	5	3	1/5	3	1	3	3	1	3
Initial Cost vs Ease of Installation	7	5	5	9	7	5	3	9	5	7	1	5	3	5	5	9	5	5	3	1	7	5
Initial Cost vs Appearance	1	1	3	1	5	1	3	5	3	1	1/5	1	5	5	5	1/3	1	3	3	1	1	1
Initial Cost vs Design Compatibility	1	3	5	1	1	1/5	5	1	1	1	1	3	3	3	1	1/3	1	1	3	1	1/3	3
Initial Cost vs User Preference	1/5	1	1	1	5	1	5	1	3	1	1/5	1	5	5	1	1/5	1	3	5	5	1/5	5
Initial Cost vs Local Availability	1/3	3	5	5	3	1/5	7	7	5	7	1/7	7	3	7	7	1/5	7	3	3	5	1/3	3
Initial Cost vs Comfort	1/5	3	5	5	3	1/5	1	1	1	5	1	5	1	3	5	1/5	1	3	1	1	1/3	3
Initial Cost vs Safety	1/3	5	3	5	3	1/3	5	5	5	3	1/3	3	7	3	5	1/5	5	3	5	5	1/7	7
Initial Cost vs Sustainability	1/3	7	7	7	7	1/7	7	7	3	5	1/5	3	7	5	7	1/5	7	3	7	5	1/7	5
Initial Cost vs Recyclability	1/7	7	7	7	9	1/5	9	7	9	5	1/9	5	7	9	9	1/9	9	7	5	5	1/9	7
Initial Cost vs Environmental Impact	1/9	9	9	7	9	1/7	7	9	7	9	1/9	9	9	9	9	1/9	9	9	9	9	1/9	9
Maintenance Cost vs Installation Cost	3	3	5	1/3	1	3	5	3	7	1	3	9	1	1	3	1/3	1/3	3	5	1	3	3
Maintenance Cost vs Durability	1/3	3	3	1/3	1/3	1/3	1	1/3	1	1/3	3	1	1	1	1/3	1	1	1	1	1	1	1
Maintenance Cost vs Resistance to External Factors	1	1/3	3	3	3	1/3	1/3	1/3	1	1/3	1/3	1/3	1	3	3	1	1	3	1/3	1/3	1/3	3
Maintenance Cost vs Ease of Installation	5	3	1	5	5	7	3	5	5	3	9	3	5	5	3	7	1	5	3	3	7	3
Maintenance Cost vs Appearance	1	5	3	5	5	1/3	3	1	1	3	1	3	5	1	3	1/5	5	3	3	5	1/5	3
Maintenance Cost vs Design Compatibility	1/5	3	1	1	3	1	3	1	3	1	1/5	5	1	3	1	1	5	3	5	1	1/5	3
Maintenance Cost vs User Preference	1/5	3	5	5	5	1	5	3	3	3	1/3	5	3	3	5	1/5	1	5	5	1	1	5
Maintenance Cost vs Local Availability	1/5	3	5	5	3	1/5	1	1	1	5	1	5	1	3	5	1/5	1	3	1	1	1/3	3
Maintenance Cost vs Comfort	1	1	3	5	5	1/3	3	1	5	3	1/5	3	1	3	3	1/3	3	3	5	1	1	3
Maintenance Cost vs Safety	1/5	3	3	5	7	1/3	5	5	7	5	1/3	3	7	7	3	1/7	3	5	7	3	1/7	5
Maintenance Cost vs Sustainability	1/5	5	7	5	3	1/5	7	5	7	7	1/7	5	3	5	7	1/5	5	5	7	7	1/5	5
Maintenance Cost vs Recyclability	1/5	3	7	3	5	1/7	3	3	5	5	1/5	7	7	5	7	1/3	5	7	7	5	1/5	7
Maintenance Cost vs Environmental Impact	1/9	9	7	7	9	1/9	9	9	7	7	1/7	7	9	9	9	1/9	7	9	9	7	1/7	9
Installation Cost vs Durability	1/3	1	3	1	1	1	1/3	3	1	1	3	1	3	3	1/3	1/3	3	1	1	1/3	1/3	1
Installation Cost vs Resistance to External Factors	3	1/3	3	1	3	1/3	1	1/3	1	1	1	3	1	1/3	1	3	1/3	1/3	3	3	1/3	1
Installation Cost vs Ease of Installation	1/5	1	5	3	5	1/3	5	3	1	1	1	3	3	3	1	1	1	5	1	3	1/3	3
Installation Cost vs Appearance	1/3	1	1/3	1	1	3	1/3	1	1/3	3	3	3	3	3	1/3	3	1	1/3	1/3	3	3	1/3
Installation Cost vs Design Compatibility	1	1/3	3	3	3	1/3	1/3	1/3	1	1/3	1/3	1/3	1	3	3	1	1	3	1/3	1/3	1/3	3
Installation Cost vs User Preference	1/5	3	3	5	5	1/3	1	5	1	5	1/5	5	5	1	3	1/3	1	3	3	3	1/3	3
Installation Cost vs Local Availability	1	3	3	5	3	1/5	1	3	5	3	1/3	1	5	5	1	1	5	3	1	1	1/3	5
Installation Cost vs Comfort	1/5	3	1	1	5	1/5	1	1	5	5	1	3	3	3	3	1	3	3	5	3	1/5	5
Installation Cost vs Safety	1/5	5	3	1	1	1/3	5	1	1	1	1/3	1	1	3	3	1/3	1	1	3	5	1/3	1
Installation Cost vs Sustainability	1	3	1	5	3	1/5	3	1	3	1	1	3	5	3	5	1	3	3	5	3	1	3
Installation Cost vs Recyclability	1/7	5	7	7	7	1/7	7	5	7	5	1/3	5	3	5	5	1/7	5	5	7	3	1/5	7
Installation Cost vs Environmental Impact	1/5	5	7	5	7	1/9	5	9	9	5	1/5	5	9	7	7	1/9	9	9	5	7	1/7	7
Durability vs Resistance to External Factors	1/3	3	3	1	1/3	1/3	3	1/3	1	3	1	3	1	1/3	3	1/3	3	3	3	1/3	1/3	3
Durability vs Ease of Installation	1	1	1	5	5	1	5	3	1	3	1/3	5	5	1	3	1/5	3	5	3	1	1/5	1
Durability vs Appearance	3	1/3	1	1	3	3	1	1/3	1/3	1	1	1/3	1	1/3	1	1/3	1	1/3	1	1/3	1	1/3
Durability vs Design Compatibility	1	3	1	3	1	1	1	3	5	5	1/3	1	1	3	5	1/5	1	5	5	5	1	5
Durability vs User Preference	3	1	1	1	1/3	1	1/3	1	1	1	1	1/3	1	3	1/3	3	3	3	1/3	1/3	1/3	1
Durability vs Local Availability	1/5	3	3	1	3	1/3	3	5	3	3	1/3	1	3	5	3	1/3	5	3	1	5	1/3	1
Durability vs Comfort	1	1	5	5	3	1/3	5	5	5	1	1	1	5	5	3	1	1	1	5	1/3	3	3
Durability vs Safety	1	3	3	5	3	1	5	3	5	3	1	1	1	1	3	1	5	3	1	5	1/3	5
Durability vs Sustainability	1	5	1	1	3	1/3	5	5	3	5	1/3	3	5	1	1	9	5	1	3	3	7	5
Durability vs Recyclability	1/3	7	5	7	7	1/3	7	7	3	7	1/7	3	3	7	7	1/7	7	5	7	3	1/3	3
Durability vs Environmental Impact	1/5	5	5	3	5	1/7	3	5	7	5	9	5	5	3	5	1/7	7	3	5	3	7	3
Resistance to External Factors vs Ease of Installation	1	1/3	1/3	3	1	3	1/3	1	1	3	1/3	3	1	1	3	3	1/3	1	1/3	1	1/3	1
Resistance to External Factors vs Appearance	3	1/3	3	3	1	1/3	1/3	1/3	1/3	1/3	1/3	1	1	3	1	3	3	3	1/3	1	1/3	1
Resistance to External Factors vs Design Compatibility	1	1	3	3	3	3	3	1/3	3	1	3	3	3	3	1	1/3	3	1/3	1/3	1/3	3	3
Resistance to External Factors vs User Preference	3	1	3	1	3	1	3	3	3	3	1/3	1	3	1	1/3	3	1	3	1	1/3	1	1

Criteria comparsion Questionnaire responses

RESPONDENT

Resistance to External Factors vs Local Availability	1/3	5	3	1	1	1/5	3	5	5	3	1	1	5	5	5	1	1	1	5	5	1	5
Resistance to External Factors vs Comfort	1/3	3	3	1/3	1/3	1	1/3	1/3	1	1	3	3	1	1/3	1/3	1	3	3	1/3	1	1	1
Resistance to External Factors vs Safety	1/3	3	5	3	1	1/3	5	1	1	1	1/3	3	1	1	3	1/3	1	3	3	3	1/3	5
Resistance to External Factors vs Sustainability	1/3	1	3	5	5	1/3	3	5	5	3	1/5	5	1	1	5	1/5	1	5	3	5	1/5	3
Resistance to External Factors vs Recyclability	1/3	5	5	5	3	7	3	5	1	3	1/3	1	5	1	5	1	1	3	9	5	7	5
Resistance to External Factors vs Environmental Impact	1/7	3	7	3	3	1/3	5	5	7	7	1/7	5	7	5	3	3	5	5	3	5	5	7
Ease of Installation vs Appearance	1	1/3	3	3	1	1/3	3	3	1	1/3	1	1/3	3	3	1/3	1	1	1	1/3	3	1/3	3
Ease of Installation vs Design Compatibility	3	3	1	1	3	1/3	1/3	1	1/3	1	3	1	3	1/3	1	1	1/3	3	3	1/3	3	1
Ease of Installation vs User Preference	1	1/3	3	1	1	1	1	3	3	1	1/3	1	1	1	1	1	1/3	3	1	1	3	1
Ease of Installation vs Local Availability	1	3	3	3	1	1	1/3	3	1	1/3	3	3	3	1	1/3	1/3	3	1/3	3	1/3	3	3
Ease of Installation vs Comfort	3	3	3	1	3	1	1/3	3	3	3	1	1/3	1/3	1/3	3	3	1/3	1/3	3	3	1	1
Ease of Installation vs Safety	1	1	3	1	3	3	3	1/3	1/3	1/3	1/3	3	1	1	1/3	5	3	1	3	3	3	1/3
Ease of Installation vs Sustainability	1	1	3	5	5	1/3	3	1	5	3	1/5	3	1	3	3	1/3	3	3	5	1	1	3
Ease of Installation vs Recyclability	1	5	1	1	3	1/3	5	5	3	5	1/3	3	5	1	1	9	5	1	3	3	7	5
Ease of Installation vs Environmental Impact	3	5	3	5	5	7	3	1	1	7	1	3	5	5	3	1/3	3	3	9	5	7	1
Appearance vs Design Compatibility	1/3	3	1/3	3	1	1/3	1/3	1	1	3	3	1	3	1	1/3	1/3	1	1/3	1	3	3	3
Appearance vs User Preference	3	3	3	3	3	1	1	1	1/3	1/3	3	1	1/3	3	3	1/3	3	3	3	3	3	1
Appearance vs Local Availability	1	3	3	1	1	3	1	1/3	3	5	3	1	3	1	3	3	3	1/3	3	1/3	1/3	1/3
Appearance vs Comfort	1/3	1/3	3	1/3	1	1	1/3	1	5	1	1/3	1	3	3	1	5	1	3	1	3	3	1
Appearance vs Safety	1	1/3	1	3	3	5	3	5	3	5	1	1	5	5	1	1	3	1/3	1	1/3	1	5
Appearance vs Sustainability	1/3	5	5	1	5	1	3	5	3	5	1	5	3	5	1	1/3	1	5	5	1	1/3	1
Appearance vs Recyclability	5	3	5	3	3	1/5	3	5	5	1	5	3	1	3	5	1	5	1	5	1	1/5	3
Appearance vs Environmental Impact	1/5	3	5	5	5	3	7	5	3	7	1/3	5	3	3	3	9	3	5	5	1	1/5	3
Design Compatibility vs User Preference	1/3	1/3	1/3	1	3	1	3	3	1/3	1	1/3	1/3	3	1/3	1/3	3	1	1/3	1/3	3	3	3
Design Compatibility vs Local Availability	1/3	3	1/3	3	3	3	1	1	3	1/3	5	3	5	1	3	1/3	1	1/3	1/3	5	3	1/3
Design Compatibility vs Comfort	1	1	3	1/3	1/3	1	1	1/3	1/3	1	1/3	3	1/3	3	1/3	1	1	1/3	1	3	1	1
Design Compatibility vs Safety	3	1	1/3	1	1/3	1/3	1/3	3	1	1	3	3	3	3	3	1/3	1/3	1	3	1	1/3	1/3
Design Compatibility vs Sustainability	1/5	3	5	5	5	1	5	3	3	3	1/3	5	3	3	5	1/5	1	5	5	1	1	5
Design Compatibility vs Recyclability	1/3	3	5	1	7	3	1	3	7	5	3	3	1	1	3	5	9	5	7	3	3	1
Design Compatibility vs Environmental Impact	1	1	5	3	5	1/5	1	3	1	5	3	5	5	3	1	7	5	1	3	3	1	1
User Preference vs Local Availability	1	1	3	3	1	1	1	1	1/3	1/3	3	1/3	3	1/3	1/3	3	1/3	1	1	1	1	1
User Preference vs Comfort	1	1/3	1/3	1	1	1/3	3	3	1/3	1/3	1	1/3	1/3	1/3	1/3	3	1/3	1/3	1/3	1	1	3
User Preference vs Safety	1	1/3	1	1/3	1/3	1	1	1	1/3	1/3	1/3	3	3	1/3	3	1	1	1	3	1	3	1/3
User Preference vs Sustainability	3	1	1/3	1	3	1	3	1/3	1/3	1/3	3	3	1/3	1	3	1/3	1/3	1/3	3	1	1	1/3
User Preference vs Recyclability	1	1	5	1	1	1/5	3	1	5	1	1	5	3	5	1	1/3	5	5	3	1	1/5	5
User Preference vs Environmental Impact	1/3	5	5	3	1	1	5	1	5	5	5	5	1	1	5	7	5	1	5	5	1	3
Local Availability vs Comfort	1/3	1	3	1	1	1	1/3	3	1	1	3	1	3	3	1/3	1/3	3	1	1	1/3	1/3	1
Local Availability vs Safety	3	1/3	1	3	3	1/3	3	3	1	3	1	1	1	1/3	1/3	1/3	1	3	3	1	1/3	3
Local Availability vs Sustainability	3	1	1	1	1/3	1	1/3	1	1	1	1	1/3	1	3	1/3	3	3	3	1/3	1/3	1/3	1
Local Availability vs Recyclability	1	5	3	3	1	3	5	1	1	3	3	5	3	5	3	1	1	3	1/3	5	7	3
Local Availability vs Environmental Impact	1/3	5	3	5	5	1/3	1	1	3	3	1	5	5	5	5	1/3	5	3	3	5	1	1
Comfort vs Safety	1	3	1	3	1	3	3	1/3	1/3	1	1/3	3	1	1/3	3	1/3	1/3	1/3	1/3	1/3	3	1/3
Comfort vs Sustainability	1/3	3	1/3	1	1/3	1	7	1/3	3	5	3	3	1	3	1/3	9	3	1	3	5	5	1/3
Comfort vs Recyclability	1	5	5	3	5	1/5	5	5	3	3	1/5	1	3	1	3	1/3	5	3	3	3	1/5	5
Comfort vs Environmental Impact	7	5	5	1	5	1/5	5	3	5	3	1/5	3	7	5	5	1	3	1	3	1	1/5	3
Safety vs Sustainability	3	3	1/3	3	1	1/3	1	1	1/3	1/3	3	1/3	1	1	3	1	1/3	1	3	1/3	3	1
Safety vs Recyclability	3	3	1	5	5	1/5	1	5	5	3	1/3	3	5	5	3	1/3	1	1	3	3	1	3
Safety vs Environmental Impact	5	3	1/3	5	7	1	3	5	3	1	3	3	1	3	1/3	3	3	9	3	5	7	3
Sustainability vs Recyclability	1/3	3	3	1/3	1	3	1/3	1	1/3	3	3	1	3	1	3	1/3	1	1	1/3	1/3	1/3	1
Sustainability vs Environmental Impact	1	3	1	5	3	1/5	3	1	3	1	1	3	5	3	5	1	3	3	5	3	1	3
Recyclability vs Environmental Impact	1	1/3	3	1	1	1/3	1/3	3	3	1/3	1	1	1/3	1	1	3	1/3	1	3	1	3	3

Criteria comparsion Questionnaire responses

RESPONDENT

R23	R24	R25	R26	R27	R28	R29	R30	R31	R32	R33	R34	R35	R36	R37	R38	R39	R40	R41	R42	R43	R44	R45	R46	R47	R48	R49	R50	GM	
3	7	3	3	7	3	5	3	9	3	1	7	5	3	1	3	7	1	5	3	5	1	5	3	5	3	7	9	2.5190924	
9	7	3	7	5	7	9	5	3	9	7	7	3	5	3	7	3	7	9	7	5	7	9	7	5	9	3	9	5.021852	
1	1/3	1	3	1/3	3	3	3	1	3	3	1	3	1	1	1/3	1/3	3	1	5	5	7	1/7	5	3	3	1	3	1.2025632	
1	5	5	1/3	5	1	5	1	1/5	3	5	5	1	1	1	3	1	5	1/5	1	1/9	3	3	1	1	1/3	3	1/7	1.500991	
5	5	5	9	3	5	5	3	9	5	3	7	1	3	5	3	9	5	3	9	5	7	3	3	7	5	1	7	4.5015732	
5	3	3	1/3	3	3	5	1	1/5	5	5	1	1	1/3	5	3	1	1	1	1	5	3	1	3	5	7	5	1	1.8053324	
3	3	3	1/5	5	5	5	5	9	1	7	3	1	1	5	5	5	5	7	3	1	5	5	9	5	1/3	1	1	2.004871	
3	3	1	1/5	5	3	1	3	1/3	1	5	5	3	1/3	3	9	1	3	7	5	7	5	5	1	5	3	5	3	1.8991733	
7	7	3	1/5	5	7	3	7	1/5	3	7	7	5	1/7	5	5	3	3	1/7	5	5	3	3	1/3	3	7	5	3	2.5019952	
1	3	1	5	1	5	5	3	7	3	5	5	1	1	1	9	3	7	1	5	3	3	5	7	9	3	1	1/5	2.0215173	
5	7	7	1/5	3	3	5	3	1/7	5	3	3	7	1/5	5	7	5	5	1/7	7	3	5	7	1/3	5	3	7	5	2.4945062	
7	5	5	1/5	7	5	7	3	1/3	5	7	5	7	1/7	3	7	7	5	1/5	7	3	5	5	5	3	9	7	7	3.0195687	
5	5	5	1/5	5	5	7	9	1/5	7	7	9	9	1/5	9	9	7	7	1	5	5	9	7	5	5	5	7	5	3.5096398	
7	9	9	1/9	9	7	9	9	1/9	9	9	7	9	1/9	7	9	9	7	1	9	9	9	7	5	7	7	9	9	4.0074279	
1	7	1	5	7	3	3	9	5	1	7	9	1	1	5	7	1	3	9	1	3	7	1	3	3	5	3	1	2.509912	
1/3	1	1/3	1/3	3	1/3	1	1/3	1/3	1/3	3	1/3	1/3	3	3	1	3	1	3	9	1	3	5	7	1	1	3	1	1.0052037	
3	1/3	1/3	1/3	1	3	3	7	5	1	1	3	1	5	1	9	3	3	1	5	1	1	5	1	1/5	3	1/7	3	1.2025632	
5	5	5	9	3	7	3	3	1	3	1	3	3	1/3	3	5	5	3	7	1	5	1	1	1	3	3	3	1	3.0913968	
3	5	5	1/3	3	1	1/7	3	1/3	3	1	1	5	1	3	1	5	1	1/5	1	1	1	1/7	1	3	1	3	1	1.5085544	
1	1	5	1/3	3	3	3	3	1	1	3	3	1	1	3	3	1	5	7	5	1	1	1	7	3	5	1	1	1.7094559	
1	3	5	1	1	1	1	1/5	1	1	1	3	3	1/5	1	3	3	1	1/3	3	1	3	5	1	1/3	1	1	3	1.5952269	
1	3	1	5	1	5	5	3	7	3	5	5	1	1	1	9	3	7	1	5	3	3	5	7	9	3	1	1/5	2.0215173	
3	5	3	1/3	5	3	5	1	1/3	1	3	3	3	1	3	5	1	3	1/5	3	3	1/7	1	1/5	3	5	3	1	1.6951013	
3	3	3	1/5	3	7	3	5	1/7	5	7	7	5	1/5	5	5	3	1	1/7	3	1/5	3	1	1/7	7	3	3	1	1.9909374	
5	3	7	1/3	7	5	3	5	1/3	5	7	5	7	1/5	5	7	3	3	1/5	3	3	1	3	1/5	3	5	3	5	2.498147	
7	5	7	1/3	7	3	3	7	1/7	5	3	7	3	1	3	7	7	3	5	3	7	5	3	5	5	3	5	5	3.0093006	
9	9	9	1/9	9	7	9	9	1/9	9	7	7	9	1/9	9	9	9	9	1/9	9	9	9	7	1/9	9	7	7	5	3.4948478	
1/3	3	1/3	1/3	1	1	3	3	1/3	1/3	1	1/3	3	1/3	1/3	1	1	1/3	1/3	1	3	1/3	1/3	1	1	1/9	1	1/3	0.8027416	
3	1	1/3	1	1/3	1	3	1/3	1	1	3	3	3	1	3	1	1/5	1	1/5	3	1/3	1	1/3	1/3	1	1	1/7	1/3	0.9018602	
5	5	5	1/5	3	5	1/9	5	1	1	1/5	1	3	1/5	1	3	1	1/5	1/3	1	1/5	1/3	1	1	1	1	3	1	1.2025632	
3	1/3	3	3	1/3	1	1/3	3	3	1	1/3	1/3	3	1	1/3	1/3	3	1/3	3	1/3	1	1/3	3	1	1/3	3	1	1	1	
3	1/3	1/3	1/3	1	3	3	7	5	1	1	3	1	5	1	9	3	3	1	5	1	1	5	1	1/5	3	1/7	3	1.2025632	
1	1	3	1/3	3	1	3	3	1	1/5	3	1	1	1	1	1	1	1/7	1/5	3	1	1/5	3	1/5	1/5	1/7	3	1/5	1.1045972	
3	1	3	1/5	1	3	5	5	1/5	5	5	5	1	1/5	5	3	3	1	1	1/9	1	3	3	1/3	1	1	1	1/5	1.4934655	
1	1	1	1	5	1	1	1	1/3	3	1/5	1/7	3	1/5	3	3	3	1	1/5	1	1/9	3	1	1/3	5	1/5	1	1	1.1981806	
1	3	5	1/5	1	5	5	5	1/3	1	3	5	1	1/3	1	3	1	3	1/5	3	5	3	5	1/5	3	3	7	7	1.4960113	
1	1	5	1/5	1	5	5	1	1/3	3	5	5	1	1	1	1	3	1	1	5	1	5	5	5	3	3	3	5	2.0014593	
3	5	5	1/5	3	3	5	5	1/3	7	3	7	7	1/7	5	5	7	7	1/7	3	5	7	5	1/3	5	1	5	1	2.4949152	
7	7	7	1/9	9	5	9	9	1/7	5	7	5	9	1/9	7	7	5	7	1/9	7	5	7	5	1/9	7	5	5	7	3.0097939	
1	3	1	3	1	1	1/3	1/3	1	1	1/3	1/3	1/3	3	1	1/3	3	1/3	3	3	1/3	3	1	5	9	3	1	1.1030791		
3	3	1	1/3	1	3	3	3	1/3	3	1/5	5	3	1	1	1	1	3	1	1/7	3	1/5	5	1	1/9	3	1	3	1.3931001	
1/3	5	1/3	9	3	1	1/3	1/3	3	1	1	3	3	5	1	1	3	1	3	5	1	7	1/5	5	3	3	3	3	1.1965339	
1	3	3	1	5	3	1	5	1/3	1	1/9	5	1	1/5	3	1	1/5	1	1/5	1	1/5	1	3	1	1	7	3	1	1.3933285	
3	1	3	3	3	1/3	1	3	1	3	3	1	5	3	1	1	1/3	1	1	1	3	3	3	5	3	3	3	1/3	3	1.2996925
3	5	1	1/5	3	3	1	1	1/3	5	3	3	3	1/5	5	3	1	5	1/3	3	3	1	5	1	7	7	3	5	1.8018194	
3	5	1	1/5	1	5	3	3	1/3	3	1	5	1	1/5	3	1/3	3	1/5	1/3	1	1	1	1/5	1	3	1/3	3	1	1.3981956	
3	5	1	1/5	5	3	3	1	1/5	5	5	5	1	1/3	5	1	1	1	1	1	3	1	3	1/5	5	3	3	1	1.7959866	
3	1	5	1/5	5	1	1	3	1/5	1	1	5	1	5	1	1	3	5	9	3	5	3	1	7	1	5	5	5	2.2081299	
3	7	7	1/5	7	3	7	5	1/7	7	3	5	7	1/7	5	7	5	5	1/3	7	5	3	5	1/3	5	3	3	3	2.6868228	
5	5	3	5	3	3	5	5	1/7	5	3	3	5	1/7	7	5	3	3	9	7	5	5	5	9	3	5	5	7	3.2977659	
1	1	1/3	1	1/3	3	3	3	1	3	1	1/3	1	1	1	3	1	3	1/3	3	7	5	1/3	1	3	1	3	9	1.1983771	
1/3	1	3	1/3	1	3	1	3	1/3	3	1	3	3	1	1	1/3	1	1	1	1	1	3	1	5	3	3	1/3	3	1.1030791	
1/3	1/3	1/3	1	1	1	1/3	1	1/3	1/3	1	3	3	1	3	3	1/3	3	3	3	3	3	3	1	1	3	1	1	1.3016946	
3	1/3	3	1/3	1	1	1	1	1/3	3	1	1	1	1/3	1/3	3	3	7	1	5	1/3	1	1	1	1/3	1/3	1	1	3	1.1983771

Criteria comparsion Questionnaire responses

RESPONDENT

1	1	1	1/3	3	5	3	1	1/5	1	1	5	1	1/3	5	3	3	5	1	3	3	3	1/7	1	1	1/5	5	1	1.5983372		
3	3	3	1	5	3	1	1	3	1/3	5	1	3	1	3	7	3	7	3	3	1	1	3	1/3	1/3	1/3	1/5	7	1.2953807		
5	5	1	1/3	5	3	5	1	1	5	1	3	3	1	3	5	1	5	1/3	5	1	1	3	1/3	5	1	1	1	1.6066545		
1	5	1	1	5	5	1	5	1/5	1	1	3	5	1/3	1	5	1	5	3	3	1	5	3	7	3	1	5	5	1.9028762		
5	1	3	5	3	7	1	1	1/5	5	5	3	3	1/3	3	3	3	1	1/5	5	5	1	5	7	1	3	5	3	2.3868688		
3	3	7	9	7	3	3	3	5	3	7	3	5	1/7	7	7	3	3	7	3	5	5	3	1/7	3	1	3	1/5	2.9035922		
1/3	1/7	3	1	3	1	1/3	1	1/3	3	1	3	1	1/3	1	1	1/3	1	1	1/5	1	1	1/3	3	1	1	1/5	1	0.9018602		
1	3	1	1/3	1/3	1/3	1/3	3	1/3	1	3	1/3	3	3	1	3	1/3	1/3	1	5	1/3	3	1	3	5	3	3	1/5	1.1030791		
1	1	1/3	1/3	1/3	1/3	1/3	1/3	1	3	3	3	3	1	1	1/3	1	1	3	1	1	1/3	1	1	1/3	3	1	1/3	1		
1/3	1/3	1	3	3	1/3	1/3	1/3	3	3	1/3	1/3	3	1	1	1/3	7	3	5	1	1	3	7	3	5	3	3	1	3	1.4048972	
1	1	1/3	1	1	1	3	1/3	1/3	1/3	1/3	1	3	1/3	1/3	3	1/3	1/3	1	1	1	3	1	1	1/3	3	3	1/3	1	1.0222154	
1/3	1	5	3	3	1/3	7	1	3	1	1/3	3	1	1/3	3	1/3	1/3	1	1	3	1/3	3	3	3	3	3	1	5	1.3954748		
3	5	3	1/3	5	3	5	1	1/3	1	3	3	3	1	3	5	1	3	1/5	3	3	1/7	1	1/5	3	5	3	1	1.6951013		
3	1	5	1/5	5	1	1	3	1/5	1	1	5	1	5	1	1	3	5	9	3	5	3	1	7	1	5	5	5	2.2081299		
3	3	5	5	1	3	3	1	7	3	3	5	5	9	3	1	1	1/7	3	3	3	3	1	5	1	5	5	1	2.7091248		
1	1	1/3	1	3	1	3	1	1/3	3	3	1	3	3	1	3	3	3	1/3	1/3	1/3	1/3	1/3	3	1/3	3	5	3	3	1.2044156	
1	1	1	1/3	3	3	3	1/3	1	1/3	1	1/5	1	1	1	1/3	3	1/5	1	1	1	1	1	1/3	1	1	1	1/3	1.0935488		
5	3	1	1	1/3	5	3	1/3	3	3	3	1	1	3	3	3	1/3	1	5	1	1	1/3	3	3	1/3	1	3	5	1.4957661		
1	1	3	3	3	3	1	3	1/3	5	3	1/3	1	3	1/3	1	3	1/3	1	3	1/3	3	1	1/5	3	1/3	3	1/7	1.1963378		
1/3	1	3	5	3	1	1	3	5	1	3	1	1	3	1	1	3	1/3	1	1/3	1	1/3	1	5	3	1	1/3	1	5	3	1.5064811
3	3	3	1	3	1	1	1	1/5	5	5	3	5	1/5	5	1/3	1	5	1	1/3	1	1	5	1	5	3	5	3	1.8088524		
1	5	3	7	1	5	5	3	1/5	3	3	3	1	1/5	1	3	5	5	7	5	3	3	3	1/3	5	1	5	7	2.2992969		
3	5	5	1	1	5	3	7	1	5	3	3	5	1/3	1	5	1	5	7	1	3	7	5	9	3	1	3	5	2.7697631		
3	1	1/3	3	3	1	1/3	1	1/3	1/3	1	1/3	1/3	1	1/3	3	1/3	1/3	1	1	1	1	1	3	3	3	1	1/3	0.8959585		
3	3	1	1	1	3	1/3	1/3	1	3	1/3	1/3	3	1/3	3	3	3	1	1	1	3	1	5	1/3	3	3	1/3	3	1.2976936		
3	3	1/3	1	1/3	1/3	3	1/3	1/3	3	1	1/3	1/3	1/3	1	3	1	3	1/3	1	1	3	1	3	3	1	3	3	1		
1/3	1/3	1/3	1	5	1	3	3	3	1	3	3	3	3	5	7	1/3	3	3	3	1	1	1	1	3	3	3	1	1.2931763		
1	3	5	1	1	1	1	1/5	1	1	1	3	3	1/5	1	3	3	1	1/3	3	1	3	5	1	1/3	1	1	3	1.5952269		
5	3	1	1	3	1	3	1	3	1	9	1	3	1	3	7	1	5	3	1	7	3	1	1	1	1	1/9	1/7	2.1049796		
5	3	3	1	1	5	3	5	1	3	5	7	5	9	5	1	5	3	1	5	5	1	3	5	1	3	5	5	2.5977066		
3	1	1/3	1	1	1	1	1/3	3	3	3	1	3	1	3	9	5	1	3	5	3	1	5	1	3	3	3	3	1.4025065		
3	3	1/3	1/3	3	1	1	5	3	1/3	3	1	1	3	1	3	5	1	3	7	3	1	3	1	3	1	1/5	3	1.0975487		
1	1	1/3	1	5	3	3	1	1/3	3	5	1	3	3	1	3	9	1	5	3	1	1	7	5	1	5	3	3	1.3933285		
1/3	1/3	3	1	3	9	7	5	3	9	3	1	5	3	5	3	1	1	3	1	5	1	5	3	9	7	3	5	1.6697329		
5	1	5	1/3	3	5	5	3	9	5	3	1	1	3	5	3	1	5	3	1	5	7	1	3	7	5	1	7	2.1970591		
7	3	5	1	7	7	3	1	1/5	1	5	5	5	7	9	9	7	3	1	1	5	7	3	5	1	5	1	1/3	2.7058451		
1/3	3	1/3	1/3	1	1	3	3	1/3	1/3	1	1/3	3	1/3	1/3	1	1	1/3	1/3	1	3	1/3	1/3	1	1	1/9	1	1/3	0.8027416		
1/3	1	1/3	1	3	3	3	1	3	1/3	1/3	1/3	1/3	1/3	1	1/3	1	1/3	1	1	1	1	3	1	1/3	3	3	1	1		
3	1	3	3	3	1/3	1	3	1	3	3	1	5	3	1	1	1/3	1	1	1	3	3	3	5	3	3	1/3	3	1.2996925		
5	3	1	1	3	1	7	3	5	3	3	3	1	1	1	1/3	1/3	3	3	1	1/3	3	1	1	3	1/9	1	1	1.8018194		
5	3	3	7	1	3	3	3	1/3	3	5	5	1	5	1	3	5	3	5	3	5	3	5	1/7	1	1	3	3	2.2998596		
1/3	1	5	1	3	1/3	7	1	1	3	1	3	5	7	5	1/3	1	5	1	3	3	1	1/5	5	1	1	5	1/7	1.1946936		
1	1/3	3	3	3	9	5	1	1/3	7	3	3	3	1	1/5	1	1/3	1	1	1	1/3	1	1	3	1/3	3	1	3	5	1.4983158	
5	3	1	1	5	1	1	5	1/3	5	3	5	1	1/5	1	5	3	3	1/3	3	3	5	1	5	5	5	5	3	2.022012		
5	5	5	3	3	5	5	1	1/3	7	5	3	3	5	3	3	5	3	9	1	3	1	5	7	5	3	1	1/7	2.5066649		
1	3	1/3	1	3	3	1/3	1	1	1	1/3	3	1/3	1	1	7	3	5	5	7	3	5	1	1	1	3	3	1	1.2999056		
5	5	5	1/3	3	1	3	3	1	3	1	3	3	1/3	3	5	5	3	1/5	1	5	1	1	1	1	1/7	3	3	1	1.8050365	
7	3	1	1	3	3	1	1	5	1/3	7	3	3	9	1/3	5	1	3	3	7	9	1	3	5	3	9	1	1/5	2.4969187		
1/3	3	1	1	7	9	5	3	3	7	3	3	1	3	9	3	1/3	3	3	9	5	3	5	1	1	1	1/9	5	1.4983158		
1	1	5	1/5	1	5	5	1	1/3	3	5	5	1	1	1	1	3	1	1	5	1	5	5	5	3	3	3	5	2.0014593		
3	3	3	1/3	3	3	1/3	3	1	3	3	3	9	1/3	1/3	1	3	3	3	1	1	3	7	1	5	3	3	3	1.4928554		

SURVEY RESPONSE PAIRWISE COMPARISONS OF FLOORING ALTERNATIVES UNDER THE COMFORT

COMFORT			RESPONDENT																				
S.no	Alt_A	Alt_B	R01	R02	R03	R04	R05	R06	R07	R08	R09	R10	R11	R12	R13	R14	R15	R16	R17	R18	R19	R20	R21
1	Porcelain/Ceramic Tiles	Natural Stone Flooring	5	1/5	1	5	1	3	1/5	1	3	9	1	5	1/3	1	3	1	5	3	9	3	7
2	Porcelain/Ceramic Tiles	Concrete-Based Flooring	5	7	9	3	1/9	9	5	1	7	1/7	7	3	9	3	9	1/3	1/5	5	1/5	1/3	1
3	Porcelain/Ceramic Tiles	Wood Flooring	1/9	1/3	1/5	1/7	1/7	1/9	1	1/7	1/7	3	1	1/7	1	1/9	1/9	1/3	1	1/9	1/9	1/7	1/9
4	Porcelain/Ceramic Tiles	Engineered Wood Flooring	3	1/9	3	1/9	3	1/5	3	1/9	1/9	1	1/5	3	1/3	1	1/5	1	3	1/7	1/9	1/5	3
5	Porcelain/Ceramic Tiles	Vinyl Flooring	1/9	3	9	1/9	1/7	1	1	1/9	1	1/9	1/7	7	1/9	1	1/9	1	1	5	1/7	1/9	1
6	Porcelain/Ceramic Tiles	Rubber Flooring	1/3	1/7	1/9	1/5	1/3	1	1/9	1/3	1	1/3	1/5	1/7	1/9	1/7	1/9	1	1/3	1/5	1	1/5	1/3
7	Porcelain/Ceramic Tiles	Terrazzo	1	1/9	3	1/9	3	1/5	3	1/9	1/9	1	1/5	3	1/3	1	1/5	1	3	1/7	1/9	1/5	3
8	Porcelain/Ceramic Tiles	Epoxy Flooring	3	3	5	1/7	1/9	1	5	1/9	1/5	3	1/3	1/3	3	1	5	7	9	9	5	3	5
9	Natural Stone Flooring	Concrete-Based Flooring	1	1/7	1	1/9	5	1/9	1/9	3	3	7	1/9	7	1/9	1/3	3	7	1/9	3	1	1/9	5
10	Natural Stone Flooring	Wood Flooring	1/5	1/3	1/9	1/5	1/3	1/3	1/9	1/3	1/3	G	1/5	1/7	1/9	1/7	1/9	1	1/3	1/5	1/9	1/5	1/3
11	Natural Stone Flooring	Engineered Wood Flooring	1	1/7	1/9	1/5	1/3	1	1/9	1/3	1	1/3	1/5	1/7	1/9	1/7	1/9	1	1/3	1/5	1	1/5	1/3
12	Natural Stone Flooring	Vinyl Flooring	1	1/5	1/3	1/9	1/3	1	1/5	1/3	1	1/3	1/5	1/7	1/9	1	1	1	1	1/5	1	1/5	1/3
13	Natural Stone Flooring	Rubber Flooring	1/9	1/9	1/9	1/9	1/9	1/9	1/9	1/9	1/9	1/9	1/9	1/9	1/9	1/9	1/9	1/9	1/9	1/9	1/9	1/9	1/9
14	Natural Stone Flooring	Terrazzo	3	1/9	3	1/9	3	1/5	3	1/9	1/9	1	1/5	3	1/3	1	1/5	1	3	1/7	1/9	1/5	3
15	Natural Stone Flooring	Epoxy Flooring	1/3	5	5	1	1/7	5	1	5	1/9	3	1/5	3	1/7	1	7	3	5	5	1/7	1	1
16	Concrete-Based Flooring	Wood Flooring	1/3	1/7	1/9	1/5	1/3	1	1/9	1/3	1	1/3	1/5	1/7	1/9	1/7	1/9	1	1/3	1/5	1	1/5	1/3
17	Concrete-Based Flooring	Engineered Wood Flooring	1/3	1/7	1/9	1/5	1/3	1	1/9	1/3	1	1/3	1/5	1/7	1/9	1/7	1/9	1	1/3	1/5	1	1/5	1/3
18	Concrete-Based Flooring	Vinyl Flooring	3	1/9	3	1/9	3	1/5	3	1/9	1/9	1	1/5	3	1/3	1	1/5	1	3	1/7	1/9	1/5	3
19	Concrete-Based Flooring	Rubber Flooring	5	7	9	3	1/9	9	5	1	7	1/7	7	3	9	3	9	1/3	9	5	1/5	1/3	1
20	Concrete-Based Flooring	Terrazzo	5	3	1	7	3	9	1	9	1/7	7	5	3	1/7	1/3	1/5	1/7	1	1	1/5	1	1/9
21	Concrete-Based Flooring	Epoxy Flooring	5	7	9	3	1/9	9	5	1	7	1/7	7	3	9	3	9	1/3	9	5	1/5	1/3	1
22	Wood Flooring	Engineered Wood Flooring	5	7	9	3	1/9	9	5	1	7	1/7	7	3	9	3	9	1/3	9	5	1/5	1/3	1
23	Wood Flooring	Vinyl Flooring	5	1/5	1	5	1	3	1/5	1	3	9	1	5	1/3	1	3	1	5	3	9	3	7
24	Wood Flooring	Rubber Flooring	1	1/7	1	1/9	5	1/9	1/9	3	3	7	1/9	7	1/9	1/3	3	7	1/9	3	1	1/9	5
25	Wood Flooring	Terrazzo	5	9	1	5	7	3	7	5	3	5	1	3	1	9	3	5	1	3	5	3	1
26	Wood Flooring	Epoxy Flooring	9	7	7	9	9	7	9	9	9	7	9	5	9	9	7	9	7	7	9	5	9
27	Engineered Wood Flooring	Vinyl Flooring	1/3	5	5	1	1/7	5	1	5	1/9	3	1/5	3	1/7	1	7	3	5	5	1/7	1	1
28	Engineered Wood Flooring	Rubber Flooring	1/9	3	9	1/9	1/7	1	1	1/9	1	1/9	1/7	7	1/9	1	1/9	1	1	5	1/7	1/9	1
29	Engineered Wood Flooring	Terrazzo	5	1/5	1	5	1	3	1/5	1	3	9	1	5	1/3	1	3	1	5	3	9	3	7
30	Engineered Wood Flooring	Epoxy Flooring	9	7	7	9	9	7	9	9	9	7	9	5	9	9	7	9	7	7	9	5	9
31	Vinyl Flooring	Rubber Flooring	3	1/9	3	1/9	3	1/5	3	1/9	1/9	1	1/5	3	1/3	1	1/5	1	3	1/7	1/9	1/5	3
32	Vinyl Flooring	Terrazzo	5	7	9	3	1/9	9	5	1	7	1/7	7	3	9	3	9	1/3	9	5	1/5	1/3	1
33	Vinyl Flooring	Epoxy Flooring	5	7	1	3	9	9	1/3	7	1	1	3	5	1	9	9	7	3	8	9	7	7
34	Rubber Flooring	Terrazzo	5	1	1	3	7	3	1/3	7	1	1	3	5	1	9	9	7	3	8	9	7	7
35	Rubber Flooring	Epoxy Flooring	9	7	7	9	9	7	9	9	9	7	9	5	9	9	7	9	7	7	9	5	9
36	Terrazzo	Epoxy Flooring	5	9	1	5	7	3	7	5	3	5	1	3	1	9	3	5	1	3	5	3	1

SURVEY RESPONSES PAIRWISE COMPARISONS OF FLOORING ALTERNATIVES UNDER THE APPEARANCE

APPEARANCE			RESPONDENT																				
S.no	Alt_A	Alt_B	R01	R02	R03	R04	R05	R06	R07	R08	R09	R10	R11	R12	R13	R14	R15	R16	R17	R18	R19	R20	R21
1	Porcelain/Ceramic Tiles	Natural Stone Flooring	1/9	1/5	1	3	1/5	1/7	1/3	1	3	1/9	1	1/7	1/5	1/5	1/9	1	1/9	1/5	1/9	1/7	1
2	Porcelain/Ceramic Tiles	Concrete-Based Flooring	3	5	7	9	5	1/7	3	1	3	1	1/7	5	1/7	1	1/5	5	1/9	3	5	1	1/5
3	Porcelain/Ceramic Tiles	Wood Flooring	3	1/3	1/3	1/7	1/7	1	5	1/7	1/9	1/9	1	1/9	1	3	1/3	1/5	1	1/3	3	3	1/7
4	Porcelain/Ceramic Tiles	Engineered Wood Flooring	1/9	1	1/9	1/3	1/9	1/5	1/9	1/5	1	1	1/7	1/7	3	1	1/5	5	1	5	1/5	1	1/5
5	Porcelain/Ceramic Tiles	Vinyl Flooring	3	3	1/9	1	5	5	1	1/7	1/5	7	1	3	1/3	3	1/9	1	1	9	5	7	1/9
6	Porcelain/Ceramic Tiles	Rubber Flooring	1/9	1/5	1/7	3	5	1	7	7	1	7	1	9	1/9	1/5	5	1	7	3	1/9	1/7	9
7	Porcelain/Ceramic Tiles	Terrazzo	1/7	9	3	1/9	7	1/9	1	1/7	1/9	5	1	1	3	5	9	5	1/3	1/3	9	5	1
8	Porcelain/Ceramic Tiles	Epoxy Flooring	3	5	7	5	9	1/7	3	9	3	3	3	1/7	9	1	1/3	1/3	5	7	9	5	1
9	Natural Stone Flooring	Concrete-Based Flooring	9	3	9	9	3	5	5	7	1	1	7	1	3	3	7	3	3	9	3	1	7
10	Natural Stone Flooring	Wood Flooring	1/5	1/7	3	7	1/3	1/7	1/5	5	1	1	9	7	1/3	3	5	3	1	1/5	9	3	9
11	Natural Stone Flooring	Engineered Wood Flooring	3	1	7	5	3	5	7	9	5	1	1	7	5	9	9	1	7	3	9	7	9
12	Natural Stone Flooring	Vinyl Flooring	5	3	9	5	5	1	5	1	5	1	1	7	1	9	9	5	5	3	7	3	9
13	Natural Stone Flooring	Rubber Flooring	7	9	5	5	9	9	5	3	7	5	7	9	3	3	7	5	1/3	7	9	5	1
14	Natural Stone Flooring	Terrazzo	1	5	5	9	9	7	3	9	9	1	7	5	3	7	1	9	7	9	3	5	5
15	Natural Stone Flooring	Epoxy Flooring	5	1	1	9	7	3	3	5	9	5	1	3	7	3	5	7	5	1	9	5	3
16	Concrete-Based Flooring	Wood Flooring	1/9	1/7	1/5	3	1	1/7	1	1	1/7	1	1/9	1/5	1/3	1	1/7	3	1/5	1/9	1/5	1	1/3
17	Concrete-Based Flooring	Engineered Wood Flooring	9	1/9	1/9	7	9	5	1/9	1/9	1/7	1/5	5	7	1/9	1/5	1/9	1	1	1/5	5	1/9	1
18	Concrete-Based Flooring	Vinyl Flooring	5	5	1/3	9	1/3	1/5	1/3	5	1	3	1/9	1/3	3	7	5	3	1/7	1	1	3	3
19	Concrete-Based Flooring	Rubber Flooring	1	1/3	1/5	5	1/3	1/5	5	1/3	1/7	5	1	3	1/9	1/9	1/5	1	1	7	1/5	1	7
20	Concrete-Based Flooring	Terrazzo	3	3	1/5	3	1/9	1/7	1/5	1/9	5	1	1/7	1	1	5	1/3	1/3	1/9	1	1/7	1/7	5
21	Concrete-Based Flooring	Epoxy Flooring	1/5	5	5	5	3	7	1/3	3	9	5	9	7	1/5	5	3	3	9	3	1	1/7	1/5
22	Wood Flooring	Engineered Wood Flooring	1/7	1	1/5	9	1/7	1	5	1/9	9	1/7	1/9	5	1/9	1/9	3	1/3	1	1/7	5	7	5
23	Wood Flooring	Vinyl Flooring	5	7	1	9	9	1	7	5	5	5	3	7	3	7	5	9	3	9	1/3	3	1/3
24	Wood Flooring	Rubber Flooring	9	5	3	7	5	9	3	1	7	9	5	7	5	1	3	3	5	3	7	3	7
25	Wood Flooring	Terrazzo	1	1/9	1/7	1	9	3	5	1/5	1	3	7	1/3	3	1	1/5	1/3	5	1/9	1/9	1/7	5
26	Wood Flooring	Epoxy Flooring	5	7	5	9	3	9	7	7	1	5	7	7	9	1/3	3	5	1	7	9	3	3
27	Engineered Wood Flooring	Vinyl Flooring	3	3	1/5	5	1	9	7	3	5	1/3	5	1/5	1	9	1	5	3	9	5	3	3
28	Engineered Wood Flooring	Rubber Flooring	3	5	9	1	1/5	5	9	3	1/5	9	1	1/5	3	1	7	3	5	5	3	9	3
29	Engineered Wood Flooring	Terrazzo	1	7	1/9	1	5	5	1/3	1/7	3	9	1	7	1/5	1	1/7	1/7	1/3	1/9	1	3	1/7
30	Engineered Wood Flooring	Epoxy Flooring	7	9	5	5	5	7	3	5	9	1	1/3	7	3	5	3	7	3	1	9	9	5
31	Vinyl Flooring	Rubber Flooring	1	3	5	7	5	1/9	7	1/5	3	9	7	5	1/3	3	1	5	5	1/5	1	9	5
32	Vinyl Flooring	Terrazzo	1/3	3	3	1/5	3	1/7	5	1	1/9	1/3	1	1	1/3	1	1/5	3	1/7	1/3	1/5	3	1
33	Vinyl Flooring	Epoxy Flooring	7	1/7	9	7	1/3	3	1	7	1	5	1/7	9	1	1	9	9	1	5	3	1	5
34	Rubber Flooring	Terrazzo	3	1/5	1/9	3	1/3	1/5	1/7	5	1	1/5	1/3	1	1/7	1/5	1/9	1/7	3	1/3	1/9	5	1/3
35	Rubber Flooring	Epoxy Flooring	1/7	5	7	1/9	5	9	1/5	1/9	1/7	1/9	5	7	1/9	5	3	1/5	3	1/3	1	5	7
36	Terrazzo	Epoxy Flooring	9	9	1	3	9	7	5	1/3	9	7	5	5	5	1	7	3	5	3	3	7	1/7

SURVEY RESPONSE PAIRWISE COMPARISONS OF FLOORING ALTERNATIVES UNDER THE DESIGN COMPATIBILITY

DESIGN COMPATIBILITY			RESPONDENT																				
S.no	Alt_A	Alt_B	R01	R02	R03	R04	R05	R06	R07	R08	R09	R10	R11	R12	R13	R14	R15	R16	R17	R18	R19	R20	R21
1	Porcelain/Ceramic Tiles	Natural Stone Flooring	3	1/5	1	1/9	1/7	1/5	1/3	9	3	5	5	3	1	3	3	1	7	9	5	3	5
2	Porcelain/Ceramic Tiles	Concrete-Based Flooring	3	7	3	9	5	7	1	9	7	9	1	5	7	7	5	9	9	5	7	9	7
3	Porcelain/Ceramic Tiles	Wood Flooring	5	7	9	1	5	7	7	1/7	1/9	7	1/5	9	1/3	1/9	9	1/5	1/9	9	9	7	3
4	Porcelain/Ceramic Tiles	Engineered Wood Flooring	9	1/3	1/3	9	1/5	5	3	7	5	7	1/5	1/7	3	1	1/5	5	5	9	1/9	1/5	9
5	Porcelain/Ceramic Tiles	Vinyl Flooring	7	1/3	1/5	7	5	5	7	1/5	1/3	1/9	5	3	1	5	1/7	1/3	1/5	1/3	1/5	1/3	9
6	Porcelain/Ceramic Tiles	Rubber Flooring	7	7	1/5	9	1	1/5	1/3	1/5	1/3	1	7	9	5	3	1/3	1/5	3	3	9	5	3
7	Porcelain/Ceramic Tiles	Terrazzo	1	9	1/5	3	1/3	7	5	7	1	7	5	7	9	9	7	3	3	7	5	9	3
8	Porcelain/Ceramic Tiles	Epoxy Flooring	3	7	5	9	9	5	7	7	9	7	9	5	5	1	5	3	5	9	9	5	5
9	Natural Stone Flooring	Concrete-Based Flooring	1/7	1/5	3	1/3	1/3	5	1/5	1	9	5	5	3	9	1/3	3	5	7	1/5	1/7	9	3
10	Natural Stone Flooring	Wood Flooring	1/3	1/9	1/9	1/9	3	1/5	1/9	5	5	1/3	1/5	3	1/3	1/7	5	1/7	1/9	9	1	1/7	1/9
11	Natural Stone Flooring	Engineered Wood Flooring	1/7	1/9	1/5	1/3	5	5	1/5	1	1/7	1	1/5	1/5	1/9	3	1/7	9	1/9	1/9	1/3	3	1/5
12	Natural Stone Flooring	Vinyl Flooring	1/9	1/9	1	1/5	5	1/3	1	1/9	7	3	5	1/9	1/3	9	1/7	1/3	1/5	7	1/3	1/7	1/9
13	Natural Stone Flooring	Rubber Flooring	1	9	5	1	1/3	1/5	3	1/3	7	9	3	3	1/5	1/3	1/7	5	5	1/5	1/7	5	
14	Natural Stone Flooring	Terrazzo	3	3	3	1/5	1/7	1	1/5	1/5	7	1	7	5	3	3	1	7	3	7	3	1/3	7
15	Natural Stone Flooring	Epoxy Flooring	1/9	1	1	1/7	1	1	1/5	1/9	3	3	1/5	3	1/7	1	1/7	1	1/5	1	1/9	1/7	1/7
16	Concrete-Based Flooring	Wood Flooring	1/7	1/7	1/3	1/3	1/7	5	1/9	3	3	1/7	3	1	1/9	1/7	1	1/7	1/7	1/9	1/7	5	1/3
17	Concrete-Based Flooring	Engineered Wood Flooring	1/3	1/9	3	3	1/7	1/5	1/7	1/7	3	1/7	1	1/5	1/5	1/3	1/7	1/5	1/3	1/7	1/7	1/7	1
18	Concrete-Based Flooring	Vinyl Flooring	1/9	5	1/3	1/9	5	1/7	1	1/7	1/9	1/7	1/3	1/7	1/7	7	1/7	1/7	7	1/7	1/7	9	1/5
19	Concrete-Based Flooring	Rubber Flooring	9	9	1/3	7	9	3	3	1/5	1/5	1/3	1	7	1/3	1/7	1/3	1	3	1/7	3	7	1/7
20	Concrete-Based Flooring	Terrazzo	1/5	1/5	1/9	1/7	7	1/5	3	7	3	1/5	3	5	1	1/7	1/5	9	7	1	3	1	3
21	Concrete-Based Flooring	Epoxy Flooring	1/3	1/5	1/5	1/5	1/5	1/9	1/3	1/5	1/7	1	3	1/3	1/9	1/3	3	1/9	1	1/9	1	1/3	1/5
22	Wood Flooring	Engineered Wood Flooring	5	5	1	1/5	5	1/7	5	7	7	1/7	3	1/3	9	7	1/3	1/9	5	3	1/9	1/5	1/9
23	Wood Flooring	Vinyl Flooring	1/9	1	1/5	1/5	1	7	1/3	7	9	9	1/5	1/7	5	1	1/7	5	1/3	1	1/9	5	1/5
24	Wood Flooring	Rubber Flooring	1	1	1/7	1/7	9	1/7	9	5	1/7	9	1/7	5	9	1/3	1/3	7	7	3	3	9	1/9
25	Wood Flooring	Terrazzo	1/3	1/5	7	7	9	3	3	5	3	1	9	1/5	3	9	5	1/7	7	5	5	5	9
26	Wood Flooring	Epoxy Flooring	1	1	7	1/5	5	1/9	3	9	5	1/5	1	9	1/7	3	3	5	5	9	3	1/9	5
27	Engineered Wood Flooring	Vinyl Flooring	1	1/3	1/3	1/9	7	3	1	1/9	9	5	5	1/5	1/5	3	1/9	3	5	1/7	5	3	9
28	Engineered Wood Flooring	Rubber Flooring	1/3	1/5	9	1	3	5	1	1/7	5	1	1/5	1/7	9	1	5	3	3	9	9	7	5
29	Engineered Wood Flooring	Terrazzo	7	1/3	1/7	5	1	3	1	9	9	7	5	3	5	3	5	3	9	3	3	1	7
30	Engineered Wood Flooring	Epoxy Flooring	1/9	5	7	7	1/3	1/5	1	1/3	9	7	7	1/7	1	3	1/5	3	5	5	1/7	1	1/5
31	Vinyl Flooring	Rubber Flooring	5	7	1/7	5	7	1/3	1	1/5	1	1/7	5	1	9	3	1/7	7	9	1	1/3	9	3
32	Vinyl Flooring	Terrazzo	3	1/5	1	1/9	1/7	1/5	1/3	9	3	5	5	3	1	3	3	1	7	9	5	3	5
33	Vinyl Flooring	Epoxy Flooring	1/5	3	1/7	1/9	7	1/9	1/9	1	1/5	5	1/3	1/7	1/5	1/9	1/7	7	1/9	1/7	1	1/5	1/9
34	Rubber Flooring	Terrazzo	5	1	9	1	1/9	1/5	1	1/3	7	5	3	1/7	1	5	1/9	1/3	3	7	7	1/5	3
35	Rubber Flooring	Epoxy Flooring	3	1	5	3	1	1/5	1/7	1/7	1/9	1	7	5	1/7	1/5	1/3	1/7	1	3	1/9	1/9	1/7
36	Terrazzo	Epoxy Flooring	1/3	1/7	1/7	1/7	1/7	1/7	1/7	1/3	1/3	1/3	1/3	5	1/3	1	1	3	1/5	5	1	1/5	1

SURVEY RESPONSE PAIRWISE COMPARISONS OF FLOORING ALTERNATIVES UNDER THE EASE OF INSTALLATION

EASE OF INSTALLATION			RESPONDENT																				
S.no	Alt_A	Alt_B	R01	R02	R03	R04	R05	R06	R07	R08	R09	R10	R11	R12	R13	R14	R15	R16	R17	R18	R19	R20	R21
1	Porcelain/Ceramic Tiles	Natural Stone Flooring	5	1/9	1/5	5	1	9	7	3	3	3	3	9	9	7	7	3	9	7	1	3	9
2	Porcelain/Ceramic Tiles	Concrete-Based Flooring	3	3	3	5	1	1/5	5	1/5	7	1	1/9	5	1	7	7	3	1	1/5	3	3	1
3	Porcelain/Ceramic Tiles	Wood Flooring	3	7	3	1/7	3	5	1/7	7	7	3	1/5	7	1/7	1/5	1/7	1/3	1/3	1/7	9	1/3	1
4	Porcelain/Ceramic Tiles	Engineered Wood Flooring	1/3	1/9	1/9	1/9	3	1/5	1/9	5	5	1/3	1/5	3	1/3	1/7	5	1/7	1/9	5	1	1/7	1/9
5	Porcelain/Ceramic Tiles	Vinyl Flooring	1/9	1/5	1/5	1/5	7	5	1/9	1/7	1/9	1/9	1/9	1/5	1/9	1/9	1/3	1/5	7	1/5	1/5	1/5	9
6	Porcelain/Ceramic Tiles	Rubber Flooring	1/7	7	1/7	1/9	1/7	1/7	1/5	1/3	1/9	1/9	7	9	1	5	1/7	1/5	1/9	5	1/7	1/7	3
7	Porcelain/Ceramic Tiles	Terrazzo	5	1	1/5	1/7	5	5	1	1	1	9	3	3	7	9	5	3	9	3	1	5	7
8	Porcelain/Ceramic Tiles	Epoxy Flooring	7	9	5	5	7	5	5	3	7	9	1/9	1/5	1/3	1/3	1/5	1/3	1/5	1/3	1/7	1/9	1/3
9	Natural Stone Flooring	Concrete-Based Flooring	3	9	9	5	7	9	5	5	9	7	1/9	1/5	1/3	1/9	1/5	1/3	1/5	1/7	1/9	1/9	1/3
10	Natural Stone Flooring	Wood Flooring	1/3	1	1/7	3	1/5	1/3	1/5	1/9	1/3	1/3	1/5	1/3	1/3	1	1/5	1/7	1/3	1/3	3	1/7	1/5
11	Natural Stone Flooring	Engineered Wood Flooring	5	3	5	7	9	7	5	3	3	3	1/7	1/9	1/9	1/5	1/9	1/3	1/5	1/9	1/5	1/7	1/5
12	Natural Stone Flooring	Vinyl Flooring	1	1/5	1/5	1/5	1/5	1/9	1/3	1/5	1/7	1	3	1/3	1/9	1/3	3	1/9	1	1/9	1	1/3	1/5
13	Natural Stone Flooring	Rubber Flooring	1/7	1/9	1/9	1/5	1/7	1/9	1/3	1/3	3	1/3	1/5	1/7	1/9	1/7	1/9	5	9	1/9	7	1/3	1/7
14	Natural Stone Flooring	Terrazzo	1/3	1/3	1/3	7	5	1/7	5	1/3	9	1	9	1/5	1/3	1/7	1/7	1/9	1/9	1/9	1/7	1/3	1/9
15	Natural Stone Flooring	Epoxy Flooring	1	9	3	1/9	9	1/9	1/9	9	9	1/9	1/9	9	1/9	1/7	1/9	9	1/9	1/9	1/9	1/9	1/9
16	Concrete-Based Flooring	Wood Flooring	1	7	1	1/5	1/3	1	7	1/7	1/9	1	1/9	5	7	9	1/9	1/5	1	1/9	5	9	1/3
17	Concrete-Based Flooring	Engineered Wood Flooring	1/7	1/7	1/3	1/3	1/7	5	1/9	3	3	1/7	3	1	1/9	1/7	1	1/7	1/7	1/9	1/7	5	1/3
18	Concrete-Based Flooring	Vinyl Flooring	1/3	1/9	3	3	1/7	1/5	1/7	1/7	3	1/7	1	1/5	1/5	1/3	1/7	1/5	1/3	1/7	1/7	1/7	1
19	Concrete-Based Flooring	Rubber Flooring	1/3	1/3	1	5	1/5	1/9	1/9	1/5	1	1/3	3	1/9	1/7	1/9	3	1/7	1/3	1/5	1	1	5
20	Concrete-Based Flooring	Terrazzo	5	1/3	1	1/5	5	1/5	9	1/3	3	1	9	1	1/9	5	5	3	3	9	5	5	1
21	Concrete-Based Flooring	Epoxy Flooring	7	3	5	7	5	9	5	3	7	5	1/3	1/3	1/5	1/9	1/5	1/5	1/3	1/5	1/3	1/5	1/7
22	Wood Flooring	Engineered Wood Flooring	1/9	5	1/3	1/9	5	1/7	1	1/7	1/9	1/7	1/3	1/7	1/7	7	1/7	1/7	7	1/7	1/7	9	1/5
23	Wood Flooring	Vinyl Flooring	3	9	9	5	7	9	5	5	7	7	1/9	1/5	1/3	1/9	1/5	1/3	1/5	1/7	1/9	1/9	1/3
24	Wood Flooring	Rubber Flooring	1/9	1/5	1/7	7	1/9	3	1/3	1/3	1/9	1/3	7	3	3	1/5	9	3	1/9	3	1/9	9	1/3
25	Wood Flooring	Terrazzo	1/9	3	1	5	9	3	5	9	7	3	5	9	1/3	3	1	1/7	1/9	1	1	3	5
26	Wood Flooring	Epoxy Flooring	1/9	1/7	1	9	1/3	1/5	1/5	3	1/3	7	1/7	1/9	1/3	1/9	1/5	5	1/9	1/5	3	1/3	1/5
27	Engineered Wood Flooring	Vinyl Flooring	1/9	1/5	1/9	1/9	5	5	7	1/5	1/3	1/3	5	7	9	1/5	5	7	1/7	1/5	1/5	1	9
28	Engineered Wood Flooring	Rubber Flooring	5	1/5	1/5	7	9	1/7	7	5	1/9	1/5	1/9	5	1/5	3	7	1	1	3	3	7	9
29	Engineered Wood Flooring	Terrazzo	1	9	7	3	9	9	5	1	3	1/9	1	3	1/3	9	3	9	1	5	3	7	1/5
30	Engineered Wood Flooring	Epoxy Flooring	7	1/5	1/9	1/7	3	3	5	1/9	5	1/7	1/5	7	7	5	5	1/5	1	3	1/7	9	5
31	Vinyl Flooring	Rubber Flooring	1/9	9	1	3	1	1/3	5	3	5	1/9	9	1	1	1	5	9	9	7	5	1/9	1
32	Vinyl Flooring	Terrazzo	1/7	3	5	9	5	9	1/7	5	1	1	7	1	7	7	7	5	3	5	1/7	3	3
33	Vinyl Flooring	Epoxy Flooring	5	3	1/3	5	1/7	7	3	1/9	1/5	1/5	7	7	1/5	9	5	3	1/5	1/7	3	9	1/3
34	Rubber Flooring	Terrazzo	1	1/7	5	1	3	7	3	3	1/5	3	1	1/3	1/7	9	1	1/7	1/9	5	7	3	9
35	Rubber Flooring	Epoxy Flooring	1	1/7	1/5	5	1/7	1	1/5	1	1/5	1/9	5	1/9	5	1	9	1/9	5	5	5	3	1
36	Terrazzo	Epoxy Flooring	5	5	7	7	9	7	7	5	3	7	1/5	1/9	1/5	1/7	1/5	1/9	1/5	1/5	1/7	1/3	1/9

SURVEY RESPONSE PAIRWISE COMPARISONS OF FLOORING ALTERNATIVES UNDER THE ENVIRONMENTAL IMPACT

ENVIRONMENTAL IMPACT			RESPONDENTS																				
S.no	Alternative 1	Alternative 2	R01	R02	R03	R04	R05	R06	R07	R08	R09	R10	R11	R12	R13	R14	R15	R16	R17	R18	R19	R20	R21
1	Porcelain/Ceramic Tiles	Natural Stone Flooring	1/3	1/7	1/3	1/3	1/5	1/9	1/3	1/9	1/3	1/5	5	9	3	7	9	3	3	7	7	7	5
2	Porcelain/Ceramic Tiles	Concrete-Based Flooring	1/9	1/7	1/5	1/3	1/7	1/5	1/9	1/5	1/3	1/9	7	3	3	9	3	7	7	7	7	7	5
3	Porcelain/Ceramic Tiles	Wood Flooring	1/3	1/9	1/9	1/7	1/7	1/9	1/3	1/9	1/5	1/9	5	9	9	7	3	3	3	3	9	3	5
4	Porcelain/Ceramic Tiles	Engineered Wood Flooring	1/3	1/3	1/9	1/3	1/5	1/7	1/9	1/7	1/7	1/7	9	9	7	3	3	7	3	3	7	9	7
5	Porcelain/Ceramic Tiles	Vinyl Flooring	1/9	1/7	1/7	1/5	1/7	1/7	1/3	1/3	1/7	1/5	7	3	7	9	9	7	5	5	9	7	9
6	Porcelain/Ceramic Tiles	Rubber Flooring	1/3	1/5	1/5	1/3	1/5	1/7	1/7	1/3	1/3	1/9	9	7	7	7	5	3	7	5	9	7	3
7	Porcelain/Ceramic Tiles	Terrazzo	1/7	1/5	1/9	1/9	1/3	1/7	1/3	1/7	1/5	1/5	9	7	3	9	5	9	9	5	7	3	9
8	Porcelain/Ceramic Tiles	Epoxy Flooring	1/7	1/9	1/7	1/9	1/3	1/5	1/3	1/7	1/5	1/9	5	5	5	3	5	9	5	5	7	7	5
9	Natural Stone Flooring	Concrete-Based Flooring	5	7	5	7	3	5	5	3	9	5	1/9	1/7	1/9	1/9	1/5	1/9	1/7	1/3	1/5	1/5	1/5
10	Natural Stone Flooring	Wood Flooring	1/9	1/5	1/9	1/5	1/7	1/9	1/9	1/9	1/7	1/7	3	9	3	5	7	7	7	3	7	3	3
11	Natural Stone Flooring	Engineered Wood Flooring	1/7	1/3	1/7	1/5	1/9	1/5	1/5	1/5	1/9	1/3	3	7	7	7	3	9	3	9	3	7	7
12	Natural Stone Flooring	Vinyl Flooring	1/9	1/3	1/9	1/5	1/5	1/5	1/3	1/9	1/7	1/9	5	5	3	5	5	9	3	3	7	7	5
13	Natural Stone Flooring	Rubber Flooring	1/7	1/9	1/3	1/5	1/9	1/9	1/9	1/3	1/3	1/5	3	9	9	5	5	9	3	3	9	7	3
14	Natural Stone Flooring	Terrazzo	7	3	9	9	7	9	9	9	3	7	1/5	1/7	1/5	1/5	1/7	1/3	1/3	1/7	1/3	1/5	1/7
15	Natural Stone Flooring	Epoxy Flooring	1/3	1/3	1/9	1/9	1/9	1/3	1/9	1/7	1/3	1/7	3	9	9	7	9	7	3	5	3	7	7
16	Concrete-Based Flooring	Wood Flooring	1/9	1/3	1/5	1/5	1/3	1/3	1/7	1/9	1/5	1/3	5	7	5	7	9	7	9	5	3	5	5
17	Concrete-Based Flooring	Engineered Wood Flooring	1/3	1/7	1/3	1/9	1/7	1/3	1/7	1/9	1/5	1/5	5	7	9	3	5	7	5	9	7	9	9
18	Concrete-Based Flooring	Vinyl Flooring	1/5	1/5	1/7	1/5	1/7	1/7	1/5	1/3	1/5	1/5	5	7	7	5	7	5	5	3	9	5	9
19	Concrete-Based Flooring	Rubber Flooring	1/5	1/3	1/7	1/3	1/5	1/7	1/3	1/9	1/7	1/5	5	5	9	9	5	3	7	9	3	9	3
20	Concrete-Based Flooring	Terrazzo	9	5	9	3	7	5	3	5	3	5	1/9	1/3	1/5	1/9	1/5	1/9	1/5	1/7	1/3	1/9	1/5
21	Concrete-Based Flooring	Epoxy Flooring	1/5	1/3	1/5	1/9	1/3	1/5	1/7	1/7	1/3	1/9	3	7	5	5	9	7	3	3	3	7	7
22	Wood Flooring	Engineered Wood Flooring	5	5	7	7	9	7	7	5	3	7	1/5	1/9	1/5	1/7	1/5	1/9	1/5	1/5	1/7	1/3	1/9
23	Wood Flooring	Vinyl Flooring	5	9	5	5	3	7	5	9	7	3	1/3	1/9	1/7	1/9	1/3	1/9	1/5	1/7	1/5	1/3	1/5
24	Wood Flooring	Rubber Flooring	1/5	1/5	1/3	1/5	1/3	1/9	1/7	1/3	1/7	1/3	3	7	3	5	9	7	3	9	7	7	3
25	Wood Flooring	Terrazzo	7	9	5	5	7	5	5	3	7	9	1/9	1/5	1/3	1/3	1/5	1/3	1/5	1/3	1/7	1/9	1/3
26	Wood Flooring	Epoxy Flooring	1/7	1/7	1/3	1/5	1/5	1/3	1/3	1/7	1/9	1/3	5	3	7	7	3	7	7	9	5	5	3
27	Engineered Wood Flooring	Vinyl Flooring	5	9	9	7	9	9	5	3	3	3	1/7	1/9	1/9	1/5	1/9	1/3	1/5	1/9	1/5	1/7	1/5
28	Engineered Wood Flooring	Rubber Flooring	1/3	1/5	1/7	1/3	1/5	1/9	1/9	1/7	1/9	1/9	9	5	7	7	9	9	9	3	3	7	9
29	Engineered Wood Flooring	Terrazzo	3	9	9	5	7	9	5	5	7	7	1/9	1/5	1/3	1/9	1/5	1/3	1/5	1/7	1/9	1/9	1/3
30	Engineered Wood Flooring	Epoxy Flooring	1/9	1/5	1/9	1/5	1/9	1/3	1/5	1/3	1/7	1/3	3	7	5	3	9	5	5	5	3	7	3
31	Vinyl Flooring	Rubber Flooring	1/9	1/9	1/5	1/7	1/7	1/3	1/7	1/9	1/7	1/3	3	7	3	9	5	9	9	3	5	3	9
32	Vinyl Flooring	Terrazzo	7	3	5	7	5	9	5	3	7	9	1/3	1/3	1/5	1/9	1/5	1/5	1/3	1/5	1/3	1/5	1/7
33	Vinyl Flooring	Epoxy Flooring	1/5	1/7	1/7	1/7	1/3	1/7	1/7	1/9	1/7	1/3	3	3	9	5	3	3	9	9	9	9	5
34	Rubber Flooring	Terrazzo	7	3	7	5	7	9	7	3	9	9	1/5	1/9	1/9	1/9	1/7	1/9	1/7	1/3	1/3	1/7	1/9
35	Rubber Flooring	Epoxy Flooring	5	1	1	3	1	1	5	1	5	1	3	1	5	1	5	1	9	1	7	1	5
36	Terrazzo	Epoxy Flooring	1/9	1/7	1/5	1/5	1/9	1/7	1/5	1/7	1/3	1/5	7	7	9	5	9	7	3	5	3	5	5

SURVEY RESPONSE PAIRWISE COMPARISONS OF FLOORING ALTERNATIVES UNDER THE INITIAL COST

INITIAL COST			RESPONDENT																				
S.no	Alt_A	Alt_B	R01	R02	R03	R04	R05	R06	R07	R08	R09	R10	R11	R12	R13	R14	R15	R16	R17	R18	R19	R20	R21
1	Porcelain/Ceramic Tiles	Natural Stone Flooring	9	1/9	9	7	1/9	9	9	1/9	7	7	9	1/9	9	1/9	9	3	1/9	1	1/9	3	5
2	Porcelain/Ceramic Tiles	Concrete-Based Flooring	1	5	3	3	1/3	1/5	1/3	3	1/3	1/3	1/3	1/5	3	1/3	1/3	3	1/3	1/3	1/3	1/5	5
3	Porcelain/Ceramic Tiles	Wood Flooring	3	5	1	5	3	3	7	5	5	9	7	5	3	1	3	1	9	7	5	3	1/5
4	Porcelain/Ceramic Tiles	Engineered Wood Flooring	5	3	5	3	3	3	1	3	5	1/3	3	1	3	1	3	5	1/5	3	5	3	5
5	Porcelain/Ceramic Tiles	Vinyl Flooring	1/5	7	5	5	1	1/7	7	5	1	7	9	1/3	1/5	1	3	1/5	7	9	1/3	9	1/5
6	Porcelain/Ceramic Tiles	Rubber Flooring	1	3	3	1	1/3	3	1	1	1/3	1	3	1	3	5	5	5	1	1/3	3	7	7
7	Porcelain/Ceramic Tiles	Terrazzo	1/7	1	9	1/3	1/7	1/5	1	1/3	9	3	9	9	9	7	5	1	1/3	7	9	5	5
8	Porcelain/Ceramic Tiles	Epoxy Flooring	5	1/5	5	1/5	1/7	3	1/3	1/3	1/5	1/3	1/5	1/7	1/7	5	1/5	1/5	7	1/7	1	5	3
9	Natural Stone Flooring	Concrete-Based Flooring	1/9	9	1/9	1/9	9	1/9	1/9	9	9	1/9	1/9	9	1/9	1/7	1/9	9	1/9	1/9	1/9	1/9	1/9
10	Natural Stone Flooring	Wood Flooring	1	1/9	1/5	1/7	1/5	1/7	1/5	5	1/9	5	5	1/5	1/9	1	9	1/9	1	1/9	7	1/9	3
11	Natural Stone Flooring	Engineered Wood Flooring	1/5	9	1/5	1	5	1/3	1/9	1/7	3	1/3	1/3	1/7	1/7	1/5	1/7	1/9	1/9	7	3	5	3
12	Natural Stone Flooring	Vinyl Flooring	1/9	1/9	9	1/7	1/7	9	9	1/7	1/9	1/9	1/9	1/9	9	1/9	9	1/9	1/9	1/9	1/9	1/9	9
13	Natural Stone Flooring	Rubber Flooring	5	1/5	5	1/5	1/7	3	1/3	1/3	1/5	1/3	1/5	1/7	1/7	5	1/5	1/5	7	1/7	1	5	3
14	Natural Stone Flooring	Terrazzo	1/9	1	1/3	1/3	1/9	1/7	1/7	1	1	1/5	1/5	1/5	3	1/3	1/5	1	1/5	1	1/9	1/9	1/5
15	Natural Stone Flooring	Epoxy Flooring	7	1/9	1/7	1/9	9	1/9	9	1/9	1/9	1/9	1/9	1/7	1/9	9	1/9	9	1/9	7	9	1/9	9
16	Concrete-Based Flooring	Wood Flooring	9	7	5	5	1	1	3	7	3	7	5	1/5	9	7	5	1	5	5	1/5	5	5
17	Concrete-Based Flooring	Engineered Wood Flooring	5	5	3	3	5	7	5	5	1/5	5	5	7	7	3	5	3	3	1	1/5	5	7
18	Concrete-Based Flooring	Vinyl Flooring	3	1	1	3	3	5	1	5	3	1	3	1	3	5	7	1	3	1	5	3	1
19	Concrete-Based Flooring	Rubber Flooring	7	1	3	5	3	1	3	3	5	5	3	7	5	1	1/3	1	7	3	7	3	1
20	Concrete-Based Flooring	Terrazzo	5	3	3	1/5	7	3	1/3	1/5	1/3	3	1	1/5	3	3	3	1/3	5	5	3	1	7
21	Concrete-Based Flooring	Epoxy Flooring	1	7	5	3	7	1	3	1	9	3	3	7	3	9	3	3	5	3	1	1	7
22	Wood Flooring	Engineered Wood Flooring	1/3	7	7	1/3	5	3	1/5	1/5	1/5	1	1/7	3	1	1/7	1/7	7	1/3	1/9	5	1/3	1/7
23	Wood Flooring	Vinyl Flooring	1/3	3	1/7	3	1/5	1/3	3	1/9	1/3	1/3	1	1/3	1/3	1	1/5	1/7	1/3	1/3	3	1/7	1/5
24	Wood Flooring	Rubber Flooring	3	1	1/3	1	1/3	3	1	1	1	1	1/3	1	3	1/9	1	3	1	1	1/3	3	3
25	Wood Flooring	Terrazzo	1/3	1	1	1/5	1/3	1	1/3	1/3	1/3	1/3	1/3	1/7	1	1/3	1/3	1	1/5	1/3	1/3	1	1/3
26	Wood Flooring	Epoxy Flooring	1/9	5	1/5	1/7	1	1	1/9	1/7	1/7	1/3	3	1/9	1/3	1/9	1/5	1/7	1/9	5	5	1/3	9
27	Engineered Wood Flooring	Vinyl Flooring	1/5	1/3	1/3	1	1/3	1/3	1/5	1/3	1/3	1/5	1/3	1/3	1/3	1/3	1/3	1/3	1/5	1	1/3	1/5	1/3
28	Engineered Wood Flooring	Rubber Flooring	1/5	1/9	5	5	7	1/9	1/7	7	3	1/9	1/9	5	1/5	1/5	1/9	9	1/5	1	1/5	1	1/9
29	Engineered Wood Flooring	Terrazzo	1/3	1/3	1/5	1/5	1	1/3	1	1/3	1/3	1/3	1/3	1	1/3	1/5	1/3	1/3	1/3	1/3	1/3	1/3	1
30	Engineered Wood Flooring	Epoxy Flooring	1/3	1/3	1/3	1/3	1/3	1/3	1/3	1/3	1	1/3	1/5	1/5	1	1/3	1	1/3	3	1/3	3	1	1/5
31	Engineered Wood Flooring	Epoxy Flooring	1/3	3	1/7	3	1/5	1/3	3	1/9	1/3	1/3	1	1/3	1/3	1	1/5	1/7	1/3	1/3	3	1/7	1/5
32	Vinyl Flooring	Rubber Flooring	5	5	1/3	1	7	3	1/9	5	9	7	1/7	1/5	1/7	1/5	7	1	1/5	1/7	9	9	1
33	Vinyl Flooring	Terrazzo	1/3	1	1	1/5	1/3	1	1/3	1/3	1/3	1/3	1/3	1/7	1	1/3	1/3	1	1/5	1/3	1/3	1	1/3
34	Rubber Flooring	Terrazzo	1/3	1	3	1	1	1	1	1/3	1	1	1	1	1	1/3	1	1	1	1/3	1	1/5	1
35	Rubber Flooring	Epoxy Flooring	3	1/5	3	9	1/7	5	9	1/9	1/7	5	9	1/9	1/3	9	1/3	1/5	1/5	1/5	7	1/5	1
36	Terrazzo	Epoxy Flooring	1/9	9	1/9	1/9	9	1/9	1/9	9	9	1/9	1/9	9	1/9	1/7	1/9	9	1/9	1/9	1/9	1/9	1/9

SURVEY RESPONSE PAIRWISE COMPARISONS OF FLOORING ALTERNATIVES UNDER THE INSTALLATION COST

INSTALLATION COST			RESPONDENT																				
S.no	Alt_A	Alt_B	R01	R02	R03	R04	R05	R06	R07	R08	R09	R10	R11	R12	R13	R14	R15	R16	R17	R18	R19	R20	R21
1	Porcelain/Ceramic Tiles	Natural Stone Flooring	1/5	5	1/5	9	9	5	1/7	1/7	1/7	9	5	9	7	1/5	9	7	7	3	9	5	3
2	Porcelain/Ceramic Tiles	Concrete-Based Flooring	1/9	1/3	7	1/5	9	1/5	1/9	1/9	1/9	1/7	1/9	1/7	7	1/5	1/3	9	1/9	1/3	1/3	1/5	1/5
3	Porcelain/Ceramic Tiles	Wood Flooring	1	5	1/5	1/9	3	1/3	3	1/5	5	1	5	5	1/5	1/9	5	1/9	5	9	7	3	1
4	Porcelain/Ceramic Tiles	Engineered Wood Flooring	9	3	7	1/5	3	3	5	9	1/9	9	3	7	5	7	5	5	5	9	9	5	7
5	Porcelain/Ceramic Tiles	Vinyl Flooring	1/3	1/7	1/3	1/3	7	5	5	1/9	1/9	1/9	9	1/5	7	1/7	1/3	1/3	1/3	1/5	5	7	1/5
6	Porcelain/Ceramic Tiles	Rubber Flooring	5	3	1/9	7	7	1/9	3	7	1/9	3	3	9	3	7	1/5	7	1/5	9	5	9	5
7	Porcelain/Ceramic Tiles	Terrazzo	5	3	7	9	3	5	9	3	3	3	9	7	7	9	3	3	7	5	3	5	3
8	Porcelain/Ceramic Tiles	Epoxy Flooring	1/7	1/9	1/5	1/3	1/7	1/3	7	9	1/9	5	1/7	1/9	1/5	1/7	1/3	1/3	1/7	1/5	5	1/7	1/3
9	Natural Stone Flooring	Concrete-Based Flooring	1/5	1/9	1/7	1/7	3	1/3	1/7	1/7	1/9	1/9	1/3	1/3	1/7	1/9	1/9	1/7	1/3	1/5	1/3	1/5	1/3
10	Natural Stone Flooring	Wood Flooring	1/9	9	1/3	1/5	3	5	1/9	1/5	1/3	1/5	1/3	7	1/7	3	1/5	1/7	1/3	7	1/9	1/5	9
11	Natural Stone Flooring	Engineered Wood Flooring	1/7	1/9	1/5	1/9	1/5	1/5	1/9	1/3	1/7	1/3	1/3	1/5	1/9	1/9	1/5	1/9	9	1/5	1/9	3	9
12	Natural Stone Flooring	Vinyl Flooring	1/9	1/5	1/5	1/5	7	5	1/9	1/7	1/9	1/9	1/9	1/5	1/9	1/9	1/3	1/5	7	1/5	1/5	1/5	9
13	Natural Stone Flooring	Rubber Flooring	1/7	1/3	1/3	7	1/5	1/9	1/3	1/9	1/5	1/5	5	1/9	1/5	1/5	1/5	1/9	1/5	9	1/5	7	1/7
14	Natural Stone Flooring	Terrazzo	1/9	1/9	1/5	1/3	1/3	1/7	1/5	9	3	1/7	3	1/3	3	7	5	1/5	5	1/9	7	1/5	9
15	Natural Stone Flooring	Epoxy Flooring	1/7	7	1/7	1/9	1/3	1/3	1/7	3	1/7	1/5	1/7	1/5	1/7	3	7	1/7	1/7	1/7	1/3	1/3	1/5
16	Concrete-Based Flooring	Wood Flooring	9	7	9	3	5	3	7	7	7	1/5	1/3	5	5	5	5	3	9	1/3	9	1/9	3
17	Concrete-Based Flooring	Engineered Wood Flooring	1/5	7	5	5	9	1/7	9	5	5	3	3	3	3	5	9	3	7	1/9	1/7	3	1/3
18	Concrete-Based Flooring	Vinyl Flooring	1/7	1/5	9	1/9	1/9	1/9	7	1/3	1/7	1/3	1/3	1/5	1/9	3	1/7	1/5	1/9	1/5	1/3	1/9	1/3
19	Concrete-Based Flooring	Rubber Flooring	1/7	9	7	7	7	3	5	7	7	7	9	3	1/3	1/5	1/5	9	1/9	7	1/5	3	1/5
20	Concrete-Based Flooring	Terrazzo	1/5	1/3	1/9	9	1/9	9	7	5	1/9	3	7	3	3	7	1/7	7	5	1/9	3	7	7
21	Concrete-Based Flooring	Epoxy Flooring	3	7	5	1/5	5	1/7	1	7	5	3	5	3	3	1	3	5	1/5	3	3	1	1/9
22	Wood Flooring	Engineered Wood Flooring	1/9	9	9	1/7	1/3	1/7	1/9	7	1/7	1/3	1/5	1/7	1/7	1/7	1/5	1/3	1/3	1/9	1/7	9	1/9
23	Wood Flooring	Vinyl Flooring	1/7	1/5	1/9	1/7	1/3	1/7	1/3	1/7	1/3	1/3	1/3	1/9	1/5	1/5	1/9	1/9	1/3	1/5	1/7	9	1/7
24	Wood Flooring	Rubber Flooring	5	3	5	3	1/5	3	7	5	1/3	1/5	9	7	3	9	3	7	3	9	1	9	1
25	Wood Flooring	Terrazzo	3	1/9	7	5	3	3	1	1/5	5	1/5	1	3	3	1/7	5	3	1/9	5	3	5	3
26	Wood Flooring	Epoxy Flooring	1/3	1/5	1/5	1/3	1/7	1/5	1/9	1/5	9	1/3	1/3	1/7	1/5	1/7	1/5	1/3	9	1/7	1/9	1/7	1/5
27	Engineered Wood Flooring	Vinyl Flooring	1/5	1/3	7	1/5	1/9	1/3	1/3	1/7	1/3	1/3	1/5	1/5	1/7	9	1/7	1/9	1/9	1/3	1/3	9	1/3
28	Engineered Wood Flooring	Rubber Flooring	9	5	3	1/9	5	5	3	5	9	3	7	9	1/3	9	3	1/5	5	5	5	1/5	1/5
29	Engineered Wood Flooring	Terrazzo	3	7	3	9	5	7	9	3	1/7	1/7	7	3	1/3	1/5	1/3	5	1/3	5	9	1/7	1/5
30	Engineered Wood Flooring	Epoxy Flooring	1/5	1/3	1/5	1/5	1/5	1/9	1/3	3	1/3	1/9	9	9	1/9	1/3	1/5	9	1/5	1/9	1/5	1/7	1/7
31	Vinyl Flooring	Rubber Flooring	9	9	3	5	9	5	7	9	5	1/9	3	5	1/7	5	9	1/5	1/7	3	1/7	9	9
32	Vinyl Flooring	Terrazzo	9	1/9	5	1/9	1/9	7	9	9	1/5	7	3	5	3	5	3	3	7	9	9	5	9
33	Vinyl Flooring	Epoxy Flooring	7	1/9	7	7	7	3	9	9	5	1/3	3	5	9	7	9	5	7	1/5	1/5	1/7	5
34	Rubber Flooring	Terrazzo	1/3	5	5	7	1/5	9	9	3	1/5	1/9	3	9	7	1/7	5	9	9	5	1/3	1/9	7
35	Rubber Flooring	Epoxy Flooring	9	1/5	7	1/9	1/9	1/7	1/7	1/7	1/5	1/3	1/7	5	1/9	1/7	1/3	1/9	1/9	1/9	1/3	3	7
36	Terrazzo	Epoxy Flooring	1/7	1/9	1/9	1/5	1/7	1/9	1/3	1/3	3	1/3	1/5	1/7	1/9	1/7	1/9	5	9	1/9	7	1/3	1/7

SURVEY RESPONSE PAIRWISE COMPARISONS OF FLOORING ALTERNATIVES UNDER THE LOCAL AVAILABILITY

LOCAL AVAILABILITY			RESPONDENT																				
S.no	Alt_A	Alt_B	R01	R02	R03	R04	R05	R06	R07	R08	R09	R10	R11	R12	R13	R14	R15	R16	R17	R18	R19	R20	R21
1	Porcelain/Ceramic Tiles	Natural Stone Flooring	3	3	5	5	1/7	1/9	1/3	1/5	1/7	1	5	9	9	5	1/5	5	9	9	5	1	7
2	Porcelain/Ceramic Tiles	Concrete-Based Flooring	1/7	7	1/9	1/9	1/5	1/7	1/9	5	3	7	9	1/5	1/5	3	1/5	1/3	1/7	1	5	1/3	1/7
3	Porcelain/Ceramic Tiles	Wood Flooring	1/3	1/5	1/3	5	1/9	7	9	1/7	1	3	7	5	3	1	5	7	5	1/7	5	3	1/7
4	Porcelain/Ceramic Tiles	Engineered Wood Flooring	9	5	9	3	7	1/3	1	1/5	1/3	3	5	7	1	3	1/5	3	7	9	7	7	3
5	Porcelain/Ceramic Tiles	Vinyl Flooring	1/9	1/5	5	1	1	1/3	1/9	9	7	1/7	5	1/7	1/3	3	7	1/5	1/5	1	9	5	1/7
6	Porcelain/Ceramic Tiles	Rubber Flooring	7	5	7	5	3	3	7	9	1	1/7	7	5	3	1	1	5	7	7	9	1	1
7	Porcelain/Ceramic Tiles	Terrazzo	9	1/3	1/9	1/3	1	1/9	7	1/3	9	1/5	5	1/5	5	1/3	1/9	1	5	9	1/5	1/5	3
8	Porcelain/Ceramic Tiles	Epoxy Flooring	9	3	1	1	1/5	9	5	1	9	7	7	3	3	1	7	5	5	7	9	1	7
9	Natural Stone Flooring	Concrete-Based Flooring	1/3	1/7	1/5	1	1/7	1/3	1/3	1/9	1	1/5	1/7	1	1/9	1/7	1/7	1/7	1/9	1	1/9	1	1/7
10	Natural Stone Flooring	Wood Flooring	1	1/9	1	1/7	9	1	1/7	1/9	1/9	1/7	1/3	5	1	1/5	1/7	3	1/5	1/3	1	1/3	3
11	Natural Stone Flooring	Engineered Wood Flooring	1/3	1/7	9	9	5	7	1/3	1/9	1	7	1/7	1	1/9	1/7	1/7	1/7	9	1	9	1	1/7
12	Natural Stone Flooring	Vinyl Flooring	1/9	1	1/9	1	1/9	3	1/5	1	3	1	1/5	3	1/5	1/7	1	1/9	3	1/5	5	1/5	1/9
13	Natural Stone Flooring	Rubber Flooring	1/5	1/5	1/5	1	1/5	1/5	1/5	1/7	5	1	5	1/5	5	1/9	7	9	9	5	7	1	5
14	Natural Stone Flooring	Terrazzo	1/7	1/9	1/7	1/7	1	1/5	1/5	1/9	1/9	1/9	1/7	1/5	1	3	1/9	3	5	1	1	3	1/9
15	Natural Stone Flooring	Epoxy Flooring	3	1	5	1	1/9	3	1/5	1	1/9	1	1/5	3	1/5	1/7	1	1/9	3	1/5	1/9	1/5	1/9
16	Concrete-Based Flooring	Wood Flooring	1	9	5	7	5	3	3	1	5	9	9	7	9	1	7	5	5	9	3	1/3	1
17	Concrete-Based Flooring	Engineered Wood Flooring	7	5	9	1	3	9	5	3	9	5	9	9	1	9	7	7	5	5	1/5	7	1
18	Concrete-Based Flooring	Vinyl Flooring	3	1/3	7	1	1/5	5	1/7	9	7	5	1/5	1/3	3	7	5	3	5	5	1/3	5	7
19	Concrete-Based Flooring	Rubber Flooring	1/5	3	7	9	3	7	7	5	5	1	9	1	5	9	9	7	3	3	7	3	5
20	Concrete-Based Flooring	Terrazzo	3	9	1/7	9	9	1/5	9	1/7	9	7	3	5	1	9	1/3	7	1/5	9	5	3	3
21	Concrete-Based Flooring	Epoxy Flooring	5	7	3	9	7	9	1/5	9	5	5	5	7	3	3	1	1	3	7	5	1	9
22	Wood Flooring	Engineered Wood Flooring	1	1	3	1/9	3	7	1/9	1/7	1	1/9	5	1/9	1/9	1	3	3	1	1/9	1	7	7
23	Wood Flooring	Vinyl Flooring	1	3	1/9	3	1/5	3	1/9	3	1/5	1	1/3	7	1/7	1	1/5	3	1/9	1	1/9	1/3	3
24	Wood Flooring	Rubber Flooring	1/3	1/5	7	5	5	7	5	1/9	7	3	3	1/9	5	1/9	3	1	1/7	9	7	1/9	1/5
25	Wood Flooring	Terrazzo	7	7	9	1/5	7	5	1/5	1/9	1/3	1	1	7	1	3	1/3	1/7	9	1	3	1/5	1/5
26	Wood Flooring	Epoxy Flooring	5	1	1/5	1/7	3	1	1/7	1/7	1/9	9	3	1/9	7	1/5	1	5	5	5	1/3	3	1/3
27	Engineered Wood Flooring	Vinyl Flooring	3	1	1/5	1	1/7	1/3	1/3	1/9	1	1/5	1/7	1	1/9	1/7	1/7	1/7	1/9	1	1/9	1	1/7
28	Engineered Wood Flooring	Rubber Flooring	1/7	1/9	1	1/7	1/3	7	1/9	3	1/5	1/7	1/5	1	5	1	3	1/3	1/7	1	1	1/9	1
29	Engineered Wood Flooring	Terrazzo	3	1/3	5	1/3	1	1/7	1/5	5	1/7	1/7	9	1/7	1	7	1/9	1/5	3	1/9	1/9	1	7
30	Engineered Wood Flooring	Epoxy Flooring	1/3	1/3	1	1/9	7	1/5	1/5	1/5	9	9	5	5	9	1	1/9	1/5	1	3	1/9	3	9
31	Vinyl Flooring	Rubber Flooring	1	5	7	9	3	1/7	9	1	9	9	1	1/9	5	7	1/3	1/9	1	7	1/3	3	7
32	Vinyl Flooring	Terrazzo	1	9	1/5	7	1/7	7	3	1/3	1/3	3	7	7	1/5	3	1/9	9	5	5	7	5	1/3
33	Vinyl Flooring	Epoxy Flooring	1	9	1	1/9	1/3	1/5	1/3	1/3	9	5	9	1/5	7	3	7	1/9	1	9	9	5	3
34	Rubber Flooring	Terrazzo	3	5	1/5	1/3	1	1	1	7	9	1/7	1/3	9	1/3	1/3	7	3	1/7	1/3	7	3	1/3
35	Rubber Flooring	Epoxy Flooring	1/9	1	1/7	9	5	7	3	1	1/5	1/9	1/3	1/5	5	1/3	5	3	1/3	7	3	1/3	1/3
36	Terrazzo	Epoxy Flooring	1/9	3	3	1/9	9	1/7	1/9	3	1/3	9	1/5	1/7	1	7	7	9	1/3	5	1/5	1/3	1/3

SURVEY RESPONSE PAIRWISE COMPARISONS OF FLOORING ALTERNATIVES UNDER THE MAINTENANCE COST

MAINTENANCE COST			RESPONDENT																				
S.no	Alt_A	Alt_B	R01	R02	R03	R04	R05	R06	R07	R08	R09	R10	R11	R12	R13	R14	R15	R16	R17	R18	R19	R20	R21
1	Porcelain/Ceramic Tiles	Natural Stone Flooring	1/7	1/3	1	5	1/9	1/3	3	5	7	1	1/7	7	1	5	7	1/7	5	1	7	3	1
2	Porcelain/Ceramic Tiles	Concrete-Based Flooring	1/5	7	5	1	5	3	3	1/5	5	5	1	1/9	3	7	3	3	9	1	1	3	1/3
3	Porcelain/Ceramic Tiles	Wood Flooring	7	3	9	7	5	5	1	7	9	3	9	5	3	5	1	9	5	9	3	1/5	9
4	Porcelain/Ceramic Tiles	Engineered Wood Flooring	3	7	9	9	1/3	3	9	1	7	7	1/5	1	3	7	9	1	7	1	5	9	5
5	Porcelain/Ceramic Tiles	Vinyl Flooring	1/7	3	7	4	9	7	9	1	5	7	7	1	3	9	1	1	7	5	9	7	9
6	Porcelain/Ceramic Tiles	Rubber Flooring	9	3	7	3	1	1	7	7	1/5	1/3	1	3	3	1	7	9	1/5	3	7	1/7	3
7	Porcelain/Ceramic Tiles	Terrazzo	3	7	3	5	1	7	3	9	1	7	3	9	1	5	5	3	5	5	1	3	3
8	Porcelain/Ceramic Tiles	Epoxy Flooring	5	5	7	3	5	1/9	7	5	5	5	1	9	9	7	1/7	3	3	5	1/5	9	1/5
9	Natural Stone Flooring	Concrete-Based Flooring	1/3	7	7	1/3	1/3	1/9	1	1/3	1/5	9	5	3	1/5	1/3	7	1/5	9	1	1	1/5	1/7
10	Natural Stone Flooring	Wood Flooring	1	1	3	1/7	7	9	1	1/7	7	1/9	7	9	1/9	3	3	5	3	7	5	7	5
11	Natural Stone Flooring	Engineered Wood Flooring	3	7	3	1/7	7	1/9	1/7	1/7	9	1/3	5	7	5	3	5	3	7	5	5	9	5
12	Natural Stone Flooring	Vinyl Flooring	5	9	3	9	1/7	5	5	9	5	1	9	7	9	5	1	5	7	1	1/5	3	5
13	Natural Stone Flooring	Rubber Flooring	5	5	1/3	9	3	1/3	3	1	9	5	1/5	1	3	5	9	7	5	9	5	1	3
14	Natural Stone Flooring	Terrazzo	1/7	1/3	1	5	1/9	1/3	3	5	7	1	1/7	9	1	5	7	1/7	5	1	7	3	1
15	Natural Stone Flooring	Epoxy Flooring	1/7	7	3	9	1/7	5	1/3	7	1	1	7	5	1/7	1/9	1	5	3	5	5	7	1/3
16	Concrete-Based Flooring	Wood Flooring	5	7	5	1	9	7	5	5	3	7	3	9	3	3	3	3	5	5	9	5	1/3
17	Concrete-Based Flooring	Engineered Wood Flooring	5	5	7	3	5	1/9	7	5	5	5	1	9	9	7	5	3	3	5	1	9	3
18	Concrete-Based Flooring	Vinyl Flooring	7	3	3	9	9	1/5	1	5	9	9	5	7	5	7	3	1	1	1	3	1/7	7
19	Concrete-Based Flooring	Rubber Flooring	9	1	1/3	7	1	7	1/5	5	3	7	7	3	5	3	5	7	5	1	9	5	1
20	Concrete-Based Flooring	Terrazzo	7	3	1/7	9	9	1/5	1/7	5	7	9	5	7	5	7	3	1	1/7	1	1/3	1/7	7
21	Concrete-Based Flooring	Epoxy Flooring	9	5	9	7	5	7	3	7	7	1	1/9	9	1	1	1/3	7	9	5	1	3	1/9
22	Wood Flooring	Engineered Wood Flooring	1/3	1/3	1/9	1/9	5	1/5	7	1	1/3	3	1/9	9	3	1/3	3	1/5	5	1	5	1/9	1/7
23	Wood Flooring	Vinyl Flooring	1/9	1	3	1/7	1	1/9	1/5	1/3	1/3	1/9	1/3	7	1/7	1/5	5	1/5	1/9	1/9	1/3	7	1/5
24	Wood Flooring	Rubber Flooring	7	1/7	3	3	1/7	1/3	1/7	1/3	1/5	1/9	1	1/7	1/3	1/5	9	5	3	1/9	9	1/7	1/7
25	Wood Flooring	Terrazzo	5	1/3	1/3	1/5	1/5	5	1/7	3	1/9	1/5	9	9	3	1/3	1/9	9	3	1/3	1	1/3	1/9
26	Wood Flooring	Epoxy Flooring	1/9	1/7	5	5	1/3	1/5	1/7	3	1/7	1	9	1/9	1/9	5	1/5	5	5	1/7	1/7	1/7	1/9
27	Engineered Wood Flooring	Vinyl Flooring	3	1/3	1/9	1/3	1/5	1/9	7	1	7	1/7	3	7	1/9	5	1/9	1/9	1/5	1	9	1/7	3
28	Engineered Wood Flooring	Rubber Flooring	1/9	1/5	1/9	1/5	1/7	1/5	9	1/9	5	1/3	9	1/3	1/5	3	1/3	1/7	1/3	1/7	7	7	7
29	Engineered Wood Flooring	Terrazzo	1/9	1/7	1/5	1/7	1	1/7	7	1/3	5	1/9	1/5	1/3	1/7	1/7	5	1	5	1/9	1/5	1/3	1/5
30	Engineered Wood Flooring	Epoxy Flooring	1/7	5	1/7	1/3	7	3	1/7	5	1/7	1	1/5	1/3	7	7	7	1/5	1/3	7	1	1/3	1
31	Vinyl Flooring	Rubber Flooring	9	5	3	5	1	3	9	7	5	5	1/5	3	3	9	1/7	5	5	1	3	7	7
32	Vinyl Flooring	Terrazzo	1/5	1/7	5	1/3	7	1/9	1/5	7	1/5	1/7	7	7	3	1/7	3	1	1/5	1/7	1/7	9	9
33	Vinyl Flooring	Epoxy Flooring	3	5	5	7	1/9	1	1/5	1	1/9	7	1/5	7	7	1/5	1/3	1/7	9	3	1/9	1/5	1/9
34	Rubber Flooring	Terrazzo	7	1	1/5	1/9	1/7	7	1/7	1/5	1/7	3	1/9	9	1	1/9	1	1	1	1/7	9	7	1
35	Rubber Flooring	Epoxy Flooring	3	1/7	1	1	1/7	9	1	1/7	1	9	1/9	1	1/7	5	1/5	1/9	1/9	1/9	1	5	1/7
36	Terrazzo	Epoxy Flooring	1/5	1/9	3	1/5	1/9	9	9	1/3	1/9	3	1/9	1	5	1/5	1/5	1/5	7	1/7	9	5	9

SURVEY RESPONSE PAIRWISE COMPARISONS OF FLOORING ALTERNATIVES UNDER THE RECYCLABILITY

RECYCLABILITY			RESPONDENT																				
S.no	Alt_A	Alt_B	R01	R02	R03	R04	R05	R06	R07	R08	R09	R10	R11	R12	R13	R14	R15	R16	R17	R18	R19	R20	R21
1	Porcelain/Ceramic Tiles	Natural Stone Flooring	7	9	5	5	3	7	3	3	5	1/9	1	1/3	3	3	7	3	5	5	7	1/5	3
2	Porcelain/Ceramic Tiles	Concrete-Based Flooring	5	5	3	7	9	1/3	3	1	3	5	1/3	1	5	1	9	9	5	5	3	3	7
3	Porcelain/Ceramic Tiles	Wood Flooring	7	7	1/5	5	1/9	5	3	9	9	5	5	9	5	1	5	5	7	3	3	1/9	5
4	Porcelain/Ceramic Tiles	Engineered Wood Flooring	7	7	1/9	9	7	5	7	9	5	7	9	7	9	7	1/9	1/9	7	9	1/9	7	9
5	Porcelain/Ceramic Tiles	Vinyl Flooring	3	7	7	3	7	9	3	1	5	9	3	5	7	1	3	7	5	7	5	5	7
6	Porcelain/Ceramic Tiles	Rubber Flooring	5	1/9	7	3	7	1/9	7	9	7	1/9	7	7	9	7	1/7	9	7	7	1/9	9	7
7	Porcelain/Ceramic Tiles	Terrazzo	5	1	1/5	5	9	1/3	9	9	5	3	1/5	1	7	5	7	1	7	1	1	3	1/3
8	Porcelain/Ceramic Tiles	Epoxy Flooring	9	7	7	7	1/7	9	1/9	9	1/9	7	9	7	7	7	1/7	9	7	1/7	9	9	9
9	Natural Stone Flooring	Concrete-Based Flooring	5	9	1/5	5	1	3	1	7	9	1/3	1/9	3	1/7	1/3	1/3	1/3	1/9	1/7	1/9	1/7	1/9
10	Natural Stone Flooring	Wood Flooring	1	1	3	1	7	1	7	3	9	1	1	9	3	3	7	1/7	9	5	9	9	1/5
11	Natural Stone Flooring	Engineered Wood Flooring	1	5	1	5	1	7	1	5	9	1	1	3	1	9	9	1/3	7	1	1	1	7
12	Natural Stone Flooring	Vinyl Flooring	9	3	1	5	5	1	1	1	9	1	9	1/3	3	3	5	9	3	1/9	5	3	3
13	Natural Stone Flooring	Rubber Flooring	7	9	5	3	5	7	3	7	7	7	9	1/7	7	3	9	3	7	5	1	7	7
14	Natural Stone Flooring	Terrazzo	3	9	5	7	9	1/7	7	1/7	5	1/7	1/3	5	3	1/5	7	5	3	1/5	1/7	1/3	3
15	Natural Stone Flooring	Epoxy Flooring	7	5	7	7	3	3	1/3	1/3	1/7	5	1/3	7	7	7	3	3	1/3	7	5	5	5
16	Concrete-Based Flooring	Wood Flooring	5	1/9	9	9	5	1/9	7	7	7	9	5	7	7	7	1/7	1/9	5	7	9	5	7
17	Concrete-Based Flooring	Engineered Wood Flooring	7	9	5	9	5	7	7	9	7	5	9	1/9	1/5	5	1/5	5	9	9	5	9	7
18	Concrete-Based Flooring	Vinyl Flooring	1	1	3	1	7	1	7	3	9	1	1	9	3	3	7	1/7	9	5	9	9	1/5
19	Concrete-Based Flooring	Rubber Flooring	3	3	7	3	3	1	1/5	7	1	5	5	3	3	1/5	3	7	7	1/9	1	3	3
20	Concrete-Based Flooring	Terrazzo	1/7	1/5	5	1	1/3	7	1/7	9	1/9	7	1/3	5	1/7	1/3	1/3	3	1/9	1/3	7	1/7	1/5
21	Concrete-Based Flooring	Epoxy Flooring	7	9	5	3	5	7	3	7	7	7	9	1/7	7	3	9	3	7	5	1	7	9
22	Wood Flooring	Engineered Wood Flooring	1/9	1/7	1/5	1/7	1/7	1/7	1/7	1/5	1/5	1/7	3	1/7	1/9	3	7	1/7	1	5	5	1	7
23	Wood Flooring	Vinyl Flooring	1/5	1/9	1/9	1/5	7	1	3	7	1/5	1/3	1/5	1/7	3	7	1/5	1/7	1/3	1/9	3	1/9	1/7
24	Wood Flooring	Rubber Flooring	1/5	1/5	1/9	1/5	1/5	1/5	1/5	1/5	1/7	1/9	1/3	1/3	1/3	1/5	5	1/9	3	3	1	1/3	5
25	Wood Flooring	Terrazzo	1/7	1/7	1/9	1/9	1/5	1/5	1/3	1/7	1/9	1/3	1	1/5	1/9	3	1/7	1/5	1/9	1	1/9	3	5
26	Wood Flooring	Epoxy Flooring	5	1/7	1/3	1/3	1/3	1	9	1	5	1/7	1/7	3	1	5	7	5	5	1/5	3	5	1/7
27	Engineered Wood Flooring	Vinyl Flooring	1/9	1/7	1/7	1/5	1/5	1/3	1/7	1/7	1/5	1/9	1	5	9	1/7	3	7	1/9	1	1/9	1/5	9
28	Engineered Wood Flooring	Rubber Flooring	1/9	1/7	1/5	1/7	1/7	1/7	1/7	1/5	1/5	1/7	3	1/7	1/9	3	7	1/7	1	5	5	1	7
29	Engineered Wood Flooring	Terrazzo	1/7	1/7	1/5	1/7	1/5	1/5	1/3	1/7	1/5	1/5	1	1	1/9	1/3	1/3	1	1/9	1/9	1/9	1	1/3
30	Engineered Wood Flooring	Epoxy Flooring	5	3	1/9	1	5	1/5	5	9	5	3	5	1/9	1	7	9	1/9	9	9	3	5	1/7
31	Vinyl Flooring	Rubber Flooring	3	9	9	3	1/9	1/7	1	7	7	3	9	1	7	1	5	1/3	1	1/3	7	5	1
32	Vinyl Flooring	Terrazzo	1/7	1/7	1/7	1/7	1/5	1/9	1/9	1/5	1/5	1/3	1/5	1/9	1	1/9	7	1/5	1	1	1/9	1/9	1/9
33	Vinyl Flooring	Epoxy Flooring	3	3	7	3	1/5	1/9	5	1/3	9	1/9	3	1	7	9	9	1	1/7	9	1/7	3	1/7
34	Rubber Flooring	Terrazzo	1/7	1/7	1/9	1/9	1/5	1/5	1/3	1/7	1/9	1/3	1	1/5	1/9	3	1/7	1/5	1/9	1	1/9	3	5
35	Rubber Flooring	Epoxy Flooring	1/5	1/3	1/7	1/3	1/7	1/3	1/5	1/3	1/9	1/3	7	9	9	1/3	7	3	9	7	1/9	1/9	1
36	Terrazzo	Epoxy Flooring	1/5	1/5	1	3	1	5	7	1/5	1/5	5	1/5	5	5	1/7	1	3	5	1/7	1	3	5

SURVEY RESPONSE PAIRWISE COMPARISONS OF FLOORING ALTERNATIVES UNDER THE RESISTANCE TO EXTERNAL FACTORS

RESISTANCE TO EXTERNAL FACTORS			RESPONDENT																				
S.no	Alt_A	Alt_B	R01	R02	R03	R04	R05	R06	R07	R08	R09	R10	R11	R12	R13	R14	R15	R16	R17	R18	R19	R20	R21
1	Porcelain/Ceramic Tiles	Natural Stone Flooring	1/3	1/3	1	1/3	1	3	1	1	3	1/3	1/3	3	1/3	3	1/3	1	1/3	1	3	3	3
2	Porcelain/Ceramic Tiles	Concrete-Based Flooring	3	3	3	1/3	1/5	1	1/3	1	1/3	1/3	1	1	1/3	1/3	1/3	1	1	3	3	1/3	1
3	Porcelain/Ceramic Tiles	Wood Flooring	7	7	1/9	9	7	9	7	9	7	7	9	7	9	7	1/9	1/9	7	9	1/9	7	9
4	Porcelain/Ceramic Tiles	Engineered Wood Flooring	9	7	7	7	1/7	9	1/9	9	1/9	7	9	7	7	7	1/7	9	7	1/7	9	9	9
5	Porcelain/Ceramic Tiles	Vinyl Flooring	5	1/9	9	9	5	1/9	7	7	7	7	9	5	7	7	1/7	1/9	5	7	9	5	7
6	Porcelain/Ceramic Tiles	Rubber Flooring	1/5	3	3	5	3	3	3	3	5	1	5	5	3	3	3	1	5	3	1	3	5
7	Porcelain/Ceramic Tiles	Terrazzo	1/3	1	1/5	3	1/5	1	1	3	1/5	3	1	1	1	5	3	1/3	1	1	3	1	5
8	Porcelain/Ceramic Tiles	Epoxy Flooring	1	1	3	1	1/3	3	5	3	1/5	1/3	1	1	3	5	1	3	3	3	1/5	5	1
9	Natural Stone Flooring	Concrete-Based Flooring	3	1/3	1/3	1/3	1/3	1/3	1/3	1/5	1	3	1/5	3	1/3	1/3	3	1/3	3	1	1	1/3	1/3
10	Natural Stone Flooring	Wood Flooring	7	9	1/7	7	7	9	7	9	7	9	9	7	7	9	9	9	1/7	7	7	7	1/7
11	Natural Stone Flooring	Engineered Wood Flooring	9	1/9	9	9	7	1/9	7	9	7	1/9	7	7	9	7	1/7	9	7	7	1/9	9	7
12	Natural Stone Flooring	Vinyl Flooring	7	9	5	9	5	7	7	9	7	5	9	1/9	1/5	5	1/5	5	9	9	5	9	7
13	Natural Stone Flooring	Rubber Flooring	7	5	7	7	3	3	1/3	1/3	1/7	5	1/3	7	7	7	3	3	1/3	7	5	5	5
14	Natural Stone Flooring	Terrazzo	1	1	3	3	1	1	3	1/5	3	5	3	1/5	1/3	1	5	1/5	3	1/5	1	5	3
15	Natural Stone Flooring	Epoxy Flooring	5	1	3	5	5	3	5	3	3	5	1	1	3	1	3	1	1	3	1	5	5
16	Concrete-Based Flooring	Wood Flooring	9	7	7	1/9	7	9	7	7	1/7	1/9	1/9	1/9	9	7	9	1/7	7	9	7	7	7
17	Concrete-Based Flooring	Engineered Wood Flooring	7	7	7	9	7	9	7	1/9	9	9	7	9	1/7	7	9	9	9	9	7	7	7
18	Concrete-Based Flooring	Vinyl Flooring	1/7	5	5	7	7	7	7	7	1/3	3	5	1/7	5	7	1/5	7	5	5	7	5	3
19	Concrete-Based Flooring	Rubber Flooring	1/3	3	3	1	3	1	3	1	1	3	3	5	3	5	3	5	3	1	3	1	1
20	Concrete-Based Flooring	Terrazzo	1/5	3	1	1	3	1	1/3	1/3	3	3	1/5	1/3	1/5	1/3	1/3	1/5	1	1/3	1	1	1
21	Concrete-Based Flooring	Epoxy Flooring	1	1/3	1/3	1	1/3	1/3	1	3	1	3	1/3	1	1/3	1	1	1	1/3	1/5	3	1/3	1
22	Wood Flooring	Engineered Wood Flooring	1/3	1	3	3	3	3	1	3	1	1	1/3	1	1	3	3	1/5	1/3	1	1/5	1/5	3
23	Wood Flooring	Vinyl Flooring	1/3	1	1/3	1	1/5	1	1	1/5	1	1/5	1/5	1	1/3	1/3	1/5	1/5	1/5	1	5	1/5	1
24	Wood Flooring	Rubber Flooring	1	1	1	1	1	1/3	3	1/3	1/5	5	1	1	1/5	1/3	1/5	1/5	1	1/3	1	1/5	1/5
25	Wood Flooring	Terrazzo	3	1/7	1/3	1/5	3	1/3	1/7	1/5	1/3	7	3	1/3	1/5	1/5	1/3	1/7	5	1/7	1/3	7	1/5
26	Wood Flooring	Epoxy Flooring	1/7	1/5	1/7	1/5	1/7	1/7	1/7	1/3	1/7	1/3	1/7	3	1/7	1/5	1/5	5	1/3	1/7	1/5	1/5	1/5
27	Engineered Wood Flooring	Vinyl Flooring	1/7	1/7	1/5	1/5	1/5	7	7	1/7	1/5	1/5	1/3	1/5	1/7	1/3	5	1/3	1/5	1/3	7	1/5	1/5
28	Engineered Wood Flooring	Rubber Flooring	1/5	1/5	1/5	1/7	7	1/9	1/5	1/9	1/9	1/7	9	1/7	5	1/5	1/9	1/7	1/5	1/5	1/9	1/7	1/9
29	Engineered Wood Flooring	Terrazzo	1/7	1/7	1/9	1/7	1/9	1/7	1/9	1/7	1/9	1/9	1/7	1/7	9	1/9	1/9	9	1/7	1/7	1/9	1/9	9
30	Engineered Wood Flooring	Epoxy Flooring	1/9	1/9	1/7	7	7	1/7	1/9	1/7	1/9	1/9	1/7	1/9	1/9	1/7	7	1/9	7	1/9	1/9	9	7
31	Vinyl Flooring	Rubber Flooring	1/3	1	1/3	1/5	1/5	1/5	1	1/5	1/3	1/5	1/3	1/5	1/3	3	3	1/3	1/5	1	1/3	1	1/5
32	Vinyl Flooring	Terrazzo	1/5	1	1/3	1	5	1	1/5	1	3	1/3	1	1/5	1/5	1	1/5	1/5	1	5	3	1/5	1/5
33	Vinyl Flooring	Epoxy Flooring	1/3	1	1/5	1	1	1	1	3	1	1	1/5	1	1/3	5	1	1/5	1/3	1/5	1/3	1/3	1
34	Rubber Flooring	Terrazzo	1	3	1/3	1/3	3	1	3	1	1/3	3	1	3	3	3	1	1/3	1/3	1/3	3	1/3	1
35	Rubber Flooring	Epoxy Flooring	1	1/5	3	1/3	1/3	3	1/5	1/3	1	1/3	1/3	1/5	1	1/5	1	1/5	1	1/5	1/3	1/5	1/5
36	Terrazzo	Epoxy Flooring	3	1	1/3	3	1	1	3	3	1	3	3	1	1	3	1	1	1/3	1	3	1	1

SURVEY RESPONSE PAIRWISE COMPARISONS OF FLOORING ALTERNATIVES UNDER THE SAFETY

SAFETY			RESPONDENT																				
S.no	Alt_A	Alt_B	R01	R02	R03	R04	R05	R06	R07	R08	R09	R10	R11	R12	R13	R14	R15	R16	R17	R18	R19	R20	R21
1	Porcelain/Ceramic Tiles	Natural Stone Flooring	1	3	1	3	9	5	9	7	3	9	1	9	5	9	7	1	1	3	1	7	7
2	Porcelain/Ceramic Tiles	Concrete-Based Flooring	3	3	7	3	3	1	1/5	7	1	5	5	3	3	1/5	3	7	7	1/9	1	3	3
3	Porcelain/Ceramic Tiles	Wood Flooring	3	9	9	3	1/9	1/7	1	7	7	3	9	1	7	1	5	1/3	1	1/3	7	7	1
4	Porcelain/Ceramic Tiles	Engineered Wood Flooring	1/3	1/5	7	1/9	7	1	1/7	7	5	7	5	7	7	3	3	7	9	1/7	3	1/9	1
5	Porcelain/Ceramic Tiles	Vinyl Flooring	5	1	7	1	7	5	3	5	1	9	1	3	1	3	3	3	9	5	1	5	9
6	Porcelain/Ceramic Tiles	Rubber Flooring	5	1/3	1/5	1/7	1/3	3	7	1/5	5	1	1/3	1/5	1/7	1/9	1/9	1/9	1/5	1/9	1/3	7	1/7
7	Porcelain/Ceramic Tiles	Terrazzo	7	1/3	3	5	7	7	5	1	7	3	9	7	5	1/3	5	1/7	9	1	3	1/3	1
8	Porcelain/Ceramic Tiles	Epoxy Flooring	1	7	1/9	3	1	1/5	9	1	3	9	1	3	5	5	5	1	9	3	7	5	1
9	Natural Stone Flooring	Concrete-Based Flooring	3	7	3	1/7	7	1	1/7	1/7	9	1/3	5	7	5	3	5	3	7	5	5	9	5
10	Natural Stone Flooring	Wood Flooring	1	1	3	1/7	7	9	1	1/7	7	1/9	7	9	1/9	3	3	5	3	7	5	7	5
11	Natural Stone Flooring	Engineered Wood Flooring	1	1/9	9	3	5	1/9	7	7	7	7	9	5	7	7	1/7	1/9	5	7	9	5	7
12	Natural Stone Flooring	Vinyl Flooring	1/3	3	5	1	5	3	3	3	1/9	1/5	7	1	3	5	3	3	1/7	1/5	1	7	3
13	Natural Stone Flooring	Rubber Flooring	3	1/7	1/9	1/9	1/9	5	1	1	1	1/7	1	1/7	1/9	1/5	1/9	1/7	1/7	1/9	1/7	1/9	1/3
14	Natural Stone Flooring	Terrazzo	1	1/3	1	7	7	3	9	1	1/9	1/7	3	1/3	3	5	3	5	5	1	1	1	7
15	Natural Stone Flooring	Epoxy Flooring	7	9	5	3	5	7	3	7	7	7	9	1/7	7	3	9	3	7	5	1	7	9
16	Concrete-Based Flooring	Wood Flooring	1/7	1/3	9	7	1/9	1/5	1/5	7	3	9	1/9	5	1/5	3	7	9	5	1/7	1/3	1	3
17	Concrete-Based Flooring	Engineered Wood Flooring	1	1/7	5	1/5	3	3	9	7	1/5	1	7	3	3	9	7	9	7	1	5	1/3	7
18	Concrete-Based Flooring	Vinyl Flooring	1/3	1/3	3	7	3	1/3	1	1/5	1/5	1/9	1	1/5	9	1/7	5	9	1/5	3	1/9	1	1/5
19	Concrete-Based Flooring	Rubber Flooring	3	1/7	1/3	1/5	3	1/3	1/7	1/5	1/3	1	3	1/3	1/5	1/5	1/3	1/7	1/5	1/7	1/3	1	1/5
20	Concrete-Based Flooring	Terrazzo	1/5	1/3	3	9	9	1/7	1	1/9	5	5	7	7	9	7	7	3	1	9	5	9	7
21	Concrete-Based Flooring	Epoxy Flooring	5	1	1	1	3	3	9	5	5	3	1	7	5	1	5	7	7	3	1	1	1/7
22	Wood Flooring	Engineered Wood Flooring	7	5	9	3	3	1	3	5	5	1/3	3	5	9	9	3	1/7	1/9	1	1/7	1/5	3
23	Wood Flooring	Vinyl Flooring	9	1/5	1/9	3	1	5	1/9	1	1/5	1/7	1/5	1/5	1/7	3	7	1/9	3	1	1/3	1/3	3
24	Wood Flooring	Rubber Flooring	1	1/7	1/3	1/5	3	1/3	1/7	1/5	1/3	3	3	1/3	1/5	1/5	1/3	1/7	5	1/7	1/3	7	1/5
25	Wood Flooring	Terrazzo	5	3	1/7	1	3	3	1	5	5	1	1/3	1	1/7	3	5	3	7	5	3	5	1
26	Wood Flooring	Epoxy Flooring	5	9	1	1	7	1	1	1/5	1/7	1/5	1	5	1	3	5	1/5	1	5	1/7	1	5
27	Engineered Wood Flooring	Vinyl Flooring	1/5	1/5	1/5	1/7	7	1/9	1/5	1/9	1/9	1/7	9	1/7	5	1/5	1/9	1/7	1/5	1/5	1/9	1/7	1/9
28	Engineered Wood Flooring	Rubber Flooring	1/7	1/7	1/9	1/7	1/9	1/7	1/9	1/7	1/9	1/9	1/7	1/7	9	1/9	1/9	9	1/7	1/7	1/9	1/9	9
29	Engineered Wood Flooring	Terrazzo	1/3	1	1	1/7	1/7	3	9	1/3	9	1	1/7	1	1	1/9	3	1/7	1	1/5	1/9	1/7	1/7
30	Engineered Wood Flooring	Epoxy Flooring	1/3	5	1	7	1	7	1	7	1	9	5	1	3	5	1/7	3	1/5	9	5	7	1/5
31	Vinyl Flooring	Rubber Flooring	1/3	1	1/3	1/5	1/5	1/5	1	1/5	1/3	1/5	1/3	1/5	1/3	1	3	1/3	1/5	1	1/3	1	1/5
32	Vinyl Flooring	Terrazzo	1/9	1	7	9	9	9	1/5	7	5	7	9	3	1/7	1	5	9	1/3	7	3	5	3
33	Vinyl Flooring	Epoxy Flooring	5	1	1/9	5	7	9	3	3	5	1/5	9	9	3	1	7	9	1	9	3	9	7
34	Rubber Flooring	Terrazzo	3	7	3	5	1	7	3	9	1	7	3	9	1	5	5	3	5	5	1	3	3
35	Rubber Flooring	Epoxy Flooring	1/7	3	7	4	9	7	9	1	5	7	7	1	3	9	1	1	7	5	9	7	9
36	Terrazzo	Epoxy Flooring	1/5	1	5	1	1/5	1/9	5	7	1/5	1/9	1	5	1	3	5	3	1/3	1/9	9	5	1/7

SURVEY RESPONSE PAIRWISE COMPARISONS OF FLOORING ALTERNATIVES UNDER THE SUSTAINABILITY

SUSTAINABILITY			RESPONDENT																				
S.no	Alt_A	Alt_B	R01	R02	R03	R04	R05	R06	R07	R08	R09	R10	R11	R12	R13	R14	R15	R16	R17	R18	R19	R20	R21
1	Porcelain/Ceramic Tiles	Natural Stone Flooring	3	3	1/5	7	3	3	5	3	1	1/5	1/5	9	7	1/5	3	1/7	7	7	7	1/5	3
2	Porcelain/Ceramic Tiles	Concrete-Based Flooring	5	1/3	1/7	1/3	1/7	1	1/3	9	1/7	1/7	1/5	5	3	5	1/3	1	5	5	3	1/9	1/9
3	Porcelain/Ceramic Tiles	Wood Flooring	7	5	7	7	3	3	1/3	1/3	1/7	5	1/3	7	7	7	3	3	1/3	7	5	5	5
4	Porcelain/Ceramic Tiles	Engineered Wood Flooring	9	9	3	5	9	5	7	9	5	1/9	3	5	1/7	5	9	1/5	1/7	3	1/7	9	9
5	Porcelain/Ceramic Tiles	Vinyl Flooring	1	5	1	5	1	7	1	5	9	1	1	3	1	9	9	1/3	7	1	1	1	7
6	Porcelain/Ceramic Tiles	Rubber Flooring	5	1/9	9	9	5	1/9	7	7	7	7	9	5	7	7	1/7	1/9	5	7	9	5	7
7	Porcelain/Ceramic Tiles	Terrazzo	1	5	1/5	1/9	3	1/3	3	1/5	5	1	5	5	1/5	1/9	5	1/9	5	9	7	3	1
8	Porcelain/Ceramic Tiles	Epoxy Flooring	9	1/5	3	1	1/5	9	1	7	5	7	3	1	1	7	1	1	7	7	9	5	9
9	Natural Stone Flooring	Concrete-Based Flooring	1/9	1/5	1/9	7	1	1/7	1/7	1/7	1/9	7	1/5	5	1/7	3	1/5	1/5	1/7	1	1/3	1/5	5
10	Natural Stone Flooring	Wood Flooring	1/7	9	7	7	7	3	5	7	7	7	9	3	1/3	1/5	1/5	9	1/9	7	1/5	3	1/5
11	Natural Stone Flooring	Engineered Wood Flooring	1/7	1/7	1	1/7	5	1	9	7	1	9	1	1/3	1/7	3	3	3	7	1/3	3	5	9
12	Natural Stone Flooring	Vinyl Flooring	1/3	1/3	1/7	1	1	1	3	1/3	1	7	1	9	3	7	1/3	7	1/3	7	1	1/5	3
13	Natural Stone Flooring	Rubber Flooring	1	3	1	3	9	5	9	7	1/7	9	1	1/5	5	9	7	1	1	3	1	7	1/3
14	Natural Stone Flooring	Terrazzo	1/5	3	1/3	1/5	1/5	1/7	7	3	1	1/3	1/9	1	1/7	7	1/5	1/3	1	5	1/5	1/5	1/3
15	Natural Stone Flooring	Epoxy Flooring	5	3	1/9	7	7	1/9	3	7	1/9	3	3	9	3	7	1/5	7	1/5	9	5	9	5
16	Concrete-Based Flooring	Wood Flooring	7	9	5	9	5	7	7	9	7	5	9	7	5	5	1/5	5	9	9	5	9	7
17	Concrete-Based Flooring	Engineered Wood Flooring	3	3	7	3	3	1	1/5	7	1	5	5	3	3	1/5	3	7	7	1/9	1	3	3
18	Concrete-Based Flooring	Vinyl Flooring	1/5	5	1/5	9	9	5	1/7	1/7	1/7	9	5	9	7	1/5	9	7	7	3	9	5	3
19	Concrete-Based Flooring	Rubber Flooring	5	7	9	3	5	3	7	7	7	1/5	1/3	5	5	5	5	3	9	1/3	9	1/9	3
20	Concrete-Based Flooring	Terrazzo	1/5	1/5	1	3	1	5	7	1/5	1/5	5	1/5	5	5	1/7	1	3	5	1/7	1	3	5
21	Concrete-Based Flooring	Epoxy Flooring	1	3	1	3	3	3	1/3	1	9	5	1/7	1	1	3	5	3	1/5	1	1/5	7	5
22	Wood Flooring	Engineered Wood Flooring	7	1/5	1/5	1/5	7	7	1/7	1	7	1/7	1	1/9	1/3	7	3	1	1	5	1	3	1/9
23	Wood Flooring	Vinyl Flooring	3	1/9	1	1/7	1/7	1/5	3	1/3	1/5	1/7	3	1/9	1/3	1/9	1/5	1	1/7	1	1/5	1/5	1
24	Wood Flooring	Rubber Flooring	1/5	1	1/3	7	1/7	1/5	3	7	9	1/7	1/7	9	5	1/5	1/5	1/5	1/5	1/5	3	1/3	1/7
25	Wood Flooring	Terrazzo	1	1/7	7	3	1/9	1/7	1	1/5	1/3	1/5	1/5	3	1/9	1	1/5	1/9	1/7	1/7	1/3	5	1
26	Wood Flooring	Epoxy Flooring	1	1/5	1/3	1/7	1/3	5	3	1/7	9	1/3	1	7	9	5	5	1	3	7	7	1/7	1
27	Engineered Wood Flooring	Vinyl Flooring	9	1/5	5	7	1/9	7	1/5	1	1/5	9	1/5	3	1/7	1/5	5	7	1	1	1/5	1/9	1/5
28	Engineered Wood Flooring	Rubber Flooring	5	1	1/3	1/7	1/9	9	3	1/3	9	1	9	5	1	1	1/5	1/3	1/9	3	3	1/3	1/3
29	Engineered Wood Flooring	Terrazzo	1/3	3	1/5	5	1/7	1/7	3	1/7	7	1/3	9	1/7	1/7	7	1	1/7	1/9	1/3	1	5	7
30	Engineered Wood Flooring	Epoxy Flooring	1	9	1/5	3	5	3	5	1	1	3	7	9	1/5	1	9	1/3	1/7	1	1/3	3	1/5
31	Vinyl Flooring	Rubber Flooring	1/3	1/9	1	1/5	1/3	1	5	9	1	9	1/7	3	1/7	5	3	5	5	7	5	1/5	7
32	Vinyl Flooring	Terrazzo	3	9	1/7	5	5	1/3	1/3	1/3	1/3	1/9	7	5	1/3	1/7	1/7	7	3	7	1/3	1	1
33	Vinyl Flooring	Epoxy Flooring	1/5	1/7	7	1/5	3	1	1/5	1	3	1/3	1/5	1/3	3	1/7	1/5	5	1	7	1/3	5	5
34	Rubber Flooring	Terrazzo	1/9	3	1	1/5	1/3	1/3	1/5	1	1/3	1/9	1/7	1/7	1	1/9	1/3	1	3	7	1/3	3	1/3
35	Rubber Flooring	Epoxy Flooring	1/9	7	1	3	3	1/5	1/7	7	5	7	1/5	5	5	1/9	3	1/5	1/9	1	1/5	1/7	1/9
36	Terrazzo	Epoxy Flooring	5	1/7	1/3	1/3	1/3	1	9	1	5	1/7	1/7	3	1	5	7	5	5	1/5	3	5	3

SURVEY RESPONSE PAIRWISE COMPARISONS OF FLOORING ALTERNATIVES UNDER THE USER PREFERENCE

USER PREFERENCE			RESPONDENT																				
S.no	Alt_A	Alt_B	R01	R02	R03	R04	R05	R06	R07	R08	R09	R10	R11	R12	R13	R14	R15	R16	R17	R18	R19	R20	R21
1	Porcelain/Ceramic Tiles	Natural Stone Flooring	9	5	5	9	3	9	5	9	3	1/7	9	9	3	1/9	5	1/9	1	7	5	7	9
2	Porcelain/Ceramic Tiles	Concrete-Based Flooring	1/5	1/7	1/3	1	9	5	1	9	1	9	1/7	3	7	1/5	9	1/5	1	3	1	5	3
3	Porcelain/Ceramic Tiles	Wood Flooring	7	9	1/7	7	1	1	7	9	3	9	3	1	1	5	5	3	7	5	1	5	3
4	Porcelain/Ceramic Tiles	Engineered Wood Flooring	3	1/7	3	5	7	1	3	9	1/3	3	1	1/3	1/3	1/5	5	9	7	9	7	1	3
5	Porcelain/Ceramic Tiles	Vinyl Flooring	1/3	7	9	5	9	1/9	9	7	3	5	1/7	1/7	1	5	1/5	1	9	5	3	1/5	1/7
6	Porcelain/Ceramic Tiles	Rubber Flooring	5	9	5	9	1	5	9	9	1	1/3	1	1/7	1	5	3	7	7	5	3	9	3
7	Porcelain/Ceramic Tiles	Terrazzo	5	1	3	9	3	1	3	1	5	1	9	3	3	5	9	9	5	5	9	1	5
8	Porcelain/Ceramic Tiles	Epoxy Flooring	3	5	7	1	3	1	3	7	9	3	5	1/5	7	9	1	7	1	3	7	5	9
9	Natural Stone Flooring	Concrete-Based Flooring	5	3	1	1/3	5	1/3	1/9	1/9	9	1	1/7	1/3	1/3	1/7	1/3	5	1/7	1/5	1/5	5	3
10	Natural Stone Flooring	Wood Flooring	5	3	9	1/5	7	3	1/9	7	3	1	3	1	1/3	9	5	1	5	5	7	5	5
11	Natural Stone Flooring	Engineered Wood Flooring	5	1	1/7	5	7	1/3	9	7	7	1	1/3	1/3	3	5	1/9	1/5	1/9	9	3	1/7	3
12	Natural Stone Flooring	Vinyl Flooring	9	1/7	1	5	1	1/7	1/3	1/3	9	1/7	9	3	9	1/9	1/7	1/9	1/9	1/5	1/7	3	1
13	Natural Stone Flooring	Rubber Flooring	1/3	5	1/5	1	1/9	1	3	7	9	3	1/3	1/5	7	9	1	7	1	3	7	5	9
14	Natural Stone Flooring	Terrazzo	1/3	3	9	5	9	5	1	1	7	7	7	1/5	7	1	5	7	7	1/9	7	5	1
15	Natural Stone Flooring	Epoxy Flooring	5	1	1	1	7	5	1/5	5	7	7	9	1/5	9	1	3	5	9	7	3	1	7
16	Concrete-Based Flooring	Wood Flooring	5	3	9	9	3	3	9	1/9	1/9	1/5	5	7	9	3	9	9	7	1	1/7	1/9	3
17	Concrete-Based Flooring	Engineered Wood Flooring	7	3	5	7	3	1/3	9	1/9	1	1/9	1/9	7	1	9	9	3	1	3	1/7	1/3	7
18	Concrete-Based Flooring	Vinyl Flooring	1/5	3	7	1	1/5	1	7	1/7	7	1	1	5	3	9	5	1/3	1/9	9	1	9	9
19	Concrete-Based Flooring	Rubber Flooring	7	7	1/5	5	1/9	5	3	9	9	5	5	9	5	1	5	5	7	3	3	1/9	5
20	Concrete-Based Flooring	Terrazzo	5	1/5	1	1	7	1/3	7	9	1	1/9	9	5	9	5	7	7	1/7	9	9	9	1
21	Concrete-Based Flooring	Epoxy Flooring	9	5	5	9	3	9	5	9	3	1/7	9	9	3	1/9	5	1/9	1	7	5	7	9
22	Wood Flooring	Engineered Wood Flooring	3	1/7	1/9	7	1/7	5	1/3	5	1/9	9	1/3	3	1/9	1/3	5	1	1/5	3	7	1/5	1/7
23	Wood Flooring	Vinyl Flooring	1/5	3	1/7	1/7	1	5	1	3	7	1/9	5	1/3	1/5	1/5	1/9	1/9	3	1/5	9	1	1/9
24	Wood Flooring	Rubber Flooring	1/9	7	3	1	9	1/7	1/9	9	5	7	1/5	7	9	1	1/5	1	5	1	1/7	1/9	5
25	Wood Flooring	Terrazzo	1/9	1/9	5	5	1	1/3	1	5	9	1/5	1	3	1	7	1/5	1/5	7	5	1	7	9
26	Wood Flooring	Epoxy Flooring	1/3	7	9	5	9	1/9	9	7	3	5	1/7	1/7	1	5	1/5	1	9	5	3	1/5	1/7
27	Engineered Wood Flooring	Vinyl Flooring	1/9	1/9	9	1	1/5	1/5	1/9	5	1/9	5	1/9	1	1/3	9	1/9	7	1	9	1/5	1	1/9
28	Engineered Wood Flooring	Rubber Flooring	1/3	5	5	1/3	1	1/3	3	9	1/9	1	3	7	3	1/7	1	7	5	7	1/5	7	9
29	Engineered Wood Flooring	Terrazzo	7	1	5	1	3	9	9	5	3	9	1	1/3	1	1	3	1	5	7	1	1	5
30	Engineered Wood Flooring	Epoxy Flooring	7	1/3	9	7	1/5	1/3	7	9	7	1	5	9	1	5	3	9	7	3	9	7	9
31	Vinyl Flooring	Rubber Flooring	1/5	1/3	1/9	1/9	7	7	1/7	9	1/5	5	9	9	1/7	5	1/3	5	3	7	3	7	7
32	Vinyl Flooring	Terrazzo	5	9	3	1/9	7	1/5	1	9	9	3	1	1	1	7	1	7	3	3	5	3	5
33	Vinyl Flooring	Epoxy Flooring	1/7	5	1	7	9	1/3	1	9	1/3	3	5	7	7	5	9	1	9	9	1	9	7
34	Rubber Flooring	Terrazzo	5	9	3	3	3	1/9	1/3	1/9	3	1/7	7	1/5	1/9	5	5	7	1/5	9	7	9	1/5
35	Rubber Flooring	Epoxy Flooring	3	7	9	1/7	3	7	5	3	1/9	1/3	1/7	1/3	1/7	1/7	5	7	5	1/5	7	3	9
36	Terrazzo	Epoxy Flooring	1/3	1	3	9	9	5	7	1/9	1/5	1	1/3	9	1/3	1/7	1/5	3	7	9	5	1	1/7

SURVEY RESPONSE PAIRWISE COMPARISONS OF FLOORING ALTERNATIVES UNDER THE COMFORT

RESPONDENT

R22	R23	R24	R25	R26	R27	R28	R29	R30	R31	R32	R33	R34	R35	R36	R37	R38	R39	R40	R41	R42	R43	R44	R45	R46	R47	R48	R49	R50	GM
1	5	1/5	3	7	1	1	9	5	5	3	9	1/7	5	5	5	1	9	1/3	3	1/3	5	7	1/9	1	5	1	3	3	2.008
1/7	1	1	1	1	1/7	3	1	3	1/5	3	3	1	1	3	3	1	1/9	3	1	1	1/5	1	1/5	1	1	3	1	1/5	1.208
1/3	1/7	1/9	1/9	1/7	1/7	1/9	1/5	1	1/9	1/7	1/9	1	1/9	1/5	1/7	1/3	1/9	1/5	1	1	1/9	1/3	1	1/9	1	1/7	1	1	0.250
1/7	1/7	1/7	1/5	1/7	3	1/9	1/7	1/3	1/9	1	1/5	1/9	1/9	1/5	1/9	1/5	3	1/9	3	1/9	1/7	1	1/9	1/7	1/7	1/3	1/7	1/9	0.330
1/3	1	7	1/9	1/7	5	1/7	1/7	5	1	1	1/9	1	1	1/5	1/7	1	1/9	1	1/7	1/7	3	1/3	1/9	1	5	1/3	1/3	1/3	0.506
1/9	1/7	1/3	1	1/5	1/5	1/9	1/3	1/9	1	1/9	1/7	1/5	1/9	1/5	1/9	1/5	1/9	1/9	1/5	1/5	1/9	1/7	1/7	1/9	1/9	1/5	1/9	1/9	0.206
1/7	1/7	1/7	1/5	1/7	3	9	9	5	7	1	1/5	1/9	5	7	9	1/5	3	9	3	5	3	1	3	1/5	9	7	5	7	1.008
5	5	7	1	3	9	1	7	1/9	1	5	7	1/3	1/3	5	1	5	1	1/3	5	3	7	7	1	3	7	1	9	5	2.009
1	1/9	1	3	3	1	1/9	1/5	1	7	1/9	3	3	1/5	7	1/9	5	1/9	1/5	1/9	1	1	1/9	1	1/3	1/5	1/3	3	1/9	0.668
1/9	1/7	1/3	1/3	1/5	1/5	1/9	1/3	1/9	1/3	1/9	1/7	1/9	1/9	1/5	1/9	1/5	1/9	1/9	1/9	1/5	1/9	1/7	1/7	1/9	1/9	1/5	1/9	1/9	0.175
1/9	1/7	1/3	1	1/5	1/5	1/9	1/3	1/9	1/9	1/9	1/7	1/5	1/9	1/5	1/9	1/5	1/9	1/9	1/5	1/5	1/9	1/7	1/7	1/9	1/9	1/5	1/9	1/5	0.204
1/9	1/7	1/3	1	1/5	1/5	1/9	1/3	1/9	1/9	1/9	1/7	1/5	1/9	1/5	1/9	1/5	1/9	1/9	1	1/3	1/9	1/7	1/7	1/9	1/9	1/7	1/9	1	0.249
1/9	1/9	1/9	1/9	1/9	1/9	1/9	1/9	1/9	1/9	1/9	1/9	1/9	1/9	1/9	1/9	1/9	1	1/3	1	1/3	1/9	1/9	3	1/9	1/3	1/3	1/7	1	0.149
1/7	1/7	1/7	1/5	1/7	3	9	9	5	7	1	1/5	1/9	5	7	9	1/5	3	9	3	5	1	1	5	1/7	7	9	5	7	1.012
5	1	7	1/7	1	7	3	5	1	3	1	7	9	3	7	3	5	5	5	1	1/7	3	5	1	1	1/3	3	1	1	1.662
1/9	1/7	1/3	1	1/5	1/5	1/9	1/3	1/9	1	1/9	1/7	1/5	1/9	1/5	1/9	1/5	1/9	1/9	1/5	1/5	1/9	1/7	1/7	1/9	3	1/5	1/9	1/9	0.220
1/9	1/7	1/3	1	1/5	1/5	1/9	1/3	1/9	1	1/9	1/7	1/5	1/9	1/5	1/9	1/5	1/9	1/9	1/5	1/5	1/9	1/7	1/7	1/9	3	1/5	5	9	0.259
1/7	1/7	1/7	1/5	1/7	3	1/9	1/7	1/3	1/9	1	1/5	1/9	1/9	1/5	1/9	1/5	3	1/9	3	1/9	1/7	1	1/9	1/7	1/7	1/3	1/7	1/9	0.330
7	1	1	1	5	1/7	3	1	3	7	3	3	1	5	3	3	1	1/7	3	3	1	1/5	1	1/5	1/7	1	5	1	9	1.738
1	1/5	1/9	3	1/5	1	1	1/5	1	1/5	1/5	3	1	1/9	3	5	1	1	1	3	1	3	1/7	3	1	1/5	1/9	1/7	1	0.827
7	1	1	1	5	1/7	3	1	3	7	3	3	1	5	3	3	1	1/7	3	3	1	1/5	1	1/5	1/7	1	1/9	1	1/5	1.493
7	1	1	1	5	1/7	3	1	3	7	3	3	1	5	3	3	1	1/7	3	3	1	1/5	1	1/5	1/7	1	1/9	1	1/5	1.493
1	5	1/5	3	7	1	1	9	5	5	3	9	1/7	5	5	5	1	9	1/3	3	1/3	5	7	1/9	1	5	1	3	3	2.008
1	1/9	1	3	3	1	1/9	1/5	1	7	1/9	3	3	1/5	7	1/9	5	1/9	1/5	1/9	1	1	1/9	1	1/3	1/5	1/3	3	1/9	0.668
7	9	3	5	5	7	1	7	7	9	1	7	1	5	5	9	3	1/5	1	1	5	1	1	3	1	9	1	2	3	2.979
7	7	7	7	5	7	7	5	9	9	3	5	5	7	5	5	5	7	5	5	3	3	3	5	3	5	3	5	3	6.071
5	1	7	1/7	1	7	3	5	1	3	1	7	1/5	3	7	1/3	5	1/3	5	1	1/7	3	5	1	1	1	3	1	9	1.491
1/3	1	7	1/9	1/7	5	1/7	1/7	5	1	1	1/9	1	1	1/5	1/7	1	1/9	1	1/7	1/7	3	1/3	1/9	1	5	1/3	1/3	1/3	0.506
1	5	1/5	3	7	1	1	9	5	5	3	9	1/7	5	5	5	1	9	1/3	3	1/3	5	7	1/9	1	5	1	3	3	2.008
7	7	7	7	5	7	7	5	9	9	3	1	1	7	1	1/9	9	1	5	3	5	5	3	5	7	1	3	5	7	5.030
1/7	1/7	1/7	1/5	1/7	3	1/9	1/7	1/3	1/9	1	1/5	1/9	1/9	1/5	1/9	1/5	3	1/9	3	1/9	1/7	1	1/9	1/7	1/7	1/3	1/7	1/9	0.330
7	1	1	1	5	1/7	3	1	3	7	3	3	1	5	3	3	1	1/7	3	3	1	1/5	1	1/5	1/7	1	1/9	1	1/5	1.493
7	9	5	3	7	1	7	1	7	3	5	7	9	1	9	1	9	1	7	1	9	7	5	5	7	1	5	5	7	3.940
1	3	5	3	7	1	7	1	1	3	5	7	1	1	1/9	1	7	1	5	1	1/5	1	1	1/9	1/3	1	1	1	3	2.006
7	7	7	7	5	7	7	5	9	9	3	9	5	9	5	5	9	7	5	9	5	5	3	9	9	5	5	9	9	6.972
7	9	3	5	5	7	1	7	7	9	1	7	1	5	5	9	3	1/5	1	1	5	1	1	3	1	9	1	2	3	2.979

SURVEY RESPONSES PAIRWISE COMPARISONS OF FLOORING ALTERNATIVES UNDER THE APPEARANCE

RESPONDENT

R22	R23	R24	R25	R26	R27	R28	R29	R30	R31	R32	R33	R34	R35	R36	R37	R38	R39	R40	R41	R42	R43	R44	R45	R46	R47	R48	R49	R50	GM
1/5	1/9	1/3	1/5	1/9	1/7	1	3	1	3	1/7	3	1/5	1/5	1/7	1	1/9	1	1	1/3	1/9	1	1/5	1	1	1/5	1/3	1	1/9	0.37
3	1/9	1	3	3	1	5	1	5	1/9	1/7	3	3	1/5	5	5	3	1	5	3	9	1/5	7	5	5	1	7	1	3	1.55
1	1	1/3	5	1/5	7	1	1/5	1/7	5	1	1/3	1/9	1/7	1/5	7	1/5	1	1/9	1/3	1/9	1/7	1/7	1/9	1/7	1/7	1/7	1	1/3	0.44
1/9	1/7	3	1/5	1/7	1	1	3	1/9	1/7	5	5	1	3	5	3	1/7	1	1/3	1/9	1/7	1	1	5	1/5	1	1/3	1	1	0.57
1/5	1/3	7	9	5	9	5	7	3	1	1/9	9	1/5	9	5	1	1/5	1	5	3	3	3	7	5	7	7	5	5	1/7	1.76
7	7	9	5	7	1	5	3	3	3	5	7	5	1	1	9	9	5	3	5	1/5	9	3	7	3	5	9	5	1/5	2.26
9	1	1/3	1/5	3	1/7	1/5	1/7	1/9	1	1/9	5	3	1/9	1/5	1/5	1/7	1/7	3	1/5	1/7	1/9	1	1/3	1	3	1	1/5	1/9	0.67
3	1	5	7	3	9	3	3	9	3	5	5	1	1/5	5	1	7	9	9	3	1	7	7	5	3	5	5	1/7	1	2.75
1/3	5	9	1/5	1	1/3	3	5	1/5	3	7	7	3	1/9	5	7	5	5	3	7	5	7	9	7	9	3	7	5	9	3.26
5	1/3	3	9	7	1/5	3	1	9	9	5	1/7	1/3	5	1	1/9	7	1/5	3	1/9	1	1/9	1	1/9	1/5	1/9	5	7	7	1.25
5	1	1/3	1/3	3	5	3	1	1	3	1/5	1/9	5	1/7	3	1/9	1/5	1	1	3	5	1	3	1/9	1/9	1	3	3	1/5	1.75
1	1	1	5	3	9	5	5	1	9	1	1	1	7	5	7	9	5	3	3	7	5	9	7	5	7	5	9	7	3.75
9	5	3	5	5	9	7	5	7	9	9	3	7	3	9	5	9	9	7	5	1	5	5	3	3	1/5	1	5	1/5	4.26
7	5	7	5	7	1/9	1/5	3	5	1	5	1	1/9	3	5	1	1/7	1	5	1/9	5	3	1	1/3	1	1	3	1/7	1	2.25
5	1	3	5	9	7	9	5	9	5	3	9	9	7	7	9	9	5	5	5	7	5	3	5	7	9	7	9	3	4.75
1/5	1	3	1/5	1/9	3	1/3	1	3	1/7	1/7	1/9	1/3	1/5	1/5	1/9	1/3	1/5	1/7	1/7	1/3	1/5	1/3	1/3	1/5	1/3	5	1	1/9	0.36
1/9	1/3	1	1/5	1/7	1/9	1	1/9	1/5	1	3	1/9	1/5	1/7	1/7	3	1/7	1/3	1	1/5	1	1/9	3	1/5	1/9	1	1/3	1/5	1/5	0.44
1/7	5	9	1	1/3	3	9	9	1/3	7	9	1/9	3	9	1/7	1/7	9	1/5	5	1	3	9	7	3	3	5	3	1/9	1/9	1.50
7	9	3	5	7	7	5	5	7	1	1/7	5	5	1/7	9	3	9	1/3	7	7	5	7	7	1	3	9	1/9	9	7	1.75
1/3	1/7	3	1/5	1/9	1/5	1/3	3	1/7	1/5	3	1	7	1/9	1/7	1/9	5	1/3	5	1	1/7	1/5	1/5	3	1	3	1/3	1	1	0.57
3	9	1	7	7	1	1	7	7	7	1	9	3	5	3	5	3	5	7	9	9	1	5	1/7	7	1/3	3	1/5	1	2.50
9	7	7	9	1/3	5	9	1/7	3	1	7	1/3	1	9	1/5	9	1	3	7	5	7	5	1	5	1/5	3	1	3	5	1.50
3	5	9	7	1	3	7	5	3	5	1/5	7	7	9	5	3	5	7	1	5	5	1	7	5	3	1/9	1/5	7	3	3.25
1	9	9	9	5	9	1	3	7	5	7	1/5	9	3	3	7	5	1	3	1/5	5	1	3	9	3	5	3	5	7	3.75
3	3	9	5	5	3	3	7	1/7	7	5	1	5	1	5	3	1/7	1	9	3	7	3	5	3	7	5	5	1	5	1.75
7	9	5	5	9	7	3	3	7	5	9	9	7	7	5	7	5	7	9	7	3	7	1	1/3	7	3	7	1	1/5	4.25
9	5	3	7	1/5	1	1/5	9	1	7	7	5	5	1	9	9	5	7	5	7	5	3	7	3	5	1	1/5	1	5	2.75
5	9	9	7	9	5	9	1	1	1	9	5	5	3	9	7	1	5	7	9	3	3	7	5	7	1	7	5	1/5	3.25
1/3	3	1	1/5	1/5	3	1/9	3	1	9	1	9	5	7	3	9	5	9	3	7	1	7	3	1	3	5	5	3	5	1.51
1	7	1	1	7	5	1	5	7	7	1	5	3	9	9	5	1	7	3	5	7	7	3	7	5	5	7	9	1/7	3.76
3	7	5	1/7	1/3	1/5	1/5	3	1/5	1/5	7	1	1	5	7	5	9	1	1/5	1	1/5	1	5	1/7	1	3	5	1/7	3	1.51
1/7	1/5	1/7	1	1/9	1/9	3	1/9	1/3	3	1/3	1/7	1	1/9	1/3	1	1/3	1/5	1/5	1	1	1/3	1/7	1/9	1/5	1/7	1	1	1/9	0.44
1	5	9	1/9	7	1/5	9	5	9	1	1/9	5	9	7	1/7	1/7	3	7	1	3	1	1/3	3	1/5	1/7	7	5	1/5	3	1.75
1/5	1/7	1/3	3	1	1/5	1/9	1/9	1	1	1/3	1/5	1	1	3	1/9	3	1/5	1/9	1	1/9	1/7	1/7	1/7	1/9	1/7	1/5	1/9	1/9	0.36
9	9	3	7	1/7	1/9	9	3	1/5	9	3	9	1/7	7	1/3	7	7	1/9	3	1/9	7	1/3	5	9	1	3	5	1	5	1.50
3	1/5	1	9	1	3	7	7	5	5	5	3	5	7	5	7	9	7	9	5	5	1	9	1	7	3	1	1/5	1	3.25

SURVEY RESPONSE PAIRWISE COMPARISONS OF FLOORING ALTERNATIVES UNDER THE DESIGN COMPATIBILITY

RESPONDENT

R22	R23	R24	R25	R26	R27	R28	R29	R30	R31	R32	R33	R34	R35	R36	R37	R38	R39	R40	R41	R42	R43	R44	R45	R46	R47	R48	R49	R50	GM
7	1	7	5	9	9	7	7	9	9	7	3	7	5	7	1	7	3	9	7	5	5	9	3	5	7	1	5	1/5	2.998
9	1	5	5	7	7	3	3	5	7	9	5	9	3	3	7	5	3	5	7	5	7	1	5	9	5	3	7	5	5.006
1/9	5	1/9	3	1/7	1	1	7	1/3	1/3	1/7	1/7	7	7	9	9	1/7	7	9	1	3	9	3	1/3	1/7	5	9	1/5	7	1.503
5	1	1/9	3	9	7	1	1/9	7	9	7	1/5	5	5	5	1/3	3	1	1/7	1/5	1/9	9	1/5	1/5	1	9	7	5	3	1.503
9	7	1/5	7	9	1/7	5	9	5	1/9	3	1/3	3	9	3	1/9	1/5	9	9	5	1/3	1	1	5	1	7	7	3	1	1.478
9	1	7	3	1	1/5	3	1/7	9	5	3	1/5	7	7	5	5	7	3	9	9	5	9	5	9	5	7	3	5	3	2.505
3	5	7	3	9	1/5	7	5	1/3	3	7	9	5	7	1/7	9	7	9	3	5	7	9	5	9	5	7	5	9	7	3.970
7	1	5	3	9	5	7	9	9	5	9	3	5	3	5	3	7	9	9	5	7	9	7	7	1	3	5	7	1/5	4.972
1/3	1/5	9	5	1	9	3	9	7	5	3	7	1	1	5	3	1	5	3	3	3	9	5	1/5	9	5	1	7	1/5	1.994
1/3	1/5	5	1/5	9	1/9	7	1/9	1/5	9	1/7	1/9	7	1/5	1	5	1/9	3	1/7	1/9	1/5	5	3	1/9	1	1/5	1/7	1/9	1/5	0.501
5	7	3	3	1/5	1/5	5	1/5	1/9	1/7	1/5	1	3	1/7	1	1/3	1	1/9	3	5	1/7	1/9	1	1/7	1/3	1/7	1/9	1/3	1	0.503
1/7	1/9	1/3	1/9	1/5	1	9	1/7	5	7	1/5	5	1/7	1/3	1	1/5	1/7	7	1/5	9	1/9	9	1	5	1/7	7	7	1/9	1	0.670
3	1/5	1/7	3	9	1/5	3	9	7	7	7	7	9	3	1/3	1	5	1	5	1	7	5	7	9	7	5	9	3	7	2.000
9	5	9	9	3	7	1	3	1	5	7	3	9	5	9	5	5	1	7	9	7	5	5	9	9	3	1	3	5	2.997
5	1	1/3	1	3	1/3	1	1	9	1	5	1/3	1	1/7	1/9	1/5	1/5	1/9	3	1/7	1	5	1/3	1/9	1	1/7	1/9	1/7	1/3	0.507
1/7	1/9	1	1/5	1/9	3	3	1	1/7	1/7	1/3	3	1/3	3	1/7	1/9	1/9	1/9	1/7	1/3	1/9	1/5	1	1/9	1/5	1/7	1/3	1/7	1/9	0.333
1/7	1/7	3	1/7	1	1/3	1	1/7	7	1/7	1	1/7	3	1/5	3	1/7	1/9	1/3	1/7	3	1/7	1/7	1/7	1/7	1/5	1/3	1/7	1/9	1/3	0.332
1/7	1	1/5	9	3	7	1/9	7	1/3	1/7	1	1/7	3	1/7	1/9	1/3	1/9	3	3	3	1	1/7	1	1/5	1/9	3	1/7	1	1/9	0.507
3	1/7	1/3	9	1	1/7	3	5	5	3	5	1/3	1/3	3	1/7	9	1	3	7	1	7	3	7	7	1/3	7	7	1/5	3	1.495
7	3	7	5	5	1	5	7	3	9	1	7	5	1	9	1	5	1/5	9	7	1/7	5	3	9	7	5	5	1/3	5	1.997
1/3	1/9	1/7	1	1/7	1/3	1/5	1/3	1/3	1/9	1/7	1	1/5	1/9	1/5	1/9	1/7	1/7	1/9	1/7	1/7	1	1/9	1	1/3	1/5	1/9	1/3	1/5	0.260
1	1/5	1/3	3	5	7	1/7	9	1/7	1/3	5	5	1/3	1/9	3	1	1/5	1/7	1/9	5	5	1/3	3	1/9	1	1/5	1/9	1	1/5	0.859
7	7	1/7	1	3	1	5	5	1/3	9	5	7	7	7	9	1/7	7	1/3	3	9	5	1	9	1	5	1	1/3	5	1/3	1.499
9	3	5	7	9	5	5	1	9	7	5	3	9	3	5	7	7	9	3	9	7	9	5	7	3	5	9	7	5	3.049
5	3	9	5	5	3	5	5	1	9	5	9	5	3	3	7	5	5	9	7	7	5	9	9	5	9	5	5	7	3.998
1/9	1	3	7	1/9	5	9	5	1/5	1	9	1/9	1/5	1/3	1/3	1/3	5	3	1/3	5	1/9	1/5	3	1/5	1/5	1/7	1/5	1	1/9	1.010
9	7	1/9	3	1/5	3	1	7	7	1	1/5	1/7	7	1/3	9	1	1/3	3	1/3	3	1	9	7	5	7	3	1/5	5	9	1.496
5	1	7	3	3	9	3	5	9	3	5	7	5	3	5	5	9	3	7	9	5	7	5	1	3	5	5	3	5	3.024
3	9	5	1	3	7	5	5	9	3	5	9	5	7	7	7	7	3	5	5	3	3	9	9	3	7	9	5	5	4.011
7	1/9	1	1/9	1/3	9	1/7	3	9	1/5	5	1/5	1/3	3	3	1/3	1/9	5	1/3	3	7	3	5	1/7	5	1	1/7	1/9	1/5	1.005
9	7	3	1	7	5	1/5	3	1	9	7	9	5	3	7	1	5	7	1	3	1/5	1	3	3	7	1	1/5	9	1/7	2.011
7	1	7	5	9	9	7	7	9	9	7	3	7	5	7	1	7	3	9	7	5	5	9	5	5	7	1	5	1/5	3.029
1/5	7	3	1/3	1/5	1/9	5	1/7	1/5	7	1/7	3	1/5	5	5	1/5	5	3	1	9	3	7	3	1	3	3	5	5	3	0.808
3	3	3	3	9	1	5	1/3	1/3	1	1/3	9	3	7	1/5	3	7	9	5	7	3	5	7	3	5	1	7	9	5	2.008
5	1/5	1	5	3	1	1/5	1/5	1/3	1/3	5	1/7	3	1	5	1/5	1	5	1/5	3	1/3	3	1/7	5	1	1	1	3	1/9	0.749
1/5	1/5	1	1	1	1/7	1/5	1	3	1/7	1	5	3	1/7	3	5	1	1/7	1	1/7	5	1/9	5	1/9	1/9	3	1	3	3	0.603

SURVEY RESPONSE PAIRWISE COMPARISONS OF FLOORING ALTERNATIVES UNDER THE EASE OF INSTALLATION

RESPONDENT

R22	R23	R24	R25	R26	R27	R28	R29	R30	R31	R32	R33	R34	R35	R36	R37	R38	R39	R40	R41	R42	R43	R44	R45	R46	R47	R48	R49	R50	GM	
3	1/5	1/9	3	3	1/5	3	9	9	1	7	5	7	9	5	9	1/3	1	1/5	1/7	9	3	5	7	5	7	5	3	5	2.703	
3	1	1/5	3	1/3	5	1/9	5	1	1/7	1	1/5	3	3	3	1	1/3	5	1/9	1	1/9	1/3	1	3	5	3	7	7	3	1.331	
1/5	1/7	7	1/5	3	1/9	1/5	5	1/3	7	1/9	1/5	5	1/5	3	9	5	1/3	1/7	1/9	7	5	1/7	1	7	1/7	5	1/7	1/9	0.839	
1/3	1/5	1	1/5	3	1/9	1	1/9	1/5	9	1/7	1/9	1/3	1/5	1	1	1/9	3	1/7	1/9	1/5	1/5	3	1/9	3	1/5	1/7	1/9	1/5	0.394	
1/7	1/9	1/3	1/5	1/9	1/3	7	1/3	1/7	5	1/7	1/7	1/7	1/3	7	1/5	1/7	1/3	3	1/3	1/7	1/9	1/9	5	1/7	3	1/9	1/7	1/9	0.334	
1/5	1/5	1/3	1	9	1/5	1/5	5	1/7	5	5	9	1/5	7	1/7	1/7	1/9	1	1	1/3	1/9	7	3	9	3	7	1/9	1/5	1/7	0.630	
5	7	9	9	3	9	5	5	7	1	3	1	9	1	7	1/5	5	7	5	5	1/3	1	1	3	5	3	1	1	3	2.718	
1/3	1/9	1/5	1/3	1/9	1/5	1/7	1/9	1/7	1/3	1/3	1/3	1/5	1/9	1/5	1/9	1/9	1/5	1	1/3	1/5	1	1/7	1/9	5	1/3	1/5	3	1	0.483	
1/3	1/9	1/5	1/7	1/7	1/3	1/7	1/9	1/5	1/5	1/5	1/9	1/5	1/5	1/3	1/5	1/5	1/5	1/5	1/3	1/3	1/7	1/3	1/3	1/5	1/5	1/9	1/7	1/3	0.392	
1/3	1/3	1/3	1/3	1/5	1/9	1	1/3	1	1/5	1	1/3	1/5	1/3	1/3	1/3	1	1/3	1/3	1/3	1/3	1/3	1/3	1/5	1/3	1	1/3	1/5	1	0.356	
1/7	1/3	1/9	1/9	1/9	1/7	1/9	1/7	1/5	1/7	1/9	1/7	1/5	1/7	1/3	1/9	1/7	1/3	1/7	1/3	1/5	1/9	1/5	1/5	1/9	1/3	1/5	1/3	1/5	0.327	
1/3	1/9	1/7	1	1/7	1/3	1/5	1/3	1/3	1/9	1/7	1	1/5	1/9	1/5	1/9	1/7	1/7	1/9	1/7	1/7	1	1	1	3	1/5	1	1/3	5	0.324	
1/9	1/3	1/3	1/3	1/3	1/3	1/3	1/3	1/7	1/7	7	1/7	1/7	1/5	1/7	9	7	1/5	9	1/5	1/3	1/9	1/3	1/5	1/3	1/3	1/9	1/9	1/9	1/3	0.335
1/9	1/5	1/7	1	1/3	1/5	1	3	1	1/9	3	5	1/7	1/5	1	1/3	1/9	3	1/7	1	1	1/9	1	1/5	1/5	1	1	1/3	7	0.503	
7	1/9	9	7	1/9	1/9	1/9	1/9	1/9	9	1/9	1/9	1/9	1/9	5	1/5	1/7	1/9	1/7	1/9	1/9	1/9	1/9	1/9	1/9	1/9	1/9	1/5	1/5	1/9	0.336
1/9	1/7	1/3	1/9	1/3	1/7	1	1/7	1/7	1	1/9	1/3	1	5	1/7	1	5	1/7	1	1	1/7	1/3	1/7	7	3	7	7	1/9	1/7	0.628	
1/7	1/9	1	1/5	1/9	3	3	1	1/7	1/7	1/3	3	1/3	3	1/7	1/9	1/9	1/9	1/7	1/3	1/9	1/5	1	1/9	1/5	1/7	1/3	1/7	1/9	0.333	
1/7	1/7	3	1/7	1	1/3	1	1/7	7	1/7	1	1/7	3	1/5	3	1/7	1/9	1/3	1/7	3	1/7	1/7	1/7	1/7	1/5	1/3	1/7	1/9	1/3	0.332	
1/5	1/3	1/9	1/9	1/3	1	1/5	1/5	1/3	7	3	1/9	5	1/7	9	1/9	1/5	1/7	3	1	1/9	1/3	5	1/7	1/9	1/3	1/7	5	3	0.476	
7	3	5	3	5	5	3	9	1	7	5	7	7	1/7	5	3	3	5	1/9	9	1/7	5	1	1	7	1/9	7	1/7	3	2.039	
1/3	1/7	1/5	1/3	1/9	1/9	1/7	1/5	1/5	1/3	1/9	1/5	1/9	1/9	1/7	1/3	1/7	1/7	1/9	1/7	1/5	1/7	1/5	1/7	1/3	1/5	1/9	1/7	1/3	0.363	
1/7	1	1/5	9	3	5	1/9	1	1/3	1/7	1	1/7	3	1/7	1/9	1/3	1/9	3	1	3	1	1/7	1	1/5	1/9	3	1/7	1	1/9	0.473	
1/3	1/9	1/5	1/7	1/7	1/3	1/7	1/9	1/5	1/5	1/5	1/9	1/5	1/5	1/3	1/5	1/5	1/5	1/5	1/3	1/3	1/7	1/3	1/3	1/5	1/9	1/9	1/7	1	0.394	
1/9	3	1/7	1/5	1/7	1/5	1	1/9	1/5	9	3	1/5	1/9	1/3	9	9	9	5	1	1/5	1	1/5	9	1/5	1	1/3	1/9	7	7	0.752	
7	9	1	5	9	7	5	5	9	9	9	1	9	1/7	7	5	9	3	3	1/5	9	3	3	1	9	3	1	9	5	2.763	
1/9	1/5	1	5	1/9	1	7	1/9	9	1/3	9	1/3	7	7	1/9	1	1/5	1/7	1	1/3	1/7	1/9	5	1	1	1/3	1/5	1/7	9	0.576	
1	1/9	9	7	1/7	3	1/7	9	7	1/9	1/9	3	9	1/9	7	1/7	1	1/9	1/5	1/3	3	3	1/7	3	1/7	1/3	1/5	7	1/3	0.827	
9	3	9	1/5	7	9	7	1/9	3	5	7	9	1/5	1/7	5	1/9	1/5	7	5	1/3	3	3	1/7	1	1/5	5	3	3	7	1.592	
5	9	1/5	9	9	5	9	9	5	1	1	3	7	3	7	7	3	1	5	7	5	1	5	3	5	1	1	5	1	2.893	
5	3	7	7	7	9	1/3	5	3	3	3	9	7	1/9	7	1/9	1/3	1/5	3	1/9	3	1/5	1/7	1	1	1/9	1/5	3	1/5	1.221	
9	3	1	1/9	7	1/7	3	1/7	7	7	3	9	1/9	1	3	5	7	7	3	1	1	3	7	1/5	9	5	5	1	3	1.918	
9	1/7	1/7	9	3	3	3	3	5	7	1	5	9	7	1	9	7	9	3	3	3	7	3	7	3	5	5	7	3	3.003	
1/3	1/3	7	1	1/7	7	7	3	7	1	9	1/3	7	1/5	5	1	3	7	7	1/7	5	5	1/9	1	9	1/3	1/7	5	7	1.471	
7	9	7	3	5	1	7	3	9	9	7	5	5	9	1/5	3	9	5	3	9	9	9	3	5	3	9	7	7	9	2.882	
1/7	9	1/9	7	1/9	3	1/9	1/7	9	7	1/3	1/3	7	1/7	1/3	1/9	1/7	1	1/5	1/3	1/9	1/5	1/3	9	1/3	7	9	5	1/5	0.767	
1/3	1/7	1/7	1/3	1/9	1/9	1/5	1/9	1/5	1/3	1/7	1/3	1/5	1/5	1/7	1/5	1/5	1/9	1/3	1/9	1/7	1/9	1/9	1/7	1/9	1/3	1/9	1/9	1/9	0.340	

SURVEY RESPONSE PAIRWISE COMPARISONS OF FLOORING ALTERNATIVES UNDER THE ENVIRONMENTAL IMPACT

RESPONDENTS

R22	R23	R24	R25	R26	R27	R28	R29	R30	R31	R32	R33	R34	R35	R36	R37	R38	R39	R40	R41	R42	R43	R44	R45	R46	R47	R48	R49	R50	GM
3	5	5	7	9	9	7	5	7	9	7	5	5	5	9	3	7	7	3	9	7	9	7	5	5	5	9	5	9	3.075
7	7	7	7	9	9	9	9	9	9	5	5	5	3	5	7	9	7	5	5	5	9	5	5	7	9	5	9	3	3.013
7	3	9	3	5	7	5	7	5	7	5	7	5	3	3	3	5	9	5	9	3	5	5	5	5	5	5	7	7	2.524
7	3	7	7	7	3	7	3	3	9	9	3	3	9	5	7	5	3	9	9	3	9	5	5	9	3	7	9	7	2.782
7	9	5	7	7	7	3	5	5	3	5	3	5	3	3	7	7	5	5	7	9	3	9	7	3	9	3	3	3	2.727
7	3	7	9	5	7	9	7	5	9	3	9	3	3	7	3	3	9	3	5	7	3	3	9	7	7	5	9	9	2.927
5	7	3	7	3	7	3	9	5	5	5	7	9	9	7	9	9	3	9	9	7	5	5	9	7	5	3	7	9	3.012
5	7	3	7	5	5	9	9	9	9	9	3	5	9	5	3	3	7	3	7	3	7	7	5	7	5	5	3	7	2.714
1/9	3	1/3	1/7	1/9	1/9	1/7	1/9	5	9	7	3	5	9	1/7	3	1/9	1/5	5	1/3	1/9	7	1	3	5	9	7	5	1	0.964
7	7	7	7	9	7	9	3	3	9	5	3	5	5	3	3	7	9	9	7	3	3	9	3	9	3	9	3	3	2.467
7	9	9	9	3	9	5	5	9	1	5	1	1	1/3	3	7	1	1/5	1	1/9	1/5	7	1/5	1	1/9	1	3	1/5	1	1.339
5	5	9	5	9	3	7	9	5	5	5	9	5	3	7	9	3	3	9	5	5	3	5	5	5	7	3	7	5	2.619
9	5	5	3	5	3	3	7	9	7	7	9	3	5	9	3	9	3	9	9	7	5	5	9	7	3	5	9	7	2.801
1/3	1/5	1/7	1/5	1/7	1/5	1/9	1/5	1/7	1/3	1/3	5	1/7	1/3	1/7	5	9	7	5	7	3	9	1/5	5	1/7	7	5	1/5	9	0.908
5	7	9	7	7	9	9	7	5	5	9	5	9	5	9	5	5	5	3	5	5	5	5	5	3	9	7	9	7	2.979
3	5	9	5	3	9	9	9	7	5	9	3	9	5	5	9	7	9	5	3	9	7	3	5	7	9	5	9	5	3.085
7	7	5	7	7	9	5	9	9	3	3	7	9	3	3	9	7	1	1/7	1/5	5	1	1/5	3	1	3	3	1/5	1	1.904
3	5	9	7	9	7	7	5	9	5	5	5	7	3	9	3	5	7	9	5	5	3	7	3	3	3	5	3	5	2.736
7	5	3	3	9	9	7	5	3	9	9	9	5	5	5	9	5	9	9	7	3	9	3	7	9	9	5	5	9	3.017
1/7	1/9	5	7	1/5	1/7	5	9	1/7	1/5	1/7	1/9	1/3	5	1/5	3	5	9	1/9	1/5	1/3	9	3	9	1	3	7	5	1/5	0.925
7	5	9	7	5	5	5	9	9	7	5	3	7	7	7	7	3	9	7	5	5	3	5	7	3	5	3	9	3	2.760
1/3	1/7	1/7	1/3	1/9	1/9	1/5	1/9	1/5	1/3	1/7	1/3	1/5	1/5	1/7	1/5	1/5	1/9	1/3	1/9	1/7	1/9	1/9	1/7	1/9	1/3	1/9	1/9	1/9	0.340
1/5	1/9	1/5	1/5	1/9	1/3	1/5	1/5	1/3	1/7	1/5	1/3	1/7	1/9	1/9	1/7	1/9	1/5	1/5	1/7	1/5	1/9	1/3	1/3	1/9	1/7	1/5	1/3	1/9	0.356
5	5	5	5	7	3	9	7	3	3	7	3	5	9	9	9	9	9	7	3	5	7	3	9	5	5	3	3	3	2.759
1/3	1/9	1/5	1/3	1/9	1/5	1/7	1/9	1/7	1/3	1/3	1/3	1/5	1/9	1/5	1/9	1/9	1/5	1/9	1/3	1/5	1/9	1/7	1/9	1/7	1/3	1/5	1/7	1/9	0.371
9	7	9	3	1/5	7	3	1	3	7	3	1	3	1/5	1/7	1/5	1	1	1/9	1/5	7	5	1	1/9	1/5	1/3	3	3	5	1.223
1/7	1/3	1/9	1/9	1/9	1/7	1/9	1/7	1/5	1/7	1/9	1/7	1/5	1/7	1/3	1/9	1/7	1/3	1/7	1/3	1/5	1/9	1/5	1/5	1/9	1/3	1/9	1/3	1/5	0.336
3	7	9	7	5	7	5	5	3	9	1	5	3	1/5	3	1/5	7	5	1	3	1	1/9	7	1/5	3	1	1/5	1	3	1.608
1/3	1/9	1/5	1/7	1/7	1/3	1/7	1/9	1/5	1/5	1/5	1/9	1/5	1/5	1/3	1/5	1/5	1/5	1/5	1/3	1/3	1/7	1/3	1/3	1/5	1/5	1/9	1/7	1/7	0.383
9	7	3	3	5	9	5	7	5	1/9	7	3	1/7	5	1/5	1/9	3	1	3	5	1/9	5	5	1/3	7	5	1/9	1/5	3	1.401
7	7	7	9	7	5	3	7	5	7	7	3	5	3	5	5	5	7	9	5	5	7	3	7	9	3	7	3	3	2.650
1/3	1/7	1/5	1/3	1/9	1/9	1/7	1/5	1/5	1/3	1/9	1/5	1/9	1/9	1/7	1/3	1/7	1/7	1/9	1/7	1/5	1/7	1/5	1/7	1/3	1/5	1/9	1/7	1/3	0.367
7	3	5	7	7	7	9	7	5	7	9	7	3	5	3	7	7	7	3	5	9	5	3	3	3	9	3	3	5	2.649
1/5	1/7	1/5	1/9	1/3	1/5	1/5	1/3	1/9	1/3	1/5	1/9	1/9	1/3	1/7	1/3	1/9	1/5	1/7	1/9	1/3	1/9	1/7	1/5	1/7	1/5	1/3	1/5	1/7	0.356
1	1	3	1	1	5	3	1	1	7	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	7	1	1	1	1.606
3	3	5	3	5	9	5	7	5	9	9	3	9	5	3	7	5	5	7	7	7	7	3	7	9	9	7	7	7	2.807

SURVEY RESPONSE PAIRWISE COMPARISONS OF FLOORING ALTERNATIVES UNDER THE INITIAL COST

RESPONDENT

R22	R23	R24	R25	R26	R27	R28	R29	R30	R31	R32	R33	R34	R35	R36	R37	R38	R39	R40	R41	R42	R43	R44	R45	R46	R47	R48	R49	R50	GM
3	9	1	9	7	1	9	5	3	9	5	7	9	9	3	9	5	9	9	1	9	7	9	5	7	3	9	5	7	3.20154
1/3	1/3	1/3	1/3	1/3	1/3	1	1/3	1/3	1/3	1/5	1/3	3	1/5	1/3	1/5	1	1	3	5	7	3	5	1/3	1	1/5	1/3	5	3	0.71669
5	1	3	3	7	5	3	5	1	7	7	3	5	1	3	3	3	3	1	5	5	3	1	3	3	1/7	3	5	1	2.89865
3	7	3	5	3	7	1	3	1/3	5	1	7	5	3	7	3	3	7	1	3	5	1	3	1/3	5	7	1	3	5	2.61459
1/5	7	7	5	1	9	7	3	1/7	5	3	1/9	1/5	1/7	9	7	1/5	1/7	5	5	1/5	1/9	3	3	7	3	3	1	1	1.49795
1	5	1	5	3	3	3	7	5	3	5	3	1/5	3	7	3	1	5	5	7	1	3	9	1	3	5	3	3	1	2.30675
1	3	5	1/5	1/3	5	7	1	3	9	5	9	1/7	9	1/5	5	5	1/3	5	1/9	1/3	3	7	1/5	1/7	7	3	1	1	1.69799
5	1/3	1/5	1/5	5	1/5	3	1/7	1/5	1/5	5	1/5	1/7	1/3	7	3	1/7	1/5	1	1/5	3	1/5	1	3	1	1/5	1/5	1	3	0.62344
7	1/9	9	9	1/9	1/9	1/9	1/9	1/9	9	1/9	1/9	1/9	1/9	5	1/5	1/7	1/9	1/7	1/9	1/9	1/9	1/9	1/9	1/9	1/9	1/5	1/5	1/9	0.30212
1/9	3	1/5	1/5	1/3	9	9	9	1/9	1/3	1	9	5	3	7	1/7	7	1/9	1/5	5	1/7	1/9	7	5	1/3	3	9	1/7	7	0.83028
9	9	1	5	1/3	1/3	3	7	5	1/5	1/9	1	1/7	1	1/7	1/9	1/7	5	1	1/5	3	1/3	1/5	1/7	1	9	1/9	1	1/7	0.66069
1/9	1/9	9	1/9	1/9	1/9	1/9	1/9	1/9	9	1/7	1/9	9	1/9	9	1/9	1/9	1/9	7	1/9	7	1/9	1/9	1/7	1/9	1/9	3	1/9	3	0.36947
5	1/3	1/5	1/5	5	1/5	3	1/7	1/5	1/5	5	1/5	1/7	1/3	7	3	1/7	1/5	1	1/5	3	1/5	1	3	1	1/5	1/5	1	3	0.62344
1/9	1/3	3	1/7	1	1/3	7	7	1/3	1	1/9	1/9	7	1/3	1/5	1/5	1/3	3	1/7	1	1/3	1	1/3	5	1/3	1	1/7	1/9	1	0.43583
1/9	1/9	1/9	1/9	1/9	1/7	1/9	1/9	1/7	9	1/9	1/7	1	1	1/9	5	1/9	3	1/9	1	1/9	1	3	1/9	5	9	1/9	3	9	0.50178
5	9	7	1	1/5	5	5	3	1	5	5	7	1/5	7	9	7	5	7	5	1	5	5	3	7	5	5	3	5	5	3.39407
9	5	5	3	5	5	3	1	1/5	5	5	3	7	5	5	5	1/7	7	7	5	5	3	3	7	5	5	7	5	5	3.49377
5	5	5	3	5	3	1/3	1	5	3	5	1/3	5	1/3	3	5	3	3	1	3	3	5	3	1	3	1	1	5	3	2.31894
1	1/5	9	3	3	5	9	3	3	5	5	3	5	3	9	7	3	5	3	5	5	3	1	9	3	9	5	3	3	3.20236
3	5	1	5	3	3	3	5	1	3	3	3	3	7	3	1	5	5	1	1	7	3	5	1	3	3	3	1/3	3	2.10497
5	3	3	7	1	5	3	9	3	1	9	3	1	7	1	7	1	5	1	7	3	1/3	1	7	5	3	1	1	7	2.90288
9	3	1/7	1	1/7	5	1/5	9	1/3	1/9	1/3	7	1/7	1/7	1/5	1/9	1/3	7	1/5	1	7	3	1/7	3	7	1	7	1	1/7	0.76929
1/3	1/3	1/3	1/3	1/5	1/9	1	1/3	3	1/5	3	1/3	1/5	1/3	1/3	1/3	1	1/3	1/3	1/3	1/3	1/3	1/3	1/5	1/3	1	1/3	1/5	1	0.41492
1/3	3	1/9	1/3	1	1/3	1/3	1/3	1/3	1	1	1	1/3	1	1/9	3	1	1	1/5	1	3	1/9	1	1/9	1	1	1/3	1	1/3	0.71189
1/3	1/3	1/5	1/3	5	1/3	1	1/3	1/7	3	1	1/5	1/3	1/3	1/5	1/3	1/9	1/5	1	3	7	1/5	1/5	1	1/3	5	1/3	1	3	0.49982
5	1	1/5	3	5	1/7	1/5	1/9	1/3	7	5	9	1/3	1/5	1/3	1/7	1/7	1/3	1/3	5	1	1	1/3	1/3	3	7	1/5	1/7	1	0.58807
1	1/3	1	1	1/5	1/5	1/3	1/3	1/3	1/3	1/3	1	7	1	1/5	1	1/3	1	1/3	1/5	1	1/3	3	1/3	1/5	1	1/3	3	1	0.45458
3	1/5	1	9	9	1/9	1/5	1/3	5	1/3	5	3	9	1/9	9	9	1	3	1	1/9	1	1	1/7	1/7	9	1/3	3	1	1/5	0.83575
1/3	1/3	1/3	1/5	1/3	1/5	1	1/3	1	3	1/3	1/5	9	1	1/3	1	9	1	1	3	1	1/5	1/5	1	1/3	1/5	3	1	5	0.55592
3	1	1	1	1/5	1	1/3	1/5	5	1/3	1/3	1/3	1/3	1/5	5	1	1	1/3	1	1	1/3	7	1	1	5	1/5	1	5	1	0.66415
1/3	1/3	1/3	1/3	1/5	1/9	1	1/3	3	1/5	3	1/3	1/5	1/3	1/3	1/3	1	1/3	1/3	1/3	1/3	1/3	1/3	1/5	1/3	1	1/3	1/5	1	0.41492
1	3	5	3	7	7	1	3	1/5	5	1/5	1/5	1	9	1/9	1/5	5	5	7	1/5	1/7	5	1/3	1	1/5	1	3	5	5	1.30191
1/3	1/3	1/5	1/3	5	1/3	1	1/3	1/7	3	1	1/5	1/3	1/3	1/5	1/3	1/9	1/5	1	3	7	1/5	1/5	1	1/3	5	1/3	1	3	0.49982
1/3	1/5	1	1/3	1	1/7	1	3	1/3	1/5	1	1/5	1	1	1/7	1	1	1/3	1/3	1/3	1	1/9	5	1	1/3	5	1/3	1	1	0.66637
1/7	5	5	9	7	1/9	1	1/5	1/5	1/7	5	1/5	1/7	1/3	1	7	1/7	5	1/5	5	1/5	1/7	3	1/7	3	1/9	3	1/5	1/5	0.76518
7	1/9	9	9	1/9	1/9	1/9	1/9	1/9	9	1/9	1/9	1/9	1/9	5	1/5	1/7	1/9	1/7	1/9	1/9	1/9	1/9	1/9	1/9	1/9	1/5	1/5	1/9	0.30212

SURVEY RESPONSE PAIRWISE COMPARISONS OF FLOORING ALTERNATIVES UNDER THE INSTALLATION COST

RESPONDENT

R22	R23	R24	R25	R26	R27	R28	R29	R30	R31	R32	R33	R34	R35	R36	R37	R38	R39	R40	R41	R42	R43	R44	R45	R46	R47	R48	R49	R50	GM
1/5	3	3	3	9	9	1/3	7	3	7	7	5	1/9	7	7	7	5	1/7	7	3	3	7	5	5	7	3	1/9	5	3	2.54392
3	9	1/3	5	1/3	1/3	1/3	1/9	1/3	1/5	1/9	1/3	1/5	1/7	1/5	1/7	1/7	9	1/7	1/5	7	1/9	1/3	1/9	1/5	1/9	1/3	9	1/7	0.38646
5	3	7	5	3	1/5	5	3	7	1/3	1	5	1	5	3	5	1/5	5	1	3	5	1/9	1/5	3	1/9	1/7	5	3	7	1.50148
1/3	1/7	7	3	1/9	5	9	5	5	7	1/3	5	5	1/9	3	5	1/7	7	7	1/5	3	3	3	5	5	3	5	1/7	7	2.61059
1/3	1/3	1/9	9	5	5	1/3	1/5	1/7	1/7	7	5	1/9	1/5	1/5	1/9	1/7	3	1/7	1/5	1/7	1/7	1/3	1/3	1/7	1/5	1/7	1/9	1/9	0.45782
3	9	9	1/9	3	1/3	9	3	1/7	1/9	3	7	5	5	5	7	1/9	7	7	1/9	1/3	3	1/7	3	9	1/3	9	3	1/5	1.8417
3	7	1/9	3	5	1/7	3	3	7	1/9	5	5	5	7	7	7	1/9	5	7	7	5	5	9	7	1/7	9	7	7	9	3.60569
1/3	1/5	3	9	1/7	1/3	1/5	1/5	1/9	5	1/7	1/9	1/3	3	5	7	1/3	1	3	5	1	3	3	5	3	1	1/5	1	1/9	0.60206
1/9	1/9	5	1/7	1/3	1/3	1/9	1/7	1/7	1/3	1/7	1/5	1/5	1/5	5	5	1/5	1/5	1/5	3	1/5	3	1	1/5	1/3	1/5	1/7	3	1	0.30084
1/3	1/7	1/9	1/3	7	1/5	1/3	1/7	1/5	1/5	5	1/3	1/3	1/3	1/7	1/9	1/3	5	1/7	1/3	1/5	1/9	1/7	1/5	1/9	1/5	1/3	1/7	1/3	0.39239
5	1/5	5	1/5	1/7	1/9	1/9	5	1/3	1/5	1/3	1/7	9	1/5	7	1/7	1/3	1/5	1/9	1/5	1/3	1/3	1/5	9	1/9	1/9	3	1/5	1/7	0.35627
1/7	1/9	1/3	1/5	1/9	1/3	7	1/3	1/7	5	1/7	1/7	1/3	7	1/5	1/7	1/3	3	1/3	1/7	1/9	1/9	7	1/7	3	1/9	1/7	1/9	1/9	0.33645
5	1/5	7	3	1	9	1/5	1/3	7	5	3	9	1/5	9	5	5	1	1/7	1/5	3	9	3	5	3	5	3	1	3	1/5	0.95662
1/3	1/7	5	3	7	5	1/5	1/5	1/9	7	3	1/7	9	5	1/5	5	3	9	1/5	1/3	1/9	1/3	1/5	3	5	1	1/9	1	1/5	0.85003
1/5	1/7	1/3	1/7	1/3	1/9	7	1/7	1/9	1/9	1/9	5	1/3	1/7	1/5	9	1/9	1/3	3	1/9	1/7	7	7	7	1/9	1/5	1/3	1/9	1/7	0.36987
9	5	5	3	3	5	5	1/9	7	3	7	9	9	7	3	3	1/9	9	9	1/9	3	9	9	3	7	1/7	7	9	7	3.18063
3	1/7	1/3	9	9	5	9	1/3	5	5	5	3	5	7	5	5	7	9	7	5	9	9	3	3	1/9	5	7	1/9	7	2.69554
1/3	1/7	1/5	1/9	1/5	1/7	1/3	1/7	1/7	1/7	3	1/9	3	9	7	1/3	5	1/5	1/5	1/3	1/5	1/9	3	1/5	1/7	1/5	1/3	1/5	3	0.35205
1/7	5	5	1/5	7	3	9	1/5	7	1/9	1/7	1/7	3	3	1/3	9	7	5	5	3	1/9	7	7	9	7	1/5	9	1/5	7	1.78292
7	7	7	1/7	7	5	9	9	5	3	3	3	3	9	7	1/7	3	1/9	3	9	5	1/3	7	9	9	1/3	7	9	7	2.42647
1/9	7	1	1/5	5	7	3	1	3	1	7	1/3	1/5	1/5	5	3	1	3	5	1	1/9	3	1/3	1	1/5	1/7	1	1	3	1.33776
9	3	1/9	1/7	1/3	1/9	1/7	1/3	1/9	9	9	1/5	1/7	1/7	1/3	1/7	1/7	1/7	1/5	1/3	1/7	1/7	1/7	1/3	1/9	9	3	1/3	1/5	0.36665
5	1/5	1/7	1/7	3	3	1/7	9	1/9	5	3	1/5	1/3	1/7	1/5	1/3	1/3	1/7	7	1/5	1/9	1/7	1/7	7	1/7	5	1/9	3	1/7	0.36918
3	3	7	3	1/3	3	1/5	1/9	1	5	5	1/9	1	7	1	1/9	1/7	5	1	1	3	7	1	1	1/9	1/5	1	3	1	1.61396
5	1/5	7	1	5	1	1	5	1/5	1/3	1/5	1	1/7	5	1/5	1	3	1/3	1	3	5	1	1/5	1	7	3	5	9	5	1.42428
1/9	1/3	1/3	3	5	1/3	1/3	1/5	5	1/3	1/5	1/7	3	1/5	1/7	1/9	1/3	1/3	1/7	1/3	1/3	5	1/9	1/9	1/7	1/3	1/3	5	1/5	0.34681
3	1/3	1/9	1/9	1/7	1/7	1/9	1/3	5	1/9	1/3	7	1/5	1/9	1/3	1/5	9	1/7	1/5	1/5	7	1/3	1/7	1/3	7	9	1/3	1/5	1/9	0.40592
1/5	7	9	5	7	5	1/5	9	3	1/5	1/9	5	7	9	3	5	7	3	1/5	5	7	9	1/7	9	3	7	1/3	5	7	2.47194
1/7	1/5	9	1/9	3	3	7	3	3	3	9	9	9	7	7	7	7	5	5	7	3	1/5	7	3	5	1/3	5	5	9	2.27887
1/5	1/7	1/7	5	1/9	7	9	3	1/5	5	3	7	9	1	1/7	9	3	9	1/3	1/7	3	7	5	1	7	3	5	7	9	0.95499
3	9	9	3	1/9	7	9	7	7	7	3	3	3	9	1/7	3	1/7	3	5	9	1/3	5	1/9	3	5	5	1/5	9	9	2.53054
1/5	1/5	9	5	3	7	1/5	5	7	1/5	7	7	1/5	5	1/5	1/3	5	7	7	9	3	3	5	3	7	5	5	1/9	9	2.4387
3	1/5	5	7	7	1/9	7	1/3	7	5	9	9	7	7	9	1/3	7	5	3	5	7	5	3	5	7	1/7	3	3	1/3	2.7646
5	7	5	3	5	7	1/5	3	5	3	5	1/7	3	3	3	1/3	9	1/9	3	9	5	9	9	7	3	3	7	3	5	2.49308
9	5	1/7	1/3	1/7	1/9	7	1/7	7	1/7	1/3	1/7	1/5	1/7	1/5	7	9	1/9	1/3	1/3	1/7	5	9	9	1/3	1/3	1/5	1/9	1/9	0.4808
1/9	1/3	1/3	1/3	1/3	1/3	1/3	1/7	1/7	5	1/7	1/7	1/5	1/7	9	5	1/5	9	1/5	1/3	1/7	1/9	1/3	1/5	1/3	1/9	1/9	1/9	1/3	0.33088

SURVEY RESPONSE PAIRWISE COMPARISONS OF FLOORING ALTERNATIVES UNDER THE LOCAL AVAILABILITY

RESPONDENT

R22	R23	R24	R25	R26	R27	R28	R29	R30	R31	R32	R33	R34	R35	R36	R37	R38	R39	R40	R41	R42	R43	R44	R45	R46	R47	R48	R49	R50	GM
9	3	5	7	3	7	1	3	5	3	7	7	1/5	7	5	1/3	5	7	5	3	1	3	9	7	5	3	3	5	9	2.7043
9	1/9	3	1/9	5	1/3	1/3	1	1/7	1	1/7	1/3	3	1/9	5	1/7	3	1/9	1/5	1/7	1/9	3	1	9	7	1/5	1/3	1/5	1	0.59997
1/5	7	5	5	9	1/9	1/3	1/3	9	7	5	7	7	1/5	5	1/9	5	5	3	3	1	3	1/7	1	1	1/5	1	1	3	1.5038
5	7	1	5	5	9	9	5	1	1/5	5	5	7	3	1	5	3	7	7	1	7	1	7	5	3	5	3	3	7	3.06494
1/7	1	1/7	5	9	5	5	3	1/3	7	1/3	1/9	1/7	1/9	1/5	1/7	3	1/5	1/7	9	3	5	1/9	3	1/9	1/7	1	9	1/5	0.79988
7	5	1	1/9	1/3	1/5	1	9	3	3	3	5	7	3	5	3	1/5	1/9	1/5	1	1/9	5	5	5	1	1	5	3	7	2.10567
1/9	7	5	7	7	5	7	5	1/7	7	1/7	1/7	1/5	5	1/3	3	5	3	7	1/5	9	1/3	1/3	7	1/7	9	1/7	1	1/7	1.10326
3	1	9	1/5	9	3	5	7	9	1	1/5	1	7	9	5	3	1	7	7	1	5	1	9	5	1	3	1	7	5	3.00246
1	1/5	3	1/5	1/5	1/9	3	1/7	1	1/9	1/5	1/7	1/7	1/7	3	1/9	1/5	1/9	1/7	1/9	1/5	1	1/9	1/9	1/5	1/9	1/3	1/9	1/9	0.2481
1/9	3	5	1/9	1/3	1/3	1/9	1/9	1/5	9	9	5	1	7	1/7	7	7	1/9	1/3	7	1/5	3	5	1/3	5	1/5	1/5	1/7	7	0.69995
1	1/5	3	1/5	1/5	3	3	1/7	1	9	1/5	1/7	1/7	1/7	3	1/9	1/5	5	1/7	3	5	5	1/9	7	1/5	9	1/3	1	3	0.80098
1/9	1/7	1/7	1/5	1/9	3	1/7	3	1/7	1	1/3	5	1/3	1/7	1/5	1/7	1	1/9	3	1	5	7	7	1/5	1	1/7	1/5	1/3	1	0.50142
1/5	3	9	1	1/9	5	1/5	1/7	1/3	1/3	1/7	1/5	1/5	7	1/9	1/3	3	1/7	1/9	1/5	1/7	1/9	7	1/7	1/5	1	1/3	1/5	1/9	0.59982
1/7	1	1/5	1	1/5	1/3	1/3	1/9	1	1	1	1/7	1/5	5	1	1/7	1/7	1/5	1/7	1/3	3	1	3	1	1/9	1/7	3	1/7	1/7	0.40108
1/9	1/7	1/7	1/5	1/9	3	1/7	3	1/7	1	1/3	5	1/3	1/7	1/5	1/7	1	1/9	3	1	5	7	7	1/5	1	1/7	1/5	1/3	1	0.50142
1	7	5	9	7	3	1	1	1/5	5	9	9	3	5	5	1/5	1	3	3	1/7	1	1	1	3	1/9	5	3	3	1	2.50564
5	3	3	7	7	9	7	5	3	9	9	9	7	5	3	7	5	5	3	7	9	7	9	5	7	5	7	5	7	5.01413
1/7	1/5	7	1/5	5	9	1/3	1/5	5	1	9	7	5	7	7	5	7	1/7	1/3	1/7	1/3	5	1/5	5	3	1/9	5	1/3	1/7	1.49626
9	7	1	7	7	5	9	9	7	1/7	7	9	3	3	3	1	1/5	5	5	3	7	3	1	3	5	1	1	1/5	3	3.20704
3	7	1/9	3	9	9	3	3	1/5	1/3	7	1/3	1	9	1	7	3	1/3	5	1	1/7	5	1/3	1/5	9	1/3	7	1/5	1	1.80386
5	3	1	3	3	5	7	5	5	9	7	9	3	1	7	9	3	5	5	7	3	5	9	3	3	3	7	9	3	4.08553
9	5	9	3	3	1/7	1	1/3	1/5	9	1/5	9	7	7	1	1/3	1/7	7	1	7	3	5	1/7	5	1/9	1/5	1/3	9	5	1.19857
3	1/5	1/5	7	1/3	1/9	1	1/7	1/5	1/7	1/9	1	1/7	1	1/3	1/9	1/7	1/3	5	1	1	3	1	5	1	5	1/5	7	5	0.65962
3	3	1/9	1	1/5	7	1/9	3	1/9	1/3	7	5	3	1/9	9	5	9	5	7	1	1	1/3	1/9	1/3	1	1/9	1/9	3	1	1.10362
1/5	5	1/9	1/3	5	1/9	1/3	1	1/5	1/3	1/3	1/5	7	7	5	1/3	7	1/7	1	1/9	1/9	1/7	5	1/7	7	1/3	1	1/3	1/5	0.79729
3	9	1	1/3	7	9	3	7	5	7	1	1/3	9	1/5	1/3	1/9	1/9	1/9	1/7	1/5	3	3	9	1	7	1/7	1/5	1/3	1/3	1
1	1/5	3	1/5	1/5	1/9	3	1/7	1	1/9	1/5	1/7	1/7	1/7	3	1/9	1/5	1	1/7	3	1/5	1	1/9	1	1/5	1/9	1/3	1	1	0.34323
9	1/5	1/5	1/3	1/9	1/9	1/3	1	7	1/7	5	1/7	9	1/7	7	5	5	7	9	1/9	5	5	9	1	1/5	1	7	7	5	0.89909
3	9	1/5	5	1/7	1/7	1/9	1/5	3	5	1	1/7	1	1/7	1/5	1/7	1/7	5	1/3	1/7	1/5	1/3	1	1/9	1/3	7	1/3	1	3	0.60815
1/9	9	1/7	9	1	1/7	1/5	1/9	9	1	1/9	5	1/9	1/3	3	1/3	1	1/5	7	1/7	1/5	1/3	1	5	1/9	7	1/5	1/7	5	0.79982
1/9	7	1/7	1/9	5	1/7	3	3	7	1	1/7	5	9	7	1/3	1/7	3	5	3	1	1/9	7	7	1	5	1	5	3	1	1.59821
3	3	1/7	1/5	9	1	5	9	3	1/3	1/9	1	1	1/7	1/5	1/3	1	1/5	1	3	1/5	1/7	1/5	5	9	1	1/9	7	7	1.20227
9	3	1	3	3	3	7	1	1	3	9	9	5	5	3	1	5	9	5	9	9	3	1	9	7	5	3	7	1/5	2.50076
1	1/9	1/3	1/7	5	1/7	7	1/9	1/7	1/7	1/5	7	1	1	1	1/3	1/7	3	1/5	1/3	1/3	1/5	1/7	7	1	5	3	3	1/3	0.80261
1/9	1	5	5	3	5	1/9	5	9	3	1/7	1/3	3	1/5	1	3	1/5	1/9	5	3	5	1/5	1/5	7	1/9	1/5	1/5	1/3	1/3	0.90062
7	1/3	5	3	1/5	9	1/9	1/7	9	9	9	3	1/3	3	1/5	1/3	3	5	7	3	7	3	3	5	1/5	1/7	1/3	7	1/7	1.20022

SURVEY RESPONSE PAIRWISE COMPARISONS OF FLOORING ALTERNATIVES UNDER THE MAINTENANCE COST

RESPONDENT

R22	R23	R24	R25	R26	R27	R28	R29	R30	R31	R32	R33	R34	R35	R36	R37	R38	R39	R40	R41	R42	R43	R44	R45	R46	R47	R48	R49	R50	GM
1	3	1	7	1	1	3	7	5	1/5	7	3	9	1	1	9	1	9	1/7	5	1	1/3	9	7	1/7	7	5	5	5	1.80211
1	1	1	5	1/5	1/3	7	1	7	3	1	1/5	1/9	3	5	1/9	3	3	1	1/5	1/3	3	1/9	1	1	1/7	1/5	1	3	1.20042
7	5	7	5	5	9	3	1	5	5	5	5	5	7	7	7	1	3	7	1	9	5	9	9	5	5	3	7	7	4.50047
7	9	7	5	7	3	3	9	7	5	5	7	1	5	9	3	5	7	5	5	9	5	3	5	9	7	3	5	3	4.20518
9	1	7	5	5	1	3	3	3	3	7	9	9	5	3	5	5	5	3	7	3	9	1	5	5	3	1	7	3	3.80788
9	9	7	7	5	5	3	9	5	3	5	3	7	3	5	9	7	9	1	3	5	9	5	7	9	3	5	5	7	3.49628
3	1	9	5	5	7	9	3	9	1	9	1	5	1	1/5	7	9	3	9	1	1	7	9	5	1	3	1/3	3	1/5	2.99225
1/3	1/5	1/5	1/3	5	7	7	9	3	9	7	5	7	5	1	1/3	9	1	9	5	7	7	7	3	3	5	1/3	1	1	2.49774
1/3	7	1/9	1/7	1/9	1/5	5	1/3	1	1/7	1	1/9	3	1/3	1	1/3	1/5	5	5	1/9	7	9	1/9	1/7	1/3	1/7	1/7	7	1/5	0.66753
9	5	1	9	3	5	1	9	3	9	5	7	3	9	5	7	7	9	3	1	9	5	3	3	7	5	3	5	3	3.20783
5	5	9	1	3	1	3	5	9	1	1	9	1	9	9	5	3	7	3	7	1	7	5	7	5	3	1	3	3	2.89865
9	5	5	1/9	1	5	7	5	7	9	7	5	3	1/5	1/7	9	7	1/5	9	3	1/9	1/5	1/7	9	1	5	5	1	7	2.50179
9	5	1	7	3	5	5	1	9	7	3	9	5	5	3	5	3	9	3	9	3	5	9	7	9	7	3	3	1	3.61094
1	3	1	9	1	1	3	7	5	1/5	9	3	9	1	1	9	1	9	1/7	5	1	1/3	7	7	1/7	7	5	3	5	1.80182
1/3	1/9	1	1/5	7	3	1	3	1/5	5	5	1/3	3	7	3	3	3	5	7	5	5	1	1/7	3	1/3	1	3	1/5	1	1.5038
1	3	1	3	9	5	7	1	9	5	3	1	7	1	5	7	9	3	5	1	7	7	9	5	3	9	5	7	9	3.9906
3	5	1	7	5	7	7	9	3	9	7	5	7	5	1	5	7	1	5	5	7	7	5	3	3	5	7	1	1/5	3.79466
1	9	9	5	9	9	9	1	7	7	9	5	5	1	3	5	1	7	5	1	1/5	5	1	5	5	7	5	1	3	3.20783
7	1	5	3	9	1	9	5	5	1/3	3	7	5	7	7	1/5	1	1/5	9	1/3	3	1	5	5	1	3	9	5	7	2.80229
1	9	1/7	1/3	9	7	9	1	7	7	9	5	5	1	3	5	1	9	5	1	1/5	5	1	5	5	9	1/3	9	3	2.30639
1/9	9	3	1	1	1/3	1	7	5	1/9	1	5	5	5	3	1/9	7	7	9	9	1	1/3	5	1/3	1/7	9	5	1	1	2.00163
1/7	1	3	1	5	3	1/7	1/5	1/7	5	1/9	1/5	1/7	1/7	9	9	3	1/5	9	1/9	1/9	3	7	3	3	1	3	1/9	1/3	0.80124
7	1/3	1/7	1/9	5	3	5	1/9	9	1/7	1	7	3	7	1/5	1	1/9	1/7	1/5	7	5	1/5	7	5	3	3	1/7	3	1/7	0.70468
1/7	1	1	1/5	1/5	7	9	5	3	1/7	1/7	7	1/7	7	1/7	1/9	1/5	7	1/7	1/9	1/3	1/3	1/3	1	9	1	1/5	1/3	7	0.65169
7	1	1/9	1/7	1/5	1/5	1	7	3	5	1	1/5	1/5	1/7	1	1/5	1/9	1/3	3	1/3	1	1/9	1	1/7	3	1	1/3	1/9	1/7	0.6081
5	1/9	7	1/5	1/9	1	9	1/5	3	1/9	1/3	1/9	1/5	1/5	5	7	7	1	1/5	1/7	3	3	1/5	1/3	1/7	1/5	1/7	1/3	1/5	0.55226
5	5	9	3	1/5	3	1/7	1/5	1/9	1/3	1/9	1	3	7	1/3	1/7	3	3	1/5	5	9	1	1/5	5	1/5	1/5	7	1/7	3	0.85003
9	3	3	1/9	7	1	1	5	1/5	1/7	1/5	1/3	1/9	1/9	1	1/7	5	1	1/9	5	3	5	3	5	3	1/7	3	1/9	1/7	0.74637
1/7	7	1/3	9	1/7	3	5	1/5	1	1/7	1/5	1	5	1	9	3	1/7	1	1/9	1/3	5	3	1/7	9	1/7	1/3	3	7	7	0.69746
1/3	7	1/9	1/3	1/9	1/7	3	1	1/7	1/7	1	1/9	1/7	1/3	1/9	3	5	1/7	1/9	5	3	5	3	1/5	1/9	1/7	1	1/5	1	0.6498
7	1	1	7	5	7	9	7	9	1	3	3	1/5	5	1/3	1/9	3	9	1	3	5	5	7	3	7	9	9	5	3	3.09064
1/3	1	1/5	1/5	1/3	5	7	5	1/5	7	1/5	1	1/5	3	1/3	1/5	1/7	1	7	3	7	3	1	1/5	1/3	1/7	7	1/9	1/9	0.79962
7	5	1/5	1/3	9	7	1	1	1/9	1/7	1/9	1/9	1	1/5	1/7	1/9	1/5	9	1/3	7	1/9	1/5	3	7	1	1/3	1/9	5	1/3	0.75147
7	3	1	1/5	1	7	1	7	5	1/9	1/5	1/7	1/7	5	3	1/9	1/9	1/7	3	1/3	9	1	1/3	3	7	1/7	9	1/3	9	0.90186
1/3	5	3	1	1/3	1/3	1/5	5	9	7	7	9	1/9	1/5	3	7	3	1/5	1	1/7	1	3	1	1/9	1/7	1	7	1	1	0.85155
9	1/3	3	7	1/7	1	1/7	1	1/9	5	7	1/3	1	1	1	1/3	7	1/3	7	1/9	9	7	9	1/5	1/9	1/9	1/3	7	1	0.95051

SURVEY RESPONSE PAIRWISE COMPARISONS OF FLOORING ALTERNATIVES UNDER THE RECYCLABILITY

RESPONDENT

R22	R23	R24	R25	R26	R27	R28	R29	R30	R31	R32	R33	R34	R35	R36	R37	R38	R39	R40	R41	R42	R43	R44	R45	R46	R47	R48	R49	R50	GM
9	1/7	9	7	1	1	3	1/7	1	9	1	1	3	1	1/9	1	1	1	1	9	1	1/7	1/9	9	5	7	1	1/9	1	1.71835
1/7	1/7	1/3	1/9	1/3	3	1	3	1	5	1	1/5	3	1	7	1/3	3	5	1/5	1	3	1	1	1/3	9	1	1/7	1	1	1.51113
5	1	7	1	5	1/9	9	1/3	1	9	7	5	9	7	7	5	5	1/5	7	5	9	9	9	7	9	3	5	3	1	3.20342
7	9	1/9	9	7	9	1/7	1/7	9	5	1/7	7	7	9	3	7	9	5	7	9	7	9	7	5	7	9	1/7	7	1/9	3.19693
5	1	1	9	1/9	5	3	1/3	5	7	1	7	9	1	9	1/3	1	1	1	7	5	3	1/3	1	7	5	7	5	1	2.95873
9	9	9	7	7	9	5	9	7	9	1/7	1/9	9	7	7	7	3	7	1/9	7	5	7	7	1/3	9	7	1/9	1/3	7	2.98814
7	1	3	1/5	1	3	5	1/9	3	1/5	7	1/5	3	5	1	1/9	5	1	5	5	1/5	1/5	3	3	1/7	1/5	3	1	1/5	1.42393
7	7	9	7	1/7	7	7	9	9	9	1/9	7	9	1/7	9	5	5	1/7	7	1/9	5	7	3	9	7	9	3	7	5	3.21251
7	1/9	7	3	1	1/7	1/7	9	1/5	5	7	1	5	1/7	1/7	1	3	1/9	1	1/5	3	3	1	7	1/5	5	1/7	3	1/9	0.82331
5	7	7	1/9	9	5	1/3	3	1/3	5	1/5	9	5	9	1	1	1/3	9	1/9	5	1/9	5	9	7	9	1	1	7	1	2.20329
1/5	7	1	1	1	7	1	3	7	5	1	9	9	5	1	9	5	1	1	1/7	7	1/7	1/5	7	5	5	7	9	7	2.30265
9	5	7	5	9	1	1	1/5	1	9	1/7	7	3	1/7	7	1/9	9	1	1	1/7	5	5	1/9	3	9	5	1/5	5	3	2.00763
1	1/5	1	5	7	1/3	7	3	1	5	3	3	7	1	1/5	1	7	5	1	5	1	7	3	1/3	5	3	1/3	1	5	2.70452
1/5	1/5	1/7	7	1/9	9	1/5	1/3	1/7	7	1/9	1/5	1	1/5	7	1/5	1/9	3	1/5	3	1/3	1/7	3	1/5	1/7	1/7	1/3	3	1/5	0.75869
7	1/7	1/5	7	7	7	3	1/5	5	3	3	7	3	1/3	7	7	3	3	9	7	5	7	1	5	7	7	7	5	9	2.90878
7	5	1/9	5	9	7	1/5	5	9	1/9	9	5	7	7	7	7	7	1/7	9	1/5	9	7	5	7	5	5	7	9	1/5	3.1022
1/5	1/5	5	5	7	7	7	7	1/7	1/9	7	1/9	9	5	5	7	7	1	7	7	7	7	7	5	5	1	3	9	3.33595	
5	7	7	1/9	9	5	1/3	3	1/3	5	1/5	9	5	9	1	1	1/3	9	1/9	5	1/9	5	9	7	7	1	1	7	1	2.19225
7	7	3	3	9	7	1/3	9	7	1	1	3	9	5	3	1/3	1/3	5	9	9	7	1	5	7	9	3	9	7	5	2.89278
1/7	1/5	9	1/3	5	1	1/7	7	1	1	5	1	9	1/7	7	1/3	1/9	3	1	7	1	1/5	1/7	1	3	1/7	5	1	5	0.86913
1	1/5	1	7	7	1/3	7	3	1/9	1/9	3	7	7	1	1/5	1	7	5	1	5	1	5	7	1/3	5	5	1	1	7	2.59266
9	1	5	1/7	1/9	1/5	1/5	7	1/3	9	1/9	1/7	7	7	1/3	5	1	1	1	1/3	3	1/7	1	7	3	1	1	1/7	5	0.74124
1/3	1/5	5	1	1/3	1/9	5	1/5	1/5	5	3	5	5	1/3	1/7	1/3	1/3	5	1/7	1/7	5	1/3	1/7	1	5	1/3	1/7	1/5	1/5	0.55513
1/7	9	1	1/9	3	5	3	1/7	1	1/9	1	3	1/3	1/7	1/3	1/9	3	1/9	1/9	1/5	1/7	3	5	1/3	1/5	1/3	1/7	5	5	0.50065
1	1/7	1/5	1/7	1/5	1/5	1/5	5	1/7	3	1/5	1/3	1/9	1	1/9	3	1/7	5	1/5	1	1/9	1/7	1/3	1/7	1	1/3	1	1/3	3	0.3563
1	9	7	7	1/9	5	7	1/7	1	5	1/9	9	3	3	1	9	1/3	1/5	1/5	1/7	1/3	1/3	9	9	1/7	1/5	7	7	1/5	1.2086
1/3	9	1/3	1/9	9	1/7	9	1/5	1/7	9	1/9	5	1	1/9	1/7	3	5	1	5	7	3	1/5	1/9	1/3	1/9	7	3	1/9	5	0.66861
9	1	5	1/7	1/9	1/5	1/5	7	1/3	9	1/9	1/7	7	7	1/3	5	1	1	1	1/3	3	1/7	1	7	3	1	1	1/7	9	0.75001
1/3	1/3	1/5	1	1	1/5	1/9	1	1/7	1/7	1/7	1/5	1/5	1	1	1	1/3	3	7	1/7	1/5	1/5	3	1/3	1	7	1	1/9	3	0.38247
9	5	1/5	1/5	1/7	9	1	5	9	1/3	9	3	1	1/9	1	7	1/3	5	1	3	1/9	3	1/9	3	1/7	3	7	3	1/3	1.51113
7	5	1	5	5	5	1	1/9	5	5	9	7	1	3	3	3	1	1	1	3	5	7	1/3	9	5	5	1/7	5	5	2.29967
1/7	3	5	3	7	1/9	5	5	1/9	5	1/7	1/7	5	1	5	1/3	1/9	1/9	1/9	1/9	1/9	1/5	1/3	3	1/9	3	1	1	1/9	0.41656
9	7	7	1/9	5	1	9	9	5	1/9	3	1/5	7	7	9	3	5	5	1/7	1/7	5	1/7	1/9	7	5	5	3	5	7	1.80182
1	1/7	1/5	1/7	1/5	1/5	1/5	5	1/7	3	1/5	1/3	1/9	1	1/9	3	1/7	1	1/5	1	1/9	1/7	1/3	1/7	1	1/3	1	1/3	1	0.33752
1/5	1/3	1/7	1/7	9	3	1/9	7	7	1/5	1/9	1	1/3	9	1/3	1/5	9	7	5	1/5	1	1/9	7	1/3	1/3	5	5	1/9	1	0.80131
9	7	9	5	1/5	1	7	9	1/3	1	5	1/3	1/3	1	3	3	9	9	3	1	1/5	5	7	1	1	1/3	3	1/7	3	1.50816

SURVEY RESPONSE PAIRWISE COMPARISONS OF FLOORING ALTERNATIVES UNDER THE RESISTANCE TO EXTERNAL FACTORS

RESPONDENT

R22	R23	R24	R25	R26	R27	R28	R29	R30	R31	R32	R33	R34	R35	R36	R37	R38	R39	R40	R41	R42	R43	R44	R45	R46	R47	R48	R49	R50	GM	
1	1	1	1	1/3	1	3	3	1	3	1	1/3	1	1	3	1	1	3	3	1	1/3	3	1	3	1/3	1/3	1	3	1	1.06814	
1/3	1	3	1/5	3	3	3	1/3	1	3	1/3	1/3	1/3	1	1	3	3	3	1/3	3	1	3	3	1/3	1/3	3	3	1/5	1	0.94874	
7	9	1/9	9	7	9	1/7	1/7	9	9	1/7	7	7	9	9	7	9	9	9	9	7	9	7	7	7	9	1/7	7	1/9	3.44841	
7	7	9	7	1/7	7	7	9	9	9	1/9	7	9	1/7	9	9	9	1/7	7	1/9	9	9	9	9	7	9	7	7	7	3.50081	
7	5	1/9	5	9	7	1/5	5	9	1/9	9	5	7	7	7	7	7	1/7	9	1/5	9	7	5	7	5	5	7	9	1/5	3.1022	
3	5	5	1/3	5	5	5	1/3	1	3	5	3	3	3	1/5	3	1	5	1/5	5	1/7	1	1/7	1/5	1/5	1/7	3	5	1	1.74489	
5	3	5	1	5	5	1/3	5	5	3	3	3	1	5	3	1	1	1	3	1	5	5	1	1	3	3	5	1	3	1.7013	
1	5	5	3	1	1/5	5	3	5	5	1/3	1/3	5	5	5	5	3	3	1	5	5	3	3	5	1/3	3	5	3	3	1.93508	
1	3	1	1/3	1	1	3	1/5	1	1	3	1	1/3	1/3	1/3	1/5	1/3	1/3	1/3	1/3	3	3	3	3	1/3	1/3	3	3	1	0.75385	
1/7	7	7	1/9	7	9	1/7	7	1/7	9	9	9	7	9	9	9	9	9	1/7	7	1/9	7	9	9	1/7	9	7	9	7	3.53617	
9	9	9	7	7	9	9	9	9	9	1/7	1/9	9	7	7	7	9	7	1/9	7	7	7	7	9	9	7	1/9	1/9	7	3.3968	
1/5	1/5	5	5	7	7	7	7	1/7	1/9	7	1/9	9	5	5	7	7	1/7	7	7	7	7	7	7	5	5	1/5	5	9	3.13889	
7	1/7	1/5	7	7	7	3	1/5	5	3	3	3	7	3	1/3	7	7	3	3	7	7	5	7	1/3	5	5	5	5	5	2.7608	
3	5	3	3	1	5	3	5	5	5	1	3	1	5	5	5	1	1	3	5	1	1	3	5	5	1	3	3	5	1.98112	
1	1/5	1	5	1/3	1	1/3	5	1	3	1	1	3	3	1/5	1/5	5	3	5	5	1/5	5	5	1/5	1	5	1	5	5	1.79322	
1/9	9	9	9	9	9	1/7	9	9	9	9	7	9	7	7	7	9	9	7	1/9	7	9	9	9	9	9	9	9	1/7	3.51845	
9	1/9	9	7	1/9	9	1/9	9	9	9	1/9	9	7	9	9	9	9	9	9	1/7	1/7	7	7	1/9	9	7	9	9	1/7	3.53617	
3	5	1/5	3	3	5	7	3	7	5	5	7	5	1/5	3	3	3	3	1/7	3	7	5	1/3	5	1/7	5	3	1/3	3	2.50261	
5	5	1	1	1/5	3	5	1	1/3	3	5	1/3	3	3	5	1	1	1	1/5	5	1	3	3	1	5	1	5	3	1	1.81722	
1/3	1	1	3	1	3	1	1	1/3	3	1/5	3	1/3	1	1	1	1/3	1	3	1/3	1/3	1	3	3	1	1	1	1/3	3	0.83284	
3	1	3	3	1/5	1	1/3	1/5	1	1	1	3	1	1	3	1/3	3	3	1	1/3	1	3	1	3	1	1/3	1/3	1/5	3	0.87919	
1	1	1/3	1	1/5	1/3	3	1	1	1	1	1/3	1	1/3	1/3	1/3	3	3	1	1	1/3	1	3	1/3	1/3	1/3	3	3	3	0.91869	
5	1/5	5	1/5	5	1/3	1/5	3	3	1/5	1/5	1	1	1/5	1	1/5	1	1/3	1/5	3	1/5	1	1/5	1	1/5	1/3	1/5	1/3	5	0.55284	
1/5	3	5	1/5	5	1	1/3	1/5	1/5	1	3	1/5	1/3	1	3	1	1/5	1	1/3	1/3	1/3	1	1/3	1/3	1/5	1/3	1/5	1/3	1	0.5759	
5	1/3	7	1/7	1/5	1/3	1/7	1/5	1/3	1/3	1/7	1/3	1/7	1/7	1/3	1/5	7	1/7	1/5	1/7	1/7	1/5	1/3	1/7	1/5	1/7	1/7	3	1/7	0.38502	
1/5	7	3	1/5	1/7	7	5	1/7	1/5	1/3	5	1/3	1/3	5	1/5	1/7	1/7	1/5	3	7	1/7	1/7	1/3	1/5	1/3	1/5	1/5	1/7	1/3	0.37089	
5	1/7	1/5	1/7	1/5	1/5	3	1/3	1/7	1/5	1/7	1/7	1/7	1/7	3	1/7	7	1/7	1/3	7	1/3	1/7	7	1/3	1/5	1/3	1/7	1/5	1/3	0.38888	
1/5	1/5	5	1/9	7	1/5	1/5	1/9	1/9	1/7	1/9	1/5	1/5	1/7	9	7	1/5	7	1/9	1/5	1/9	1/5	1/5	7	7	1/7	1/5	1/9	1/5	0.33008	
7	1/9	1/7	1/7	1/7	9	1/9	1/9	1/9	1/7	1/9	7	1/7	9	1/7	9	1/9	7	1/9	1/7	1/9	9	1/7	1/7	1/7	1/7	1/7	1/7	1/9	1/9	0.29292
1/7	1/7	7	1/7	1/9	1/7	1/7	1/7	1/9	1/9	1/7	1/9	7	1/7	1/7	1/7	1/7	1/7	1/9	1/7	7	1/7	1/9	1/7	1/7	1/9	1/7	1/7	9	0.28853	
3	1/3	1/3	1	1	1	1/5	1/5	1/3	1	1	1/5	1/5	1	1	1/3	1/3	1/5	1/3	1/5	1/5	3	1	1/3	1	1	1	1	1/5	0.47963	
1	1/5	1/3	1	5	1	1/5	1/3	1	1/5	1	1/3	1	5	1	1/5	1	1/5	1/3	1/3	1	1	1/5	1/3	5	1	1/3	1	1	0.64178	
5	1/3	1/5	1/5	1/5	1/3	1/5	1/3	1/3	1/3	1/5	1	1/5	1/3	1/3	1	1/5	1/3	5	3	3	1/5	1/5	1	3	1/5	1/3	1/5	1/3	0.53368	
1	1	1	1/3	1	1	3	1/3	3	3	3	1	1/3	1	3	1/3	1/3	1/3	3	3	1	1/3	3	1	1/3	1/3	1/3	1/3	3	0.97827	
1	1/5	1	3	1	3	1/3	1	1/3	1	1/3	1/3	1/5	1/5	1/5	1/3	1/3	1/5	1	1/5	1	3	1/3	1/3	1/3	1/5	1/5	1	1/3	0.46921	
1/3	3	3	3	1/3	1	1/3	1	1/3	3	3	1/3	1/3	1	1/3	3	1	1	1	1/3	1/3	1/3	1	3	1	1	1/3	3	1	1.06814	

SURVEY RESPONSE PAIRWISE COMPARISONS OF FLOORING ALTERNATIVES UNDER THE SAFETY

RESPONDENT

R22	R23	R24	R25	R26	R27	R28	R29	R30	R31	R32	R33	R34	R35	R36	R37	R38	R39	R40	R41	R42	R43	R44	R45	R46	R47	R48	R49	R50	GM
1/5	5	1	1	7	1	5	3	3	3	7	5	5	7	1	3	9	3	5	1	5	3	5	3	5	1/3	1	3	5	3.00319
7	7	3	3	9	7	1/3	9	7	1	1	3	9	5	3	1/3	1/3	1/7	9	9	7	5	5	7	9	3	1	7	5	2.66274
7	5	1	5	5	5	1	1/9	5	5	9	9	1	3	3	3	1	1	1	3	9	7	1/3	9	5	5	1/7	5	7	2.37028
7	3	9	1	1	5	3	1/9	3	9	3	1	3	1	3	5	7	1/5	7	5	1/3	1	5	1	3	5	1/3	1	3	1.91184
9	3	1	7	7	5	1	1/5	1	7	3	7	7	3	5	1/3	3	1	5	5	1	3	1	7	3	5	5	7	5	3.00369
1/7	1/5	5	1/5	7	1	1	1/7	1	1/3	1/9	7	3	7	1/7	1/7	5	1/3	1	1/9	3	1/9	1/9	1/5	3	3	1/9	1/3	1/3	0.5295
1/7	9	5	5	5	3	3	5	9	1	9	7	9	1	1	3	7	7	7	1	3	7	5	1	5	7	3	5	3	3.00369
7	9	1	1	5	1/9	7	1	1/5	3	9	7	1	5	1/3	1/3	7	9	7	1	1	1	9	1/3	5	1/9	3	7	5	2.10891
5	5	9	1	3	1	3	5	9	1	1	9	1	9	9	5	3	5	3	7	1	7	5	7	5	3	1	3	3	3.00856
9	5	1	9	3	5	1	9	3	9	5	7	3	9	5	7	5	9	3	1	5	5	3	3	3	5	3	1	3	2.99808
7	5	1/9	5	9	7	1/5	5	9	1/9	9	5	7	7	7	7	1	5	1/5	9	7	5	7	5	5	7	9	5	5	3.22035
1	5	3	1/7	1/9	1/5	1	3	1/3	1	5	7	1/9	3	3	5	1/3	3	3	1/7	3	5	1/5	1	1	3	3	1/7	1/9	1.20862
1	1/7	3	1	1/9	1/5	1/3	3	1/9	1/7	1/9	1/3	1/9	1/5	3	1	1/5	1/5	1/3	1/7	3	1	1/5	1/3	7	1	1/9	1/9	1/5	0.34104
5	1	9	1	5	9	5	5	1	9	9	7	9	1/3	7	1	5	7	1	1	9	9	1/5	7	3	7	3	5	7	2.56609
1	1/5	1	7	7	1/3	7	3	1/9	1/9	3	9	7	1	1/5	1	9	5	1	5	1	5	9	7	5	5	5	1	5	2.86943
1	9	7	9	1/7	3	1/3	7	3	9	1	9	9	1	3	1/7	3	7	1/5	1/5	1/7	3	7	1/5	1/3	9	1	1/3	9	1.44275
1/5	1/9	3	9	9	1/3	1	7	7	1	7	5	5	9	9	3	5	1/5	9	3	9	7	1	3	5	5	3	3	5	2.63119
1	1/7	1/3	1	7	1/7	1/7	1/7	1/9	1/5	1/5	1	1	9	1/7	1/5	1	7	7	5	1/9	7	1/3	3	1/9	1/9	5	1/9	5	0.6939
5	1/3	3	1/7	1/5	1/3	1/7	1/5	1/3	1/3	1/7	1/3	1/7	1/7	1/3	1/5	1	1/7	1/5	1/7	1/7	1/5	1/3	1/7	1/5	1/7	1/3	7	1/3	0.3323
5	3	9	1	1/5	3	5	3	1	3	9	3	1	7	5	1	3	1/3	9	7	3	1/7	3	1/7	1/9	7	3	1	3	2.24058
1/5	5	1	9	1	3	9	7	7	9	7	1/5	7	7	1	5	1	7	1	7	7	1	5	1	5	3	5	3	3	2.71352
1/3	5	5	1/5	1/5	1/7	3	1/7	1/9	7	1	3	1/3	9	1/5	3	1	5	1	3	5	1	7	1/3	7	1/7	1/9	9	3	1.3931
1/7	1	1/9	1/9	5	5	9	5	5	1/3	1/3	1/9	1	7	3	7	3	1/9	1/9	5	3	3	1/7	1/3	1/9	1/5	1	3	3	0.81507
7	1/3	7	1/7	1/5	1/3	1/7	1/5	1/3	1/3	1/7	1/3	1/7	1/7	1/3	1/5	1/3	1/7	1/5	1/7	1/7	1/5	1/3	1/7	1/5	1/7	1/7	7	1/7	0.35679
1/9	1/7	1	1	7	5	1/9	3	1	1/5	7	1	5	5	1/5	1	5	1	1	3	3	1/9	3	1	1/5	1	3	3	1/3	1.36781
1	7	1/9	1	1	1/5	1/3	3	1	5	1	3	1/5	1	1	1/9	1	3	5	1/5	1/9	1/5	1	1/9	1	3	1	9	7	1.03969
1/5	1/5	5	1/9	7	1/5	1/5	1/9	1/9	1/7	1/9	1/5	1/5	1/7	9	7	1/5	7	1/9	1/5	1/9	1/5	1/5	7	7	1/7	1/5	1/9	1/5	0.33008
7	1/9	1/7	1/7	1/7	9	1/9	1/9	1/9	1/7	1/9	7	1/7	9	1/7	9	1/9	7	1/9	1/7	1/3	9	1/7	1/7	1/7	1/7	1/7	1/9	1/9	0.29943
9	9	1/9	3	1/3	1	1	1/5	1	7	3	5	1/7	1	1/9	1/3	1/9	1	3	1/9	3	1/3	5	3	7	1/9	9	9	1/5	0.7971
1/9	9	3	3	3	9	1	9	3	1	1/9	7	1	7	1	7	1/5	1	3	1/7	1/5	1	1/7	1	1/5	1	3	1/3	3	1.5055
3	1/3	1/3	1	1/3	1	1/5	1/5	1/3	1	1	1/5	1/5	1	1	1/3	1/3	1/5	1/3	1/5	1/5	3	1	1/3	1	1	1	1	1/5	0.45901
1	3	1	1/3	1	1	5	3	1/7	3	3	1/5	5	1	1	1/5	1	3	1/7	3	3	3	1	1/3	1/9	3	1/3	1	1/5	1.46041
1	3	1	7	1/5	1	1	7	1	9	1	3	3	1	5	9	5	3	5	3	1	3	5	5	5	3	5	5	5	2.90312
3	1	9	5	5	7	9	3	9	1	9	1	5	1	1/5	7	9	3	9	1	1	7	9	5	1	3	1/3	3	1/5	2.99225
9	1	7	5	5	1	3	3	3	3	7	9	9	5	3	5	5	5	3	7	3	9	1	5	5	3	1	7	3	3.80788
9	1/3	7	1/9	1	1/5	7	1	1	1/7	1	1	1	1/5	3	3	1	1	1/7	9	1/5	7	3	9	1/3	7	3	1	1/3	1.09373

SURVEY RESPONSE PAIRWISE COMPARISONS OF FLOORING ALTERNATIVES UNDER THE SUSTAINABILITY

RESPONDENT

R22	R23	R24	R25	R26	R27	R28	R29	R30	R31	R32	R33	R34	R35	R36	R37	R38	R39	R40	R41	R42	R43	R44	R45	R46	R47	R48	R49	R50	GM
7	5	3	5	7	3	5	5	1/3	1	1/5	3	1/5	7	5	1/5	5	1/7	3	5	1/5	1	1/5	1	3	3	5	3	1	1.7005
1/5	1/7	7	1/9	1/3	1	3	1/9	5	7	1/3	5	3	1/9	1/7	1/7	3	1/7	7	3	1/3	1/9	9	1	1/9	1	3	1/5	3	0.7682
7	1/7	1/5	7	7	7	3	1/5	5	3	3	3	7	3	1/3	7	7	3	3	5	7	5	7	1/3	5	5	3	5	5	2.71441
3	9	9	3	1/9	7	9	7	7	7	3	3	3	9	1/7	3	1/7	3	5	9	1/3	5	1/9	3	5	5	1/5	9	5	2.50097
1/5	7	1	1	1	7	1	3	7	5	1	9	9	5	1	9	5	1	1	1/7	7	1/7	1/5	7	5	5	7	9	7	2.30265
7	5	1/9	5	9	7	1/5	5	9	1/9	9	5	7	7	3	7	7	1/7	5	1/5	9	7	5	7	5	5	7	7	1/5	2.99932
5	3	7	5	3	1/5	5	3	7	1/3	1	5	1	5	3	5	1/5	5	1	3	5	1/9	1/5	3	1/9	1/7	5	3	7	1.50148
5	1/3	5	3	3	5	1/9	3	1	9	1	5	5	7	7	5	1	5	9	5	3	7	3	1	5	1	5	1	9	2.79752
1/5	1/3	1	1/5	5	1	3	1/3	1/3	1/5	1/5	1	1/9	1/7	1/9	1/7	1	1	1/5	1/3	1/5	1	1/5	1/5	1/3	1	9	1/5	1/5	0.42974
1/7	5	5	1/5	7	3	9	1/5	7	1/9	1/7	1/7	3	3	1/3	9	7	5	5	3	1/9	7	7	1	7	1/5	9	1/5	7	1.70627
3	5	3	5	3	7	9	7	7	5	3	1/7	1/3	5	1/5	5	1	5	1/3	1/7	3	1	1/7	1/5	7	1/5	1	1/5	5	1.50339
1	1/7	3	9	3	7	1/5	1	1/5	1/5	5	9	1/3	5	5	1	1	1	1	1	7	1/7	3	7	1/3	9	7	1/5	1/3	1.29946
1/5	5	1	1	7	1/5	1/9	3	3	3	7	5	5	7	1	3	5	1/7	5	1	5	3	5	1	5	5	9	1/5	5	2.10174
1/5	1	1	1	1	3	1/9	1/9	7	5	1/3	1	5	1/9	7	7	1/3	1/9	1/3	5	1/9	5	1/9	5	3	3	3	5	5	0.83454
3	9	9	1/9	3	1/3	9	3	1/7	1/9	3	7	5	5	5	7	1/9	7	7	1/9	1/3	3	1/7	3	9	1/3	9	3	1	1.90195
1/5	9	5	5	7	7	7	7	3	5	7	1/9	9	5	5	7	7	1/7	7	7	7	7	7	7	5	5	1/5	5	1	4.30734
7	7	3	3	9	7	1/3	9	7	1	1	3	9	5	3	1/3	1/3	3	9	9	7	5	5	7	9	3	3	7	5	2.89278
1/5	3	3	3	9	9	1/3	7	3	7	7	5	1/9	7	7	7	5	1/7	3	3	3	7	5	5	7	3	1/9	5	3	2.50117
9	5	5	3	3	5	5	1/9	7	3	7	9	9	7	3	3	1/9	9	9	1/9	3	9	9	3	7	1/7	7	7	1	3.00831
9	7	9	5	1/5	1	7	9	1/3	1	5	1/3	1/3	1	3	3	9	9	3	1	1/5	7	7	1	7	1/3	3	1/3	3	1.60554
7	5	5	1/7	9	9	5	3	9	7	1	9	1	7	3	9	5	3	5	3	9	7	5	7	3	7	1	7	9	2.80143
1	1	5	1/3	1/5	1	5	1/5	3	3	1/7	5	5	1	1/7	1/7	5	1/5	1/5	3	1/5	1	1/3	1	1/7	1/9	1/3	5	1	0.83443
1/9	1/5	1/3	3	1/9	1/9	1/5	1	3	1/5	1/3	1/5	1/5	1/9	1/5	1/7	3	1/9	1/7	1	1/7	1	1/5	1/5	1/9	1/7	1/5	1/9	1/9	0.30075
7	7	1/7	1/3	9	7	1	1/3	1/7	5	9	5	1	1	9	7	1/9	3	9	9	3	9	1/5	7	1/3	3	1	7	7	1.30138
1/5	1/7	1/5	5	3	1/9	3	1/7	1/9	1/7	5	1/3	1	1	1/5	3	5	1/9	3	1/3	1/7	1/5	3	1	1/9	1/5	1/9	1	5	0.50315
1/7	1/7	1/7	7	1/7	1	1	1	3	1/7	1	3	1/7	1/7	1/5	3	1/3	7	9	1/3	5	9	1	1	1/3	1	3	3	5	1.10498
1/7	1/9	1	1	7	1/5	5	1/5	7	7	3	1/3	1/3	3	1/3	1/9	1/9	5	1/9	5	1/9	1	3	1/7	1/3	1/7	5	5	3	0.83159
1/9	5	3	1	7	3	1/7	1	7	1/3	9	1/3	5	3	5	1	3	1	5	1/5	5	5	7	3	1	5	3	3	5	1.501
3	5	1	1	1/5	1/9	1/9	1/9	1/7	1/5	1/3	1/7	1/7	3	1/9	1/3	1/9	1/3	1/9	1	5	7	1/9	1	1/5	1/3	1/9	3	1	0.55421
1	5	1/3	5	1	1/5	5	5	1/7	3	5	3	1/7	5	1	1	1/7	1	3	3	5	3	1/7	3	3	1/7	1/5	3	1	1.30188
1/7	5	9	3	5	1	1	5	1/5	1/3	3	1	7	3	1	7	7	1	7	9	1	1/5	3	1	7	9	7	3	1	1.79857
1/5	3	1/9	1/7	5	1	3	1/5	5	1/3	1/3	1/7	1/3	1/7	1/5	1/9	1/7	1/3	1	1/3	1/9	7	3	1/5	1/3	1/5	1/3	1	1/9	0.62595
1	3	3	9	1/5	9	9	5	7	9	5	9	3	1/3	5	9	1/5	1	9	7	7	1	1/7	5	5	1	1/5	3	3	1.60531
1/7	1/5	1	3	1/9	1/3	1/7	1	1/5	3	1/9	1/7	1	1/7	1/7	1/7	1	1/3	3	1/3	1/9	1/3	1/3	1/3	1/9	1	1/5	1	1/7	0.40176
1/9	3	1/7	1/3	1/7	7	5	1/7	1/3	7	5	1/3	1/3	1/5	1/3	1/9	1/5	1/9	5	5	1/5	1	5	1	3	7	5	1	3	0.8332
1	9	7	7	1	5	7	7	1	5	7	9	3	3	1	7	5	1	1	3	5	3	5	3	1	5	7	5	1/5	2.20419

SURVEY RESPONSE PAIRWISE COMPARISONS OF FLOORING ALTERNATIVES UNDER THE USER PREFERENCE

RESPONDENT

R22	R23	R24	R25	R26	R27	R28	R29	R30	R31	R32	R33	R34	R35	R36	R37	R38	R39	R40	R41	R42	R43	R44	R45	R46	R47	R48	R49	R50	GM
1	1/5	1/9	9	7	7	5	1/5	7	1/3	5	5	1/3	7	1	5	9	1/3	9	5	3	1	9	1	9	5	7	7	3	2.72256
3	9	9	7	1/3	3	3	9	7	9	1	7	1	5	1	3	1	3	1/9	1	5	1	1/3	7	9	1	3	3	7	2.00015
9	9	1	1	5	3	9	9	7	5	5	9	5	3	3	5	3	5	7	3	3	1	7	1	5	5	1	3	7	3.49713
7	1	1	3	9	9	5	1/3	7	7	5	1	9	9	1	3	7	7	1	5	1/5	1	3	1/5	3	1	3	1	1/9	2.07987
3	5	1/9	3	1	7	7	3	1/9	3	1/9	1/3	1/7	7	1	1/7	1/5	9	1	9	7	9	3	1/5	1	1	3	5	3	1.47541
5	1	3	5	7	3	1	3	3	7	9	5	5	1	7	5	5	1	5	5	1	3	7	3	1	5	7	9	1	3.21408
3	1	7	5	7	5	1	3	9	7	5	1	1	9	7	3	7	1	1	9	1	7	9	3	7	1	3	5	1	3.35194
9	7	7	1	7	3	7	5	5	9	3	5	5	7	7	5	3	9	7	1	5	9	5	1	9	7	5	1	5	4.00421
1/5	1/7	1/5	1/7	3	1	1/5	1/7	9	1/3	1/5	3	1/7	1	1/7	1	7	1/7	1/3	1	1/7	1/9	1/3	1/5	1/9	1	1/5	1/7	1/7	0.48064
1/5	3	5	1	1	5	3	3	3	1/3	1/9	1/3	1/9	3	1	1	5	1/7	1	3	1/5	3	1/5	5	3	5	1	9	9	1.72435
1/3	5	1/5	9	1/3	7	5	1	1/7	1/7	1/9	7	1/5	3	7	1/3	9	1	1/7	5	1/9	1	9	1/7	1/3	1/3	9	3	7	1.17053
1/9	7	1/7	3	1/7	1/9	1/7	1/7	9	1/5	1/9	3	1/9	7	1	1	1/3	1	1/9	1	9	3	9	3	1/7	7	7	1/3	3	0.7837
1/7	7	7	1	7	3	7	5	5	1/9	3	5	5	7	1	1	3	1/9	5	3	5	1	1/9	1	1/9	5	3	7	5	1.91884
1	3	1/7	3	3	7	1	1	9	1	1/7	7	9	1/7	1/9	1/3	5	5	3	3	3	1/5	5	1/5	1	7	3	5	5	1.98433
3	1/5	1	3	3	3	7	1	5	1	9	1	3	9	7	3	1/7	5	1	9	1	5	7	1	3	1/3	9	7	1/7	2.42195
7	1	5	1/7	1/9	5	1	5	7	3	5	9	5	1/5	7	1	5	1/7	5	9	3	7	5	9	1	3	7	9	5	2.42254
5	9	7	5	1/5	1/7	9	1/7	7	1	3	1	7	3	7	3	7	9	1/3	1/7	5	1/5	5	5	1	1/5	1	5	1/7	1.65558
9	1/5	1/7	9	1/5	5	1/9	1/9	1/9	9	1	9	1/9	9	1/7	1/5	1/3	1/3	5	1/9	7	7	5	1/7	1/3	1/3	3	1	7	1.18025
5	1	7	1	5	1/9	9	1/3	1	9	7	5	9	7	7	5	5	1/5	7	5	9	9	9	7	9	3	3	3	1/3	3.10195
5	7	7	7	9	7	9	1	7	5	3	3	1	9	3	1	1	9	3	7	5	3	5	7	1	5	1	9	7	3.25683
1	3	5	9	7	7	5	9	7	5	5	5	7	7	1	5	9	5	3	5	3	1	9	1	7	5	7	5	1	3.74908
1/9	1/9	1/3	1/9	5	1	7	1	3	5	7	1/5	3	1/5	1/5	5	3	5	1/5	1	1/9	1	1/5	1/3	1/5	1/7	1/3	1/9	5	0.7352
1/9	9	1/3	1/9	1/3	1/5	1/9	1/9	1/5	1	3	1/7	5	1	1/7	5	1/7	1/3	1/7	3	1	3	1/3	1/3	1/3	1/3	1/3	1/9	1	0.53126
1	3	3	1/3	3	7	1/5	5	3	1/9	7	1	7	1	1/3	1	7	1/9	5	3	1	1/5	1	5	1/7	1/5	1	1	1/3	1.18044
5	5	1/3	1	7	5	1/7	7	1/9	1	1/3	1/3	1/7	1	1/9	3	3	1/7	3	1/5	1/5	5	3	5	3	3	1	3	1	1.22948
3	5	1/9	3	1	7	7	3	1/9	3	1/9	1/3	1/7	7	1	1/7	1/5	9	1	9	7	9	3	1/5	1	1	3	5	3	1.47541
1/3	1/9	1/7	1/7	1/3	7	1/9	3	9	1/9	1/7	7	9	9	3	9	9	1/3	1/3	1/9	1	7	7	1/3	1	1/9	1/9	1	1/3	0.75281
1/3	1/7	1/5	9	1/7	3	1	1/7	9	1	7	1/7	7	1/5	3	1/5	9	3	9	1/9	5	1/5	9	5	7	1/7	9	7	1	1.47027
1/3	1/3	3	1/5	5	1	3	7	1/3	1/9	1/3	1	1/3	1	3	5	1/3	3	3	1/5	3	1	3	1	7	1/9	1	3	9	1.5844
3	3	5	5	1/9	1/5	7	1	3	1/5	3	1/3	7	3	1/3	1/3	3	1	5	3	1	3	1/5	1/3	1	1/9	1/5	3	1	1.81663
9	9	7	9	5	3	1	1	7	7	1	1	1/3	7	1	1	5	9	5	7	5	7	9	9	7	9	3	3	1/5	2.49288
1	1	9	5	3	1	7	3	1	9	5	7	7	1	7	7	3	3	7	5	1	3	5	7	1	5	3	5	1	2.89842
7	9	3	9	1	7	9	5	1/5	1/7	7	9	1/3	1	3	9	5	9	1	5	3	5	5	3	3	7	5	7	9	3.21277
1/5	7	9	1	1	1	1/7	1/3	1/9	3	5	5	1/7	1	5	1/7	1/3	7	9	7	1/9	1/3	7	1/5	1/7	1/7	3	1/7	7	1.12193
1/5	9	1/3	7	1/3	1/5	5	1/9	1/7	1/5	7	1/7	1/7	7	7	9	1/9	1	3	5	1/5	1/3	7	7	1/5	7	3	3	5	1.27579
1/3	1/3	1	1/5	3	1	1/7	1/9	5	1/5	3	1/3	7	3	3	1	1	1/5	3	7	5	1/9	5	5	1	3	3	3	1	1.225

CRITERIA PAIRWISE COMPARISON

	Initial Cost	Maintenance Cost	Installation Cost	Durability	Resistance to External Factors	Ease of Installation	Appearance	Design Compatibility	User Preference	Local Availability	Comfort	Safety	Sustainability	Recyclability	Environmental Impact
Initial Cost	1.000	2.51909243	5.021852	1.202563	1.50099101	4.50157319	1.80533245	2.004870953	1.8991733	2.50199519	2.021517	2.4945062	3.019568666	3.509639773	4.00742785
Maintenance Cost	1.000	1.000	2.509912	1.005204	1.20256317	3.09139683	1.50855441	1.709455888	1.5952269	2.02151729	1.695101	1.9909374	2.49814703	3.00930057	3.49484784
Installation Cost	0.199	0.398420345	1.000	0.802742	0.90186024	1.20256317	1	1.202563175	1.1045972	1.49346552	1.198181	1.4960113	2.001459251	2.494915196	3.00979394
Durability	0.831557145	0.994823222	1.2457309	1.000	1.10307915	1.39310007	1.19653391	1.393328472	1.2996925	1.80181936	1.398196	1.7959866	2.208129928	2.686822816	3.29776592
Resistance to External Factors	0.666226509	0.831557145	1.1088193	0.906553	1.000	1.19837706	1.10307915	1.301694594	1.1983771	1.59833723	1.295381	1.6066545	1.902876215	2.386868789	2.90359225
Ease of Installation	0.222144561	0.323478368	0.8315571	0.717824	0.8344619	1.000	0.90186024	1.103079149	1	1.4048972	1.022215	1.3954748	1.695101337	2.208129928	2.70912479
Appearance	0.5539146	0.662886264	1	0.835747	1	1.10881926	1.000	1.20441561	1.0935488	1.49576607	1.196338	1.5064811	1.808852385	2.299296932	2.76976314
Design Compatibility	0.49878522	0.584981459	0.8315571	0.717706	0.76822936	0.90655326	0.83027818	1.000	0.8959585	1.29769356	1	1.2931763	1.595226945	2.10497962	2.59770661
User Preference	0.526544889	0.626870053	0.9053073	0.769413	0.8344619	1	0.91445392	1.116123174	1.000	1.40250648	1.097549	1.3933285	1.669732876	2.197059075	2.70584508
Local Availability	0.399681024	0.494677936	0.6695836	0.554995	0.62565019	0.71179585	0.66855374	0.77059795	0.7130092	1.000	0.802742	1	1.29969254	1.801819358	2.29985962
Comfort	0.494677936	0.589935232	0.8345987	0.715208	0.77197386	0.97826739	0.83588433	1	0.9111213	1.24573094	1.000	1.1946936	1.49831576	2.022011994	2.50666493
Safety	0.40088094	0.502275974	0.6684442	0.556797	0.62241134	0.716602	0.66379855	0.773289767	0.7177059	1	0.837035	1.000	1.299905623	1.805036513	2.49691873
Sustainability	0.331173128	0.400296695	0.4996355	0.452872	0.52552026	0.58993523	0.55283671	0.626870053	0.5988982	0.76941274	0.667416	0.7692866	1.000	1.49831576	2.00145925
Recyclability	0.284929527	0.33230313	0.4008152	0.372187	0.41895893	0.4528719	0.43491555	0.475063982	0.4551539	0.55499459	0.494557	0.5540054	0.667416059	1.000	1.49285538
Environmental Impact	0.24953662	0.28613549	0.3322487	0.303236	0.34440097	0.3691229	0.3610417	0.384954943	0.3695703	0.43480915	0.398936	0.4004936	0.499635453	0.669857251	1.000
SUM	7.659	10.548	17.860	10.913	12.455	19.221	13.777	16.066	14.852	20.023	16.125	19.891	24.664	31.694	39.294

TABLE CRITERIA PAIRWISE COMPARISON MATRIX

	Initial Cost	Maintenance Cost	Installation Cost	Durability	Resistance to External Factors	Ease of Installation	Appearance	Design Compatibility	User Preference	Local Availability	Comfort	Safety	Sustainability	Recyclability	Environmental Impact	Average	lmda	Consistency Index CI	Rondom lbdex RI	Consistency ratio CR
Initial Cost	0.131	0.239	0.281	0.110	0.121	0.234	0.131	0.125	0.128	0.125	0.125	0.125	0.122	0.111	0.102	0.147	15.74953	0.053537749	1.59	0.03367154
Maintenance Cost	0.131	0.095	0.141	0.092	0.097	0.161	0.109	0.106	0.107	0.101	0.105	0.100	0.101	0.095	0.089	0.109	15.50543			
Installation Cost	0.026	0.038	0.056	0.074	0.072	0.063	0.073	0.075	0.074	0.075	0.074	0.075	0.081	0.079	0.077	0.067	15.10987			
Durability	0.109	0.094	0.070	0.092	0.089	0.072	0.087	0.087	0.088	0.090	0.087	0.090	0.090	0.085	0.084	0.087	15.3079			
Resistance to External Factors	0.087	0.079	0.062	0.083	0.080	0.062	0.080	0.081	0.081	0.080	0.080	0.081	0.077	0.075	0.074	0.078	15.27479			
Ease of Installation	0.029	0.031	0.047	0.066	0.067	0.052	0.065	0.069	0.067	0.070	0.063	0.070	0.069	0.070	0.069	0.060	15.09099			
Appearance	0.072	0.063	0.056	0.077	0.080	0.058	0.073	0.075	0.074	0.075	0.074	0.076	0.073	0.073	0.070	0.071	15.2316			
Design Compatibility	0.065	0.055	0.047	0.066	0.062	0.047	0.060	0.062	0.060	0.065	0.062	0.065	0.065	0.066	0.066	0.061	15.23098			
User Preference	0.069	0.059	0.051	0.071	0.067	0.052	0.066	0.069	0.067	0.070	0.068	0.070	0.068	0.069	0.069	0.066	15.23248			
Local Availability	0.052	0.047	0.037	0.051	0.050	0.037	0.049	0.048	0.048	0.050	0.050	0.050	0.053	0.057	0.059	0.049	15.22927			
Comfort	0.065	0.056	0.047	0.066	0.062	0.051	0.061	0.062	0.061	0.062	0.062	0.060	0.061	0.064	0.064	0.060	15.24963			
Safety	0.052	0.048	0.037	0.051	0.050	0.037	0.048	0.048	0.048	0.050	0.052	0.050	0.053	0.057	0.064	0.050	15.22298			
Sustainability	0.043	0.038	0.028	0.041	0.042	0.031	0.040	0.039	0.040	0.038	0.041	0.039	0.041	0.047	0.051	0.040	15.2142			
Recyclability	0.037	0.032	0.022	0.034	0.034	0.024	0.032	0.030	0.031	0.028	0.031	0.028	0.027	0.032	0.038	0.030	15.25759			
Environmental Impact	0.033	0.027	0.019	0.028	0.028	0.019	0.026	0.024	0.025	0.022	0.025	0.020	0.020	0.021	0.025	0.024	15.31025			
SUM	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	MAX	15.7495			

TABLE;- Nnormalized Matrix, Average normalized values ,principal eigenvalue/lambda value of criteria and Consistency Ratio

PAIRWISE COMPARISON OF ALTERNATIVES FOR THE APPEARANCE CRITERION

	Porcelain/Ceramic Tiles	Natural Stone Flooring	Concrete-Based Flooring	Wood Flooring	Engineered Wood Flooring	Vinyl Flooring	Rubber Flooring	Terrazzo	Epoxy Flooring
Porcelain/Ceramic Tiles	1.000	0.36602369	1.5500933	0.44479554	0.56649777	1.75681258	2.26396093	0.67197694	2.74538297
Natural Stone Flooring	2.73206362	1.000	3.25683231	1.2543479	1.74771865	3.74908157	4.26250537	2.25316142	4.75016479
Concrete-Based Flooring	0.64512246	0.30704682	1.000	0.35745964	0.43803086	1.50330314	1.75098484	0.57319678	2.50117549
Wood Flooring	2.24822399	0.79722699	2.79751866	1.000	1.50355081	3.24682176	3.74754991	1.74814635	4.24802095
Engineered Wood Flooring	1.765232	0.57217448	2.2829442	0.66509225	1.000	2.75475	3.25075848	1.50586689	3.76187314
Vinyl Flooring	0.56921268	0.26673199	0.66520183	0.3079935	0.36300935	1.000	1.50843229	0.44170338	1.7474339
Rubber Flooring	0.44170374	0.23460381	0.57110717	0.26684101	0.30762052	0.66293993	1.000	0.36057455	1.49856111
Terrazzo	1.4881463	0.44382084	1.74460156	0.57203449	0.66406932	2.26396274	2.77335156	1.000	3.24629148
Epoxy Flooring	0.36424791	0.21051901	0.39981201	0.23540374	0.26582502	0.57226771	0.66730679	0.30804381	1.000
SUM	11.254	4.198	14.268	5.104	6.856	17.510	21.225	8.863	25.499

TABLE PAIRWISE COMPARISON OF ALTERNATIVES FOR THE APPEARANCE CRITERION MATRIX

	Porcelain/Ceramic Tiles	Natural Stone Flooring	Concrete-Based Flooring	Wood Flooring	Engineered Wood Flooring	Vinyl Flooring	Rubber Flooring	Terrazzo	Epoxy Flooring	Average	lambda	Consistency Index CI	Rondom ibdex RI	Consistency ratio CR
Porcelain/Ceramic Tiles	0.089	0.087	0.109	0.087	0.083	0.100	0.107	0.076	0.108	0.094	9.067799	0.012888018	1.45	0.0088883
Natural Stone Flooring	0.243	0.238	0.228	0.246	0.255	0.214	0.201	0.254	0.186	0.229	9.103104			
Concrete-Based Flooring	0.057	0.073	0.070	0.070	0.064	0.086	0.082	0.065	0.098	0.074	9.038596			
Wood Flooring	0.200	0.190	0.196	0.196	0.219	0.185	0.177	0.197	0.167	0.192	9.099868			
Engineered Wood Flooring	0.157	0.136	0.160	0.130	0.146	0.157	0.153	0.170	0.148	0.151	9.100905			
Vinyl Flooring	0.051	0.064	0.047	0.060	0.053	0.057	0.071	0.050	0.069	0.058	9.035084			
Rubber Flooring	0.039	0.056	0.040	0.052	0.045	0.038	0.047	0.041	0.059	0.046	9.030579			
Terrazzo	0.132	0.106	0.122	0.112	0.097	0.129	0.131	0.113	0.127	0.119	9.0816			
Epoxy Flooring	0.032	0.050	0.028	0.046	0.039	0.033	0.031	0.035	0.039	0.037	9.039421			
SUM	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	Max	9.103			

TABLE;- Nnormalized Matrix, Average normalized values ,principal eigenvalue/lambda value of criteria and Consistency Ratio

PAIRWISE COMPARISON OF ALTERNATIVES FOR THE COMFORT CRITERION

	Porcelain/Ceramic Tiles	Natural Stone Flooring	Concrete-Based Flooring	Wood Flooring	Engineered Wood Flooring	Vinyl Flooring	Rubber Flooring	Terrazzo	Epoxy Flooring
Porcelain/Ceramic Tiles	1.000	2.00795927	1.20812905	0.24988004	0.33018266	0.50599788	0.20566085	1.00813766	2.00861773
Natural Stone Flooring	0.49801807	1.000	0.66774438	0.17725918	0.20357041	0.2489901	0.14859079	1.01165924	1.66176795
Concrete-Based Flooring	0.82772615	1.49757906	1.000	0.21967412	0.25882895	0.33018266	1.73838609	0.82711675	1.49285538
Wood Flooring	4.00192028	5.64145685	4.5521976	1.000	1.49285538	2.00795927	0.66774438	2.97893947	6.07051996
Engineered Wood Flooring	3.02862662	4.91230536	3.86355549	0.66985725	1.000	1.49116852	0.50599788	2.00795927	5.03041224
Vinyl Flooring	1.97629286	4.01622393	3.02862662	0.49801807	0.67061502	1.000	0.33018266	1.49285538	3.95481597
Rubber Flooring	4.86237423	6.72989198	0.5752462	1.49757906	1.97629286	3.02862662	1.000	2.00648745	6.97158949
Terrazzo	0.99192803	0.98847513	1.20901916	0.33568994	0.49801807	0.66985725	0.49838338	1.000	2.97893947
Epoxy Flooring	0.49785481	0.60176874	0.66985725	0.16473053	0.19879086	0.25285627	0.14343931	0.33568994	1.000
SUM	17.685	27.396	16.774	4.813	6.629	9.536	5.238	12.669	31.170

TABLE PAIRWISE COMPARISON OF ALTERNATIVES FOR THE COMFORT CRITERION MATRIX

	Porcelain/Ceramic Tiles	Natural Stone Flooring	Concrete-Based Flooring	Wood Flooring	Engineered Wood Flooring	Vinyl Flooring	Rubber Flooring	Terrazzo	Epoxy Flooring	Average	lambda	Consistency Index CI	Random index RI	Consistency ratio CR
Porcelain/Ceramic Tiles	0.089	0.478	0.085	0.049	0.048	0.029	0.010	0.114	0.079	0.109	8.276095	0.624700418	1.45	0.4308279
Natural Stone Flooring	0.044	0.238	0.047	0.035	0.030	0.014	0.007	0.114	0.065	0.066	8.746857			
Concrete-Based Flooring	0.074	0.357	0.070	0.043	0.038	0.019	0.082	0.093	0.059	0.093	13.9976			
Wood Flooring	0.356	1.344	0.319	0.196	0.218	0.115	0.031	0.336	0.238	0.350	9.204297			
Engineered Wood Flooring	0.269	1.170	0.271	0.131	0.146	0.085	0.024	0.227	0.197	0.280	8.730882			
Vinyl Flooring	0.176	0.957	0.212	0.098	0.098	0.057	0.016	0.168	0.155	0.215	8.248086			
Rubber Flooring	0.432	1.603	0.040	0.293	0.288	0.173	0.047	0.226	0.273	0.375	9.658065			
Terrazzo	0.088	0.235	0.085	0.066	0.073	0.038	0.023	0.113	0.117	0.093	11.77957			
Epoxy Flooring	0.044	0.143	0.047	0.032	0.029	0.014	0.007	0.038	0.039	0.044	10.3369			
SUM	1.571	6.526	1.176	0.943	0.967	0.545	0.247	1.429	1.222	Max	13.998			

TABLE;- Nnormalized Matrix, Average normalized values ,principal eigenvalue/lambda value of criteria and Consistency Ratio

PAIRWISE COMPARISON OF ALTERNATIVES FOR THE DESIGN COMPATIBILITY CRITERION

	Porcelain/Ceramic Tiles	Natural Stone Flooring	Concrete-Based Flooring	Wood Flooring	Engineered Wood Flooring	Vinyl Flooring	Rubber Flooring	Terrazzo	Epoxy Flooring
Porcelain/Ceramic Tiles	1.000	2.99784214	5.00641625	1.50318175	1.50318175	1.47816582	2.50502782	3.96961688	4.97202379
Natural Stone Flooring	0.33357327	1.000	1.99367735	0.50073212	0.50317279	0.66985725	2.00048001	2.99735073	0.50747477
Concrete-Based Flooring	0.19974368	0.50158568	1.000	0.33308712	0.33176444	0.50661119	1.49540011	1.9974032	0.26013317
Wood Flooring	0.66525555	1.99707578	3.00221758	1.000	0.85911037	1.49856141	3.04882272	3.99772111	1.01026888
Engineered Wood Flooring	0.66525555	1.98738886	3.01418682	1.16399479	1.000	1.49564528	3.02371696	4.01070427	1.00520372
Vinyl Flooring	0.67651409	1.49285538	1.97390033	0.66730665	0.66860773	1.000	2.01056031	3.02862662	0.80802931
Rubber Flooring	0.39919716	0.49988003	0.66871735	0.32799546	0.33071879	0.49737379	1.000	2.00779712	0.74885535
Terrazzo	0.25191348	0.33362796	0.50065004	0.25014251	0.24933277	0.33018266	0.49805829	1.000	0.60303942
Epoxy Flooring	0.20112534	1.97054133	3.84418487	0.9898355	0.99482322	1.23757887	1.33537138	1.65826637	1.000
SUM	4.393	12.781	21.004	6.736	6.441	8.714	16.917	24.667	10.915

TABLE PAIRWISE COMPARISON OF ALTERNATIVES FOR THE DESIGN COMPATIBILITY CRITERION MATRIX

	Porcelain/Ceramic Tiles	Natural Stone Flooring	Concrete-Based Flooring	Wood Flooring	Engineered Wood Flooring	Vinyl Flooring	Rubber Flooring	Terrazzo	Epoxy Flooring	Average	lambda	Consistency Index CI	Rondom ibdex RI	Consistency ratio CR
Porcelain/Ceramic Tiles	0.089	0.714	0.351	0.295	0.219	0.084	0.118	0.448	0.195	0.279	10.67683	0.209603965	1.45	0.1445545
Natural Stone Flooring	0.030	0.238	0.140	0.098	0.073	0.038	0.094	0.338	0.020	0.119	8.547073			
Concrete-Based Flooring	0.018	0.119	0.070	0.065	0.048	0.029	0.070	0.225	0.010	0.073	8.699752			
Wood Flooring	0.059	0.476	0.210	0.196	0.125	0.086	0.144	0.451	0.040	0.198	9.036898			
Engineered Wood Flooring	0.059	0.473	0.211	0.228	0.146	0.085	0.142	0.453	0.039	0.204	9.072334			
Vinyl Flooring	0.060	0.356	0.138	0.131	0.098	0.057	0.095	0.342	0.032	0.145	9.183732			
Rubber Flooring	0.035	0.119	0.047	0.064	0.048	0.028	0.047	0.227	0.029	0.072	9.857132			
Terrazzo	0.022	0.079	0.035	0.049	0.036	0.019	0.023	0.113	0.024	0.045	10.60865			
Epoxy Flooring	0.018	0.469	0.269	0.194	0.145	0.071	0.063	0.187	0.039	0.162	9.158759			
SUM	0.390	3.044	1.472	1.320	0.939	0.498	0.797	2.783	0.428	Max	10.677			

TABLE;- Nnormalized Matrix, Average normalized values ,principal eigenvalue/lambda value of criteria and Consistency Ratio

PAIRWISE COMPARISON OF ALTERNATIVES FOR THE DURABILITY CRITERION

	Porcelain/Ceramic Tiles	Natural Stone Flooring	Concrete-Based Flooring	Wood Flooring	Engineered Wood Flooring	Vinyl Flooring	Rubber Flooring	Terrazzo	Epoxy Flooring
Porcelain/Ceramic Tiles	1.000	0.41107696	1.1128772	4.47044016	4.59886656	4.02044359	3.84934394	3.39750947	2.9922277
Natural Stone Flooring	2.43263449	1.000	1.92762082	6.12821947	6.26950035	5.63144749	5.44170573	4.9406457	4.49163127
Concrete-Based Flooring	0.89857173	0.51877423	1.000	4.81301216	4.94511376	4.34908646	4.17216793	3.7040491	3.28288154
Wood Flooring	0.22369162	0.16317953	0.2077701	1.000	1.17133725	0.63204845	0.55893363	0.43275135	0.3636202
Engineered Wood Flooring	0.21744488	0.15950234	0.20221982	0.85372509	1.000	0.57648857	0.51613739	0.40788893	0.34640497
Vinyl Flooring	0.24872877	0.17757424	0.22993335	1.58215719	1.73463976	1.000	0.81038176	0.55564957	0.44225403
Rubber Flooring	0.25978453	0.18376591	0.23968355	1.78912117	1.93746864	1.23398631	1.000	0.62687299	0.48314746
Terrazzo	0.29433325	0.20240269	0.26997482	2.31079582	2.45164782	1.79969543	1.59521946	1.000	0.65054329
Epoxy Flooring	0.33419917	0.22263626	0.30461044	2.75012221	2.88679457	2.26114389	2.06976149	1.53717672	1.000
SUM	5.909	3.039	5.495	25.698	26.995	21.504	20.014	16.603	14.053

TABLE PAIRWISE COMPARISON OF ALTERNATIVES FOR THE DURABILITY CRITERION MATRIX

	Porcelain/Ceramic Tiles	Natural Stone Flooring	Concrete-Based Flooring	Wood Flooring	Engineered Wood Flooring	Vinyl Flooring	Rubber Flooring	Terrazzo	Epoxy Flooring	Average	lambda	Consistency Index CI	Random index RI	Consistency ratio CR
Porcelain/Ceramic Tiles	0.089	0.098	0.078	0.876	0.671	0.230	0.181	0.383	0.117	0.303	10.26795	0.285417521	1.45	0.1968397
Natural Stone Flooring	0.216	0.238	0.135	1.201	0.914	0.322	0.256	0.557	0.176	0.446	11.28334			
Concrete-Based Flooring	0.080	0.124	0.070	0.943	0.721	0.248	0.197	0.418	0.129	0.325	10.0812			
Wood Flooring	0.020	0.039	0.015	0.196	0.171	0.036	0.026	0.049	0.014	0.063	9.078295			
Engineered Wood Flooring	0.019	0.038	0.014	0.167	0.146	0.033	0.024	0.046	0.014	0.056	9.525659			
Vinyl Flooring	0.022	0.042	0.016	0.310	0.253	0.057	0.038	0.063	0.017	0.091	8.230088			
Rubber Flooring	0.023	0.044	0.017	0.351	0.283	0.070	0.047	0.071	0.019	0.103	8.17769			
Terrazzo	0.026	0.048	0.019	0.453	0.358	0.103	0.075	0.113	0.026	0.136	8.268849			
Epoxy Flooring	0.030	0.053	0.021	0.539	0.421	0.129	0.098	0.173	0.039	0.167	8.54284			
SUM	0.525	0.724	0.385	5.035	3.937	1.228	0.943	1.873	0.551	Max	11.283			

TABLE;- Nnormalized Matrix, Average normalized values ,principal eigenvalue/lambda value of criteria and Consistency Ratio

PAIRWISE COMPARISON OF ALTERNATIVES FOR THE ENVIRONMENTAL CRITERION

	Porcelain/Ceramic Tiles	Natural Stone Flooring	Concrete-Based Flooring	Wood Flooring	Engineered Wood Flooring	Vinyl Flooring	Rubber Flooring	Terrazzo	Epoxy Flooring
Porcelain/Ceramic Tiles	1.000	3.07527988	3.01326105	2.5237514	2.78184587	2.72685874	2.9268085	3.01239375	2.71407892
Natural Stone Flooring	0.32517366	1.000	0.96370832	2.46703484	1.33943492	2.61944251	2.80103456	0.90768822	2.97859534
Concrete-Based Flooring	0.33186637	1.03765836	1.000	3.08507238	1.90448639	2.73638419	3.01727771	0.9250046	2.75973294
Wood Flooring	0.39623554	0.4053449	0.3241415	1.000	0.340399	0.3556329	2.75882826	0.37106164	1.22276715
Engineered Wood Flooring	0.35947355	0.74658349	0.52507595	2.93772899	1.000	0.33575834	1.60821335	0.38303426	1.40066841
Vinyl Flooring	0.36672233	0.38176062	0.36544576	2.81188831	2.97833256	1.000	2.64998118	0.36724303	2.6493244
Rubber Flooring	0.34166909	0.35701095	0.33142458	0.36247273	0.62180805	0.37736117	1.000	0.35564	1.60626144
Terrazzo	0.33196192	1.10169987	1.0810757	2.69497001	2.61073249	2.72299245	2.81183216	1.000	2.80660606
Epoxy Flooring	0.36844912	0.33572872	0.3623539	0.8178172	0.71394485	0.37745472	0.62256366	0.35630223	1.000
SUM	3.822	8.441	7.966	18.701	14.291	13.252	20.197	7.678	19.138

TABLE PAIRWISE COMPARISON OF ALTERNATIVES FOR THE ENVIRONMENTAL CRITERION MATRIX

	Porcelain/Ceramic Tiles	Natural Stone Flooring	Concrete-Based Flooring	Wood Flooring	Engineered Wood Flooring	Vinyl Flooring	Rubber Flooring	Terrazzo	Epoxy Flooring	Average	lambda	Consistency Index CI	Rondom ibdex RI	Consistency ratio CR
Porcelain/Ceramic Tiles	0.089	0.733	0.211	0.494	0.406	0.156	0.138	0.340	0.106	0.297	11.08072	0.33108721	1.45	0.228336
Natural Stone Flooring	0.029	0.238	0.068	0.483	0.195	0.150	0.132	0.102	0.117	0.168	10.27333			
Concrete-Based Flooring	0.029	0.247	0.070	0.604	0.278	0.156	0.142	0.104	0.108	0.193	9.731343			
Wood Flooring	0.035	0.097	0.023	0.196	0.050	0.020	0.130	0.042	0.048	0.071	10.01184			
Engineered Wood Flooring	0.032	0.178	0.037	0.576	0.146	0.019	0.076	0.043	0.055	0.129	7.516586			
Vinyl Flooring	0.033	0.091	0.026	0.551	0.434	0.057	0.125	0.041	0.104	0.162	8.368788			
Rubber Flooring	0.030	0.085	0.023	0.071	0.091	0.022	0.047	0.040	0.063	0.052	11.6487			
Terrazzo	0.029	0.262	0.076	0.528	0.381	0.156	0.132	0.113	0.110	0.199	9.949538			
Epoxy Flooring	0.033	0.080	0.025	0.160	0.104	0.022	0.029	0.040	0.039	0.059	10.30716			
SUM	0.340	2.011	0.558	3.664	2.084	0.757	0.952	0.866	0.751	Max	11.649			

TABLE;- Nnormalized Matrix, Average normalized values ,principal eigenvalue/lambda value of criteria and Consistency Ratio

PAIRWISE COMPARISON OF ALTERNATIVES FOR THE INITIAL COST CRITERION

	Porcelain/Ceramic Tiles	Natural Stone Flooring	Concrete-Based Flooring	Wood Flooring	Engineered Wood Flooring	Vinyl Flooring	Rubber Flooring	Terrazzo	Epoxy Flooring
Porcelain/Ceramic Tiles	1.000	3.20153873	0.71668651	2.89865119	2.61459115	1.49794918	2.30675038	1.69799082	0.6234404
Natural Stone Flooring	0.31234981	1.000	0.30212038	0.83027818	0.66068546	0.36947343	0.6234404	0.43583497	0.50177763
Concrete-Based Flooring	1.3953102	3.30993889	1.000	3.3940711	3.49377389	2.31894131	3.20236064	2.10496699	2.90287605
Wood Flooring	0.34498804	1.20441561	0.29463142	1.000	0.76928662	0.41491719	0.71189404	0.49981867	0.58807303
Engineered Wood Flooring	0.38246898	1.51357955	0.28622345	1.29990562	1.000	0.45458106	0.83574731	0.55591618	0.41491719
Vinyl Flooring	0.66757939	2.70655456	0.43123127	2.4101195	2.19982769	1.000	1.89284229	1.30190801	0.49981867
Rubber Flooring	0.43351028	1.60400257	0.31226964	1.40470343	1.19653391	0.52830603	1.000	0.66637489	0.76517874
Terrazzo	0.58893134	2.29444644	0.47506683	2.0007256	1.79883234	0.76810343	1.50065679	1.000	0.30212038
Epoxy Flooring	1.60400257	1.99291467	0.34448595	1.70046909	2.4101195	2.0007256	1.30688419	3.30993889	1.000
SUM	6.729	18.827	4.163	16.939	16.144	9.353	13.381	11.573	7.598

TABLE PAIRWISE COMPARISON OF ALTERNATIVES FOR THE INITIAL COST CRITERION MATRIX

	Porcelain/Ceramic Tiles	Natural Stone Flooring	Concrete-Based Flooring	Wood Flooring	Engineered Wood Flooring	Vinyl Flooring	Rubber Flooring	Terrazzo	Epoxy Flooring	Average	lambda	Consistency Index CI	Random index RI	Consistency ratio CR
Porcelain/Ceramic Tiles	0.089	0.763	0.050	0.568	0.381	0.086	0.109	0.192	0.024	0.251	8.929089	0.285855777	1.45	0.1971419
Natural Stone Flooring	0.028	0.238	0.021	0.163	0.096	0.021	0.029	0.049	0.020	0.074	9.729327			
Concrete-Based Flooring	0.124	0.788	0.070	0.665	0.510	0.132	0.151	0.238	0.114	0.310	10.97439			
Wood Flooring	0.031	0.287	0.021	0.196	0.112	0.024	0.034	0.056	0.023	0.087	9.376975			
Engineered Wood Flooring	0.034	0.361	0.020	0.255	0.146	0.026	0.039	0.063	0.016	0.107	8.364909			
Vinyl Flooring	0.059	0.645	0.030	0.472	0.321	0.057	0.089	0.147	0.020	0.204	8.331179			
Rubber Flooring	0.039	0.382	0.022	0.275	0.175	0.030	0.047	0.075	0.030	0.119	9.022055			
Terrazzo	0.052	0.547	0.033	0.392	0.262	0.044	0.071	0.113	0.012	0.170	8.263191			
Epoxy Flooring	0.143	0.475	0.024	0.333	0.352	0.114	0.062	0.373	0.039	0.213	11.28685			
SUM	0.598	4.485	0.292	3.319	2.355	0.534	0.630	1.306	0.298	Max	11.287			

TABLE;- Nnormalized Matrix, Average normalized values ,principal eigenvalue/lambda value of criteria and Consistency Ratio

PAIRWISE COMPARISON OF ALTERNATIVES FOR THE INSTALLATION COST CRITERION

	Porcelain/Ceramic Tiles	Natural Stone Flooring	Concrete-Based Flooring	Wood Flooring	Engineered Wood Flooring	Vinyl Flooring	Rubber Flooring	Terrazzo	Epoxy Flooring
Porcelain/Ceramic Tiles	1.000	2.54392096	0.38645753	1.50148322	2.61058547	0.45782139	1.84169879	3.60568562	0.60206331
Natural Stone Flooring	0.39309397	1.000	0.30083647	0.39239335	0.35627344	0.3364532	0.9566161	0.85003053	0.36987246
Concrete-Based Flooring	2.58760643	3.32406511	1.000	3.18063238	2.69554211	0.35205198	1.78292442	2.42647346	1.33775569
Wood Flooring	0.66600811	2.54846314	0.31440289	1.000	0.36664636	0.36918252	1.61396033	1.42428184	0.34681127
Engineered Wood Flooring	0.38305584	2.80683289	0.37098289	2.72742379	1.000	0.40592025	2.471944	2.27887389	0.95498822
Vinyl Flooring	2.18425791	2.97218154	2.8404896	2.70868727	2.46353811	1.000	2.53054115	2.43870032	2.76460327
Rubber Flooring	0.54297696	1.04535142	0.56087627	0.61959392	0.40453991	0.39517239	1.000	2.49307838	0.4807993
Terrazzo	0.27733976	1.17642833	0.41212072	0.70210823	0.43881322	0.41005448	0.40111053	1.000	0.33088067
Epoxy Flooring	1.6609549	2.70363462	0.74752065	2.88341265	1.04713334	0.36171555	2.07986994	3.02223757	1.000
SUM	9.695	20.121	6.934	15.716	11.383	4.088	14.679	19.539	8.188

TABLE PAIRWISE COMPARISON OF ALTERNATIVES FOR THE INSTALLATION COST CRITERION MATRIX

	Porcelain/Ceramic Tiles	Natural Stone Flooring	Concrete-Based Flooring	Wood Flooring	Engineered Wood Flooring	Vinyl Flooring	Rubber Flooring	Terrazzo	Epoxy Flooring	Average	lambda	Consistency Index CI	Rondom ibdex RI	Consistency ratio CR
Porcelain/Ceramic Tiles	0.089	0.606	0.027	0.294	0.381	0.026	0.087	0.407	0.024	0.216	9.095376	0.504107916	1.45	0.3476606
Natural Stone Flooring	0.035	0.238	0.021	0.077	0.052	0.019	0.045	0.096	0.015	0.066	10.57601			
Concrete-Based Flooring	0.230	0.792	0.070	0.623	0.393	0.020	0.084	0.274	0.052	0.282	9.967505			
Wood Flooring	0.059	0.607	0.022	0.196	0.053	0.021	0.076	0.161	0.014	0.134	7.92999			
Engineered Wood Flooring	0.034	0.669	0.026	0.534	0.146	0.023	0.116	0.257	0.037	0.205	8.30241			
Vinyl Flooring	0.194	0.708	0.199	0.531	0.359	0.057	0.119	0.275	0.108	0.283	13.03286			
Rubber Flooring	0.048	0.249	0.039	0.121	0.059	0.023	0.047	0.281	0.019	0.099	10.41526			
Terrazzo	0.025	0.280	0.029	0.138	0.064	0.023	0.019	0.113	0.013	0.078	9.570339			
Epoxy Flooring	0.148	0.644	0.052	0.565	0.153	0.021	0.098	0.341	0.039	0.229	9.272522			
SUM	0.862	4.793	0.486	3.079	1.660	0.233	0.692	2.205	0.321	Max	13.033			

TABLE;- Nnormalized Matrix, Average normalized values ,principal eigenvalue/lambda value of criteria and Consistency Ratio

PAIRWISE COMPARISON OF ALTERNATIVES FOR THE LOCAL AVAILABILITY CRITERION

	Porcelain/Ceramic Tiles	Natural Stone Flooring	Concrete-Based Flooring	Wood Flooring	Engineered Wood Flooring	Vinyl Flooring	Rubber Flooring	Terrazzo	Epoxy Flooring
Porcelain/Ceramic Tiles	1.000	2.70429626	0.599967527	1.503796114	3.064942858	0.799880686	2.105669894	1.103259997	3.002460038
Natural Stone Flooring	0.369781971	1.000	0.248102729	0.699950153	0.800981507	0.501421248	0.599820738	0.401077172	0.501421248
Concrete-Based Flooring	1.666756875	4.030588469	1.000	2.505640851	5.014128159	1.496256565	3.207040992	1.803857637	4.085532327
Wood Flooring	0.664983764	1.428673164	0.399099496	1.000	1.198573531	0.659616031	1.103621783	0.797293304	1
Engineered Wood Flooring	0.326270357	1.248468275	0.199436466	0.834325116	1.000	0.343229833	0.899088181	0.608146117	0.799816094
Vinyl Flooring	1.250186457	1.994331121	0.668334578	1.516033499	2.913499656	1.000	1.598208162	1.202268955	2.500764997
Rubber Flooring	0.474908248	1.667164765	0.311813913	0.906107523	1.112237955	0.625700722	1.000	0.802609975	0.900620774
Terrazzo	0.906404657	2.493285758	0.554367473	1.25424357	1.644341668	0.831760644	1.245935176	1.000	1.200223046
Epoxy Flooring	0.33306022	1.994331121	0.244766146	1	1.25028742	0.399877638	1.110345252	0.833178469	1.000
SUM	6.992	18.561	4.226	11.220	17.999	6.658	12.870	8.552	14.991

TABLE PAIRWISE COMPARISON OF ALTERNATIVES FOR THE LOCAL AVAILABILITY CRITERION MATRIX

	Porcelain/Ceramic Tiles	Natural Stone Flooring	Concrete-Based Flooring	Wood Flooring	Engineered Wood Flooring	Vinyl Flooring	Rubber Flooring	Terrazzo	Epoxy Flooring	Average	lambda	Consistency Index CI	RANDOM index RI	Consistency ratio CR
Porcelain/Ceramic Tiles	0.089	0.644	0.042	0.295	0.447	0.046	0.099	0.124	0.118	0.212	9.435811	0.144896693	1.45	0.0999288
Natural Stone Flooring	0.033	0.238	0.017	0.137	0.117	0.029	0.028	0.045	0.020	0.074	9.163503			
Concrete-Based Flooring	0.148	0.960	0.070	0.491	0.731	0.085	0.151	0.204	0.160	0.333	9.481874			
Wood Flooring	0.059	0.340	0.028	0.196	0.175	0.038	0.052	0.090	0.039	0.113	9.762823			
Engineered Wood Flooring	0.029	0.297	0.014	0.163	0.146	0.020	0.042	0.069	0.031	0.090	8.606215			
Vinyl Flooring	0.111	0.475	0.047	0.297	0.425	0.057	0.075	0.136	0.098	0.191	10.15917			
Rubber Flooring	0.042	0.397	0.022	0.178	0.162	0.036	0.047	0.091	0.035	0.112	8.945699			
Terrazzo	0.081	0.594	0.039	0.246	0.240	0.048	0.059	0.113	0.047	0.163	8.969651			
Epoxy Flooring	0.030	0.475	0.017	0.196	0.182	0.023	0.052	0.094	0.039	0.123	7.996072			
SUM	0.621	4.421	0.296	2.198	2.625	0.380	0.606	0.965	0.588	Max	10.159			

TABLE;- Nnormalized Matrix, Average normalized values ,principal eigenvalue/lambda value of criteria and Consistency Ratio

PAIRWISE COMPARISON OF ALTERNATIVES FOR THE MAINTENANCE COST CRITERION

	Porcelain/Ceramic Tiles	Natural Stone Flooring	Concrete-Based Flooring	Wood Flooring	Engineered Wood Flooring	Vinyl Flooring	Rubber Flooring	Terrazzo	Epoxy Flooring
Porcelain/Ceramic Tiles	1.000	1.80211476	1.20041982	4.50047183	4.20518235	3.80787932	3.49627622	2.99225012	2.49773753
Natural Stone Flooring	0.55490362	1.000	0.66752548	3.20782582	2.89865119	2.50178708	2.20347176	1.80181936	1.50379611
Concrete-Based Flooring	0.83304189	1.49807015	1.000	3.99059589	3.7946588	3.20782582	3.61093947	2.30638609	2.00162574
Wood Flooring	0.22219892	0.31173762	0.25058914	1.000	0.80124417	0.70467631	0.65169346	0.60809701	0.55225662
Engineered Wood Flooring	0.23780182	0.34498804	0.2635283	1.24805901	1.000	0.85003053	0.74637093	0.69745561	0.64979686
Vinyl Flooring	0.26261336	0.39971427	0.31173762	1.41909126	1.17642833	1.000	3.09064049	0.79962041	0.75147304
Rubber Flooring	0.28601859	0.45382928	0.27693624	1.53446378	1.33981638	0.32355753	1.000	0.90186024	0.85154826
Terrazzo	0.33419666	0.55499459	0.43357875	1.64447446	1.433783	1.25059339	1.10881926	1.000	0.95051181
Epoxy Flooring	0.40036232	0.66498376	0.4995939	1.81075239	1.5389425	1.33071974	1.17433156	1.05206478	1.000
SUM	4.131	7.030	4.904	20.356	18.189	14.977	17.083	12.160	10.759

TABLE PAIRWISE COMPARISON OF ALTERNATIVES FOR THE MAINTENANCE COST CRITERION MATRIX

	Porcelain/Ceramic Tiles	Natural Stone Flooring	Concrete-Based Flooring	Wood Flooring	Engineered Wood Flooring	Vinyl Flooring	Rubber Flooring	Terrazzo	Epoxy Flooring	Average	lambda	Consistency Index CI	Random index RI	Consistency ratio CR
Porcelain/Ceramic Tiles	0.089	0.429	0.084	0.882	0.613	0.217	0.165	0.338	0.098	0.324	9.301305	0.125282058	1.45	0.0864014
Natural Stone Flooring	0.049	0.238	0.047	0.628	0.423	0.143	0.104	0.203	0.059	0.211	8.820109			
Concrete-Based Flooring	0.074	0.357	0.070	0.782	0.553	0.183	0.170	0.260	0.078	0.281	9.207821			
Wood Flooring	0.020	0.074	0.018	0.196	0.117	0.040	0.031	0.069	0.022	0.065	9.26907			
Engineered Wood Flooring	0.021	0.082	0.018	0.245	0.146	0.049	0.035	0.079	0.025	0.078	8.94591			
Vinyl Flooring	0.023	0.095	0.022	0.278	0.172	0.057	0.146	0.090	0.029	0.101	10.00226			
Rubber Flooring	0.025	0.108	0.019	0.301	0.195	0.018	0.047	0.102	0.033	0.094	8.484134			
Terrazzo	0.030	0.132	0.030	0.322	0.209	0.071	0.052	0.113	0.037	0.111	9.236674			
Epoxy Flooring	0.036	0.158	0.035	0.355	0.224	0.076	0.055	0.119	0.039	0.122	9.281853			
SUM	0.367	1.675	0.344	3.988	2.653	0.855	0.805	1.372	0.422	Max	10.002			

TABLE;- Nnormalized Matrix, Average normalized values ,principal eigenvalue/lambda value of criteria and Consistency Ratio

PAIRWISE COMPARISON OF ALTERNATIVES FOR THE RECYCLABILITY CRITERION

	Porcelain/Ceramic Tiles	Natural Stone Flooring	Concrete-Based Flooring	Wood Flooring	Engineered Wood Flooring	Vinyl Flooring	Rubber Flooring	Terrazzo	Epoxy Flooring
Porcelain/Ceramic Tiles	1.000	1.71835141	1.51112591	3.20341718	3.1969253	2.95873474	2.988145	1.42393337	3.21250774
Natural Stone Flooring	0.58195314	1.000	0.82330621	2.20329382	2.30265282	2.00763012	2.70452121	0.75869215	2.90878368
Concrete-Based Flooring	0.66175823	1.21461491	1.000	3.10220308	3.33595405	2.19224722	2.89277694	0.86912695	2.59265789
Wood Flooring	0.31216665	0.45386593	0.32235156	1.000	0.74124361	0.55513041	0.50065004	0.35630221	1.20859847
Engineered Wood Flooring	0.31280055	0.43428171	0.29976432	1.34908415	1.000	0.66860773	0.75000889	0.38246668	1.51112591
Vinyl Flooring	0.33798231	0.49809972	0.45615293	1.80137852	1.49564528	1.000	2.2996739	0.41655756	1.80181936
Rubber Flooring	0.33465578	0.36975121	0.3456886	1.9974032	1.33331753	0.43484426	1.000	0.33751781	0.80131082
Terrazzo	0.70228005	1.31805765	1.1505799	2.80660623	2.61460684	2.40062863	2.96280665	1.000	1.50815506
Epoxy Flooring	0.3112833	0.34378631	0.38570457	0.82740466	0.66175823	0.55499459	1.2479552	0.66306179	1.000
SUM	4.555	7.351	6.295	18.291	16.682	12.773	17.347	6.208	16.545

TABLE PAIRWISE COMPARISON OF ALTERNATIVES FOR THE RECYCLABILITY CRITERION MATRIX

	Porcelain/Ceramic Tiles	Natural Stone Flooring	Concrete-Based Flooring	Wood Flooring	Engineered Wood Flooring	Vinyl Flooring	Rubber Flooring	Terrazzo	Epoxy Flooring	Average	lambda	Consistency Index CI	Randon ibdex RI	Consistency ratio CR
Porcelain/Ceramic Tiles	0.089	0.409	0.106	0.628	0.466	0.169	0.141	0.161	0.126	0.255	9.786376	0.225002971	1.45	0.1551745
Natural Stone Flooring	0.052	0.238	0.058	0.432	0.336	0.115	0.127	0.086	0.114	0.173	9.710306			
Concrete-Based Flooring	0.059	0.289	0.070	0.608	0.487	0.125	0.136	0.098	0.102	0.219	8.946732			
Wood Flooring	0.028	0.108	0.023	0.196	0.108	0.032	0.024	0.040	0.047	0.067	9.251877			
Engineered Wood Flooring	0.028	0.103	0.021	0.264	0.146	0.038	0.035	0.043	0.059	0.082	8.794197			
Vinyl Flooring	0.030	0.119	0.032	0.353	0.218	0.057	0.108	0.047	0.071	0.115	9.205098			
Rubber Flooring	0.030	0.088	0.024	0.391	0.194	0.025	0.047	0.038	0.031	0.097	7.637505			
Terrazzo	0.062	0.314	0.081	0.550	0.381	0.137	0.140	0.113	0.059	0.204	9.453531			
Epoxy Flooring	0.028	0.082	0.027	0.162	0.097	0.032	0.059	0.075	0.039	0.067	10.80002			
SUM	0.405	1.751	0.441	3.584	2.433	0.729	0.817	0.700	0.649	Max	10.800			

TABLE;- Nnormalized Matrix, Average normalized values ,principal eigenvalue/lambda value of criteria and Consistency Ratio

PAIRWISE COMPARISON OF ALTERNATIVES FOR THE RESISTANCE TO EXTERNAL FACTORS CRITERION

	Porcelain/Ceramic Tiles	Natural Stone Flooring	Concrete-Based Flooring	Wood Flooring	Engineered Wood Flooring	Vinyl Flooring	Rubber Flooring	Terrazzo	Epoxy Flooring
Porcelain/Ceramic Tiles	1.000	1.06813778	0.94873877	3.44841301	3.50080519	3.10220308	1.74488544	1.70130147	1.93507979
Natural Stone Flooring	0.93620881	1.000	0.75385084	3.53617478	3.39680493	3.13888695	2.76080376	1.98111542	1.79322435
Concrete-Based Flooring	1.05403092	1.32652236	1.000	3.51844554	3.53617478	2.50260748	1.81722437	0.83283808	0.87918931
Wood Flooring	0.28998847	0.28279145	0.28421642	1.000	0.91868632	0.55283671	0.57589694	0.38501712	0.37089122
Engineered Wood Flooring	0.28564857	0.2943943	0.28279145	1.08851082	1.000	0.38887565	0.33007522	0.2929183	0.28853456
Vinyl Flooring	0.32235156	0.31858427	0.39958324	1.80885238	2.57151611	1.000	0.4796289	0.64178332	0.5336795
Rubber Flooring	0.57310353	0.36221336	0.55028978	1.73642179	3.02961244	2.08494524	1.000	0.97826739	0.46920531
Terrazzo	0.5877853	0.50476615	1.20071359	2.59728709	3.41392123	1.5581583	1.02221541	1.000	1.06813778
Epoxy Flooring	0.51677456	0.55765471	1.13741146	2.6962083	3.46578937	1.87378379	2.13126316	0.93620881	1.000
SUM	5.566	5.715	6.558	21.430	24.833	16.202	11.862	8.749	8.338

TABLE PAIRWISE COMPARISON OF ALTERNATIVES FOR THE RESISTANCE TO EXTERNAL FACTORS CRITERION MATRIX

	Porcelain/Ceramic Tiles	Natural Stone Flooring	Concrete-Based Flooring	Wood Flooring	Engineered Wood Flooring	Vinyl Flooring	Rubber Flooring	Terrazzo	Epoxy Flooring	Average	lambda	Consistency Index CI	Rondom ibdex RI	Consistency ratio CR
Porcelain/Ceramic Tiles	0.089	0.254	0.066	0.676	0.511	0.177	0.082	0.192	0.076	0.236	10.11531	0.162135693	1.45	0.1118177
Natural Stone Flooring	0.083	0.238	0.053	0.693	0.495	0.179	0.130	0.224	0.070	0.241	10.29709			
Concrete-Based Flooring	0.094	0.316	0.070	0.689	0.516	0.143	0.086	0.094	0.034	0.227	9.157475			
Wood Flooring	0.026	0.067	0.020	0.196	0.134	0.032	0.027	0.043	0.015	0.062	9.616373			
Engineered Wood Flooring	0.025	0.070	0.020	0.213	0.146	0.022	0.016	0.033	0.011	0.062	8.504452			
Vinyl Flooring	0.029	0.076	0.028	0.354	0.375	0.057	0.023	0.072	0.021	0.115	7.869756			
Rubber Flooring	0.051	0.086	0.039	0.340	0.442	0.119	0.047	0.110	0.018	0.139	9.168743			
Terrazzo	0.052	0.120	0.084	0.509	0.498	0.089	0.048	0.113	0.042	0.173	9.227717			
Epoxy Flooring	0.046	0.133	0.080	0.528	0.505	0.107	0.100	0.106	0.039	0.183	9.592838			
SUM	0.495	1.361	0.460	4.199	3.622	0.925	0.559	0.987	0.327	Max	10.297			

TABLE;- Nnormalized Matrix, Average normalized values ,principal eigenvalue/lambda value of criteria and Consistency Ratio

PAIRWISE COMPARISON OF ALTERNATIVES FOR THE SUSTAINABILITY CRITERION

	Porcelain/Ceramic Tiles	Natural Stone Flooring	Concrete-Based Flooring	Wood Flooring	Engineered Wood Flooring	Vinyl Flooring	Rubber Flooring	Terrazzo	Epoxy Flooring
Porcelain/Ceramic Tiles	1.000	1.70050305	0.76819904	2.71441348	2.50096696	2.30265282	2.99931686	1.50148322	2.79752089
Natural Stone Flooring	0.58806128	1.000	0.42973642	1.70627129	1.50339318	1.29945749	2.10174208	0.8345351	1.90194521
Concrete-Based Flooring	1.30174597	2.32700779	1.000	4.30734167	2.89277694	2.50117499	3.00831407	1.60554089	2.80142688
Wood Flooring	0.36840371	0.58607327	0.23216175	1.000	0.83442842	0.30075078	1.30137596	0.50315258	1.10497789
Engineered Wood Flooring	0.39984535	0.66516199	0.3456886	1.19842514	1.000	0.83159356	1.50099674	0.55420996	1.30187771
Vinyl Flooring	0.43428171	0.76955191	0.39981209	3.32501211	1.20251051	1.000	1.79857184	0.62594625	1.6053098
Rubber Flooring	0.33340925	0.47579577	0.3324121	0.76841745	0.66622397	0.5559967	1.000	0.40176235	0.83319827
Terrazzo	0.66600811	1.19827195	0.62284306	1.98746868	1.80437032	1.59758126	2.48903362	1.000	2.2041942
Epoxy Flooring	0.35745935	0.5257775	0.35696095	0.90499549	0.7681213	0.62293272	1.20019452	0.45368053	1.000
SUM	5.449	9.248	4.488	17.912	13.173	11.012	17.400	7.480	15.550

TABLE PAIRWISE COMPARISON OF ALTERNATIVES FOR THE SUSTAINABILITY CRITERION MATRIX

	Porcelain/Ceramic Tiles	Natural Stone Flooring	Concrete-Based Flooring	Wood Flooring	Engineered Wood Flooring	Vinyl Flooring	Rubber Flooring	Terrazzo	Epoxy Flooring	Average	lambda	Consistency Index CI	Randon ibdex RI	Consistency ratio CR
Porcelain/Ceramic Tiles	0.089	0.405	0.054	0.532	0.365	0.132	0.141	0.169	0.110	0.222	9.424432	0.108118241	1.45	0.0745643
Natural Stone Flooring	0.052	0.238	0.030	0.334	0.219	0.074	0.099	0.094	0.075	0.135	9.31332			
Concrete-Based Flooring	0.116	0.554	0.070	0.844	0.422	0.143	0.142	0.181	0.110	0.287	8.762339			
Wood Flooring	0.033	0.140	0.016	0.196	0.122	0.017	0.061	0.057	0.043	0.076	8.799865			
Engineered Wood Flooring	0.036	0.158	0.024	0.235	0.146	0.047	0.071	0.063	0.051	0.092	9.373773			
Vinyl Flooring	0.039	0.183	0.028	0.651	0.175	0.057	0.085	0.071	0.063	0.150	7.72542			
Rubber Flooring	0.030	0.113	0.023	0.151	0.097	0.032	0.047	0.045	0.033	0.063	9.864946			
Terrazzo	0.059	0.285	0.044	0.389	0.263	0.091	0.117	0.113	0.086	0.161	9.47501			
Epoxy Flooring	0.032	0.125	0.025	0.177	0.112	0.036	0.057	0.051	0.039	0.073	9.742975			
SUM	0.484	2.203	0.315	3.509	1.921	0.629	0.820	0.844	0.610	Max	9.865			

TABLE;- Nnormalized Matrix, Average normalized values ,principal eigenvalue/lambda value of criteria and Consistency Ratio

PAIRWISE COMPARISON OF ALTERNATIVES FOR THE USER PREFERENCE CRITERION

	Porcelain/Ceramic Tiles	Natural Stone Flooring	Concrete-Based Flooring	Wood Flooring	Engineered Wood Flooring	Vinyl Flooring	Rubber Flooring	Terrazzo	Epoxy Flooring
Porcelain/Ceramic Tiles	1.000	2.72255604	2.00015209	3.49713183	2.07986994	1.47540852	3.21408026	3.35193532	4.00421228
Natural Stone Flooring	0.3673019	1.000	0.48064168	1.72435388	1.1705301	0.78370255	1.91883529	1.98433219	2.42194724
Concrete-Based Flooring	0.49996198	2.08055198	1.000	2.42253994	1.65557818	1.18024895	3.10194505	3.25683361	3.74908157
Wood Flooring	0.28594861	0.57992736	0.41278989	1.000	0.73520093	0.53126373	1.18044245	1.22948015	1.47540852
Engineered Wood Flooring	0.4807993	0.85431378	0.60401859	1.36017238	1.000	0.75281479	1.47027263	1.58440004	1.81663306
Vinyl Flooring	0.67777838	1.27599432	0.84727887	1.88230428	1.32834797	1.000	2.49287705	2.89841711	3.21276718
Rubber Flooring	0.311131	0.52114947	0.32237837	0.84713999	0.68014597	0.40114293	1.000	1.12193116	1.27578515
Terrazzo	0.29833511	0.50394788	0.3070467	0.81335189	0.63115373	0.3450159	0.89132028	1.000	1.2249995
Epoxy Flooring	0.24973701	0.41289091	0.26673199	0.67777838	0.5504689	0.31125816	0.78383104	0.81632686	1.000
SUM	4.171	9.951	6.241	14.225	9.831	6.781	16.054	17.244	20.181

TABLE PAIR WISE COMPARISON OF ALTERNATIVES FOR THE USER PREFERENCE CRITERION MATRIX

	Porcelain/Ceramic Tiles	Natural Stone Flooring	Concrete-Based Flooring	Wood Flooring	Engineered Wood Flooring	Vinyl Flooring	Rubber Flooring	Terrazzo	Epoxy Flooring	Average	lambda	Consistency Index CI	Random index RI	Consistency ratio CR
Porcelain/Ceramic Tiles	0.089	0.649	0.140	0.685	0.303	0.084	0.151	0.378	0.157	0.293	9.109719	0.042702826	1.45	0.0294502
Natural Stone Flooring	0.033	0.238	0.034	0.338	0.171	0.045	0.090	0.224	0.095	0.141	8.656272			
Concrete-Based Flooring	0.044	0.496	0.070	0.475	0.241	0.067	0.146	0.367	0.147	0.228	8.663363			
Wood Flooring	0.025	0.138	0.029	0.196	0.107	0.030	0.056	0.139	0.058	0.086	9.185161			
Engineered Wood Flooring	0.043	0.203	0.042	0.266	0.146	0.043	0.069	0.179	0.071	0.118	9.341623			
Vinyl Flooring	0.060	0.304	0.059	0.369	0.194	0.057	0.117	0.327	0.126	0.179	9.256228			
Rubber Flooring	0.028	0.124	0.023	0.166	0.099	0.023	0.047	0.127	0.050	0.076	9.131546			
Terrazzo	0.027	0.120	0.022	0.159	0.092	0.020	0.042	0.113	0.048	0.071	9.080097			
Epoxy Flooring	0.022	0.098	0.019	0.133	0.080	0.018	0.037	0.092	0.039	0.060	9.185458			
SUM	0.371	2.370	0.437	2.787	1.434	0.387	0.756	1.946	0.791	Max	9.342			

TABLE;- Nnormalized Matrix, Average normalized values ,principal eigenvalue/lambda value of criteria and Consistency Ratio

PAIRWISE COMPARISON OF ALTERNATIVES FOR THE EASE OF INSTALLATION CRITERION

	Porcelain/Ceramic Tiles	Natural Stone Flooring	Concrete-Based Flooring	Wood Flooring	Engineered Wood Flooring	Vinyl Flooring	Rubber Flooring	Terrazzo	Epoxy Flooring
Porcelain/Ceramic Tiles	1.000	2.70319144	1.33104862	0.83866671	0.39376404	0.33419666	0.6300797	2.71792305	0.48309781
Natural Stone Flooring	0.3699331	1.000	0.3915357	0.35631403	0.32682117	0.32355753	0.33536406	0.50325528	0.33551427
Concrete-Based Flooring	0.75128736	2.55404551	1.000	0.628246	0.33308712	0.33176444	0.47599024	2.03913491	0.3629511
Wood Flooring	1.19236878	2.80651312	1.59173318	1.000	0.47348675	0.39357314	0.75238388	2.76346711	0.57613232
Engineered Wood Flooring	2.53959195	3.05977727	3.00221758	2.1119915	1.000	0.82738799	1.59199414	2.89301055	1.22093542
Vinyl Flooring	2.99225012	3.09064049	3.01418682	2.54082378	1.20862282	1.000	1.91820627	3.00270251	1.47075477
Rubber Flooring	1.58710082	2.98183411	2.10088343	1.32910874	0.62814301	0.52132037	1.000	2.88246742	0.76692206
Terrazzo	0.367928	1.98706309	0.49040404	0.36186427	0.34566068	0.33303332	0.346925	1.000	0.340399
Epoxy Flooring	2.0699742	2.98049915	2.75519212	1.73571239	0.81904414	0.679923	1.30391347	2.93772899	1.000
SUM	12.870	23.164	15.677	10.903	5.529	4.745	8.355	20.740	6.557

TABLE PAIRWISE COMPARISON OF ALTERNATIVES FOR THE EASE OF INSTALLATION CRITERION MATRIX

	Porcelain/Ceramic Tiles	Natural Stone Flooring	Concrete-Based Flooring	Wood Flooring	Engineered Wood Flooring	Vinyl Flooring	Rubber Flooring	Terrazzo	Epoxy Flooring	Average	lambda	Consistency Index CI	Rondom ibdex RI	Consistency ratio CR
Porcelain/Ceramic Tiles	0.089	0.644	0.093	0.164	0.057	0.019	0.030	0.307	0.019	0.158	8.259166	0.282848638	1.45	0.195068
Natural Stone Flooring	0.033	0.238	0.027	0.070	0.048	0.018	0.016	0.057	0.013	0.058	10.12811			
Concrete-Based Flooring	0.067	0.608	0.070	0.123	0.049	0.019	0.022	0.230	0.014	0.134	7.795997			
Wood Flooring	0.106	0.669	0.112	0.196	0.069	0.022	0.035	0.312	0.023	0.171	8.682837			
Engineered Wood Flooring	0.226	0.729	0.210	0.414	0.146	0.047	0.075	0.326	0.048	0.247	10.80048			
Vinyl Flooring	0.266	0.736	0.211	0.498	0.176	0.057	0.090	0.339	0.058	0.270	11.26279			
Rubber Flooring	0.141	0.710	0.147	0.260	0.092	0.030	0.047	0.325	0.030	0.198	9.396507			
Terrazzo	0.033	0.473	0.034	0.071	0.050	0.019	0.016	0.113	0.013	0.091	7.787669			
Epoxy Flooring	0.184	0.710	0.193	0.340	0.119	0.039	0.061	0.331	0.039	0.224	10.26996			
SUM	1.144	5.518	1.099	2.136	0.806	0.271	0.394	2.340	0.257	Max	11.263			

TABLE;- Nnormalized Matrix, Average normalized values ,principal eigenvalue/lambda value of criteria and Consistency Ratio

PAIRWISE COMPARISON OF ALTERNATIVES FOR THE SAFETY CRITERION

	Porcelain/Ceramic Tiles	Natural Stone Flooring	Concrete-Based Flooring	Wood Flooring	Engineered Wood Flooring	Vinyl Flooring	Rubber Flooring	Terrazzo	Epoxy Flooring
Porcelain/Ceramic Tiles	1.000	3.0031948	2.66273616	2.37028035	1.91184239	3.00368717	0.5295012	3.00368717	2.10891348
Natural Stone Flooring	0.33297873	1.000	3.00855702	2.99808425	3.22035471	1.20862282	0.34103964	2.56609136	2.86942651
Concrete-Based Flooring	0.37555354	0.33238526	1.000	1.44275437	2.63118563	0.69390276	0.33230313	2.24058155	2.71352364
Wood Flooring	0.42189102	0.33354633	0.69311868	1.000	1.39310007	0.81507132	0.35679256	1.36780914	1.03968544
Engineered Wood Flooring	0.52305567	0.3105248	0.3800568	0.71782352	1.000	0.33007522	0.2994256	0.7970963	1.50549726
Vinyl Flooring	0.33292415	0.82738799	1.44112412	1.2268865	3.02961244	1.000	0.45900826	1.46041173	2.90311629
Rubber Flooring	1.88856984	2.93221046	3.00930057	2.802749	3.3397278	2.17861005	1.000	2.99225012	3.80787932
Terrazzo	0.33292415	0.38969774	0.4463127	0.73109615	1.25455355	0.68473841	0.33419666	1.000	1.0937281
Epoxy Flooring	0.47417782	0.34850169	0.36852452	0.96182938	0.66423236	0.34445744	0.26261336	0.91430402	1.000
SUM	5.682	9.477	13.010	14.252	18.445	10.259	3.915	16.342	19.042

TABLE PAIRWISE COMPARISON OF ALTERNATIVES FOR THE SAFETY CRITERION MATRIX

	Porcelain/Ceramic Tiles	Natural Stone Flooring	Concrete-Based Flooring	Wood Flooring	Engineered Wood Flooring	Vinyl Flooring	Rubber Flooring	Terrazzo	Epoxy Flooring	Average	lambda	Consistency Index CI	Random index RI	Consistency ratio CR
Porcelain/Ceramic Tiles	0.089	0.715	0.187	0.464	0.279	0.172	0.025	0.339	0.083	0.261	10.14214	0.16839244	1.45	0.1161327
Natural Stone Flooring	0.030	0.238	0.211	0.587	0.470	0.069	0.016	0.290	0.113	0.225	8.492597			
Concrete-Based Flooring	0.033	0.079	0.070	0.283	0.384	0.040	0.016	0.253	0.106	0.140	8.468469			
Wood Flooring	0.037	0.079	0.049	0.196	0.203	0.047	0.017	0.154	0.041	0.091	9.605611			
Engineered Wood Flooring	0.046	0.074	0.027	0.141	0.146	0.019	0.014	0.090	0.059	0.068	10.22921			
Vinyl Flooring	0.030	0.197	0.101	0.240	0.442	0.057	0.022	0.165	0.114	0.152	9.195867			
Rubber Flooring	0.168	0.698	0.211	0.549	0.487	0.124	0.047	0.338	0.149	0.308	10.34714			
Terrazzo	0.030	0.093	0.031	0.143	0.183	0.039	0.016	0.113	0.043	0.077	9.747326			
Epoxy Flooring	0.042	0.083	0.026	0.188	0.097	0.020	0.012	0.103	0.039	0.068	9.70559			
SUM	0.505	2.258	0.912	2.792	2.690	0.586	0.184	1.844	0.747	Max	10.347			

TABLE;- Nnormalized Matrix, Average normalized values ,principal eigenvalue/lambda value of criteria and Consistency Ratio