

UNIVERSITI TEKNOLOGI MARA

DEVELOPING A SYSTEMATIC
DESIGN STRATEGY FOR KITCHEN
FURNITURE INTEGRATING
FUNCTIONAL MATERIALS

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ABSTRACT

Despite the growing advancements in material science and smart home technology, traditional kitchen furniture design remains primarily driven by conventional materials, lacking a structured framework to assess diverse user needs and to select appropriate functional composites such as antibacterial laminates, heat resistant coatings, and self cleaning surfaces. This absence of systematic integration between user requirements and material properties limits innovation, restricts product upgrading, and constrains the sustainable development of the kitchen furniture industry. This research aims to formulate a systematic design strategy for kitchen furniture that incorporates functional materials through the comprehensive identification, prioritisation, and translation of user needs into design and material attributes. A mixed method approach combining observation, interviews, and questionnaires was adopted to collect user data, followed by analytical modelling using the Kano model, AHP, QFD, and FBS frameworks to establish logical correlations between user expectations, product quality characteristics, and structural functions. The analysis revealed that heat resistant, antimicrobial, and easy to clean surfaces were the most valued material features across different user groups, while ergonomics and safety were dominant design concerns. When applying functional materials to kitchen furniture, Screening can be conducted from aspects such as functional needs, performance needs, usability needs, etc. And comprehensively consider factors such as regional application, prioritizing core demands, modularization, comprehensive material performance and aesthetics, cost, and green sustainability for evaluation. The study contributes theoretically by proposing a multi model integration framework that links user behaviour with material performance and by offering a strategic guideline for applying functional materials in intelligent kitchen design. These outcomes provide valuable references for the sustainable advancement of kitchen furniture design and the improvement of modern living quality.

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CHAPTER 1

INTRODUCTION

1.1 Research Background

Furniture, as a fundamental necessity of human life, has a history of development that can be traced back to the earliest civilisations. The form and function of furniture have been in a state of constant evolution throughout the long history of human social development, influenced by a multitude of factors, including cultural, economic, technological and other factors. In the case of kitchen furniture, its development is essentially linked to the evolution of cooking techniques and the advent of new cooking appliances. The concept of the modern kitchen originated in the mid to late 19th century, when Catherine Beecher (Mock, 2011) proposed the construction of cupboards, drawers and shelves to store various utensils and advocated for their construction. The introduction of worktops with drawers enabled greater efficiency in the preparation of food. In 1894, Frank Lloyd Wright (Cromley, 2012) combined the kitchen with the fireplace, thereby transforming the kitchen from a purely functional space into a central hub of family life. One of the most notable examples of kitchen furniture is the Frankfurt Kitchen, designed by the Austrian architect Margarete Schutte Lihotzky in 1926 (Mirka, 2023) . The design of the Frankfurt Kitchen remains a relevant reference point for contemporary kitchen furniture design, as it incorporates principles of efficient space utilisation, manpower reduction and optimised workmanship. The 'Frankfurt Kitchen' is regarded as the inaugural exemplar of contemporary kitchen design, establishing a new benchmark for modern kitchen furniture design. In a confined space, the design incorporates sufficient storage, incorporates rational behavioural processes, simplifies the work path and exemplifies ergonomic principles.

The advancement of science and technology, coupled with the accelerated growth of the social economy, has led to a notable enhancement in the quality of life for individuals across the globe. Concurrently, the functionality of furniture in daily life is becoming increasingly important to people. A study revealed that the average modern person spends 15.7 hours per day at home, with an even greater proportion of time spent indoors (Brasche & Bischof, 2005) . The kitchen is a fundamental