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**13<sup>TH</sup> INDES 2024**  
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THE 13<sup>TH</sup> INTERNATIONAL INNOVATION, INVENTION & DESIGN COMPETITION 2024

**EXTENDED ABSTRACTS**

**e-BOOK**

# EXTENDED ABSTRACTS e-BOOK

THE 13th INTERNATIONAL  
INNOVATION, INVENTION &  
DESIGN COMPETITION 2024



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Office Of Research, Industry,  
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UiTM Perak Branch

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Perpustakaan Negara Malaysia

Cataloguing in Publication Data

No e- ISBN: 978-967-2776-31-4

Cover Design: Dr. Mohd Khairulnizam Ramlie  
Typesetting : Zarinatun Ilyani Abdul Rahman

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# ENCOURAGING CHILD INDEPENDENT MOBILITY: A CONCEPTUAL FRAMEWORK FOR SMART SAFE JOURNEY DEVICE (SSJD)

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## ABSTRACT

In an era of increased urbanisation and technological advancement, the safety and autonomy of children has become a paramount concern. This paper presents a novel framework for the design and implementation of SMART Journey Devices (SSJD) aimed at fostering children's independence. Drawing upon a comprehensive review of existing safety concerns and technological solutions, this framework emphasises a user-centric approach that integrates cutting-edge technology with practical design considerations. The proposed devices incorporate features such as GPS tracking, proximity sensors, and impact-resistant materials to mitigate risks and enhance safety when children travel. The identification of safety concerns specific to children's independent mobility, the integration of parents' perception based on the literature, and focusing on scalability and regulatory compliance in Malaysian context not only provide immediate safety benefits but also lay the groundwork for adoption. Furthermore, the framework underscores the importance of community support and advocacy in the adoption of SSJD, highlighting the potential for collaboration with the neighbourhood community. By leveraging technology, design, and collaboration, SSJD has the potential to revolutionise the way we protect children during their travel and empower them to explore the world with confidence.

**Keyword:** children independent mobility, smart living, safety management, self-sustaining neighbourhood, inclusivity

## 1. INTRODUCTION

Research on children's independent mobility (CIM) has been steadily declining over the last few decades. According to studies, the lengths and ranges that children may travel without adult supervision have reduced dramatically. Prominent researchers, such as Mayer Hillman, highlighted the need to raise healthier, more independent, and socially engaged children. CIM-friendly surroundings can increase children's physical activity and general well-being. However, parents' concerns about safety, social judgments, and practical challenges persisted which made them restrict their children's movement (Crawford et al., 2017). Parents will not restrict their children's movement if the neighbourhoods are activity-friendly or walkable (Tyagi & Raheja, 2021). Providing children with independent mobility demonstrates the community attainment of a particular quality of living. People in a community should be connected through community-based projects such as the Volunteer Smartphone Patrol (VSP) initiative which can ensure the safety and independence of children. Additionally, advancements in technology play a crucial role in supporting CIM, offering innovative solutions to address safety concerns and facilitate independent mobility for children in modern urban environments.

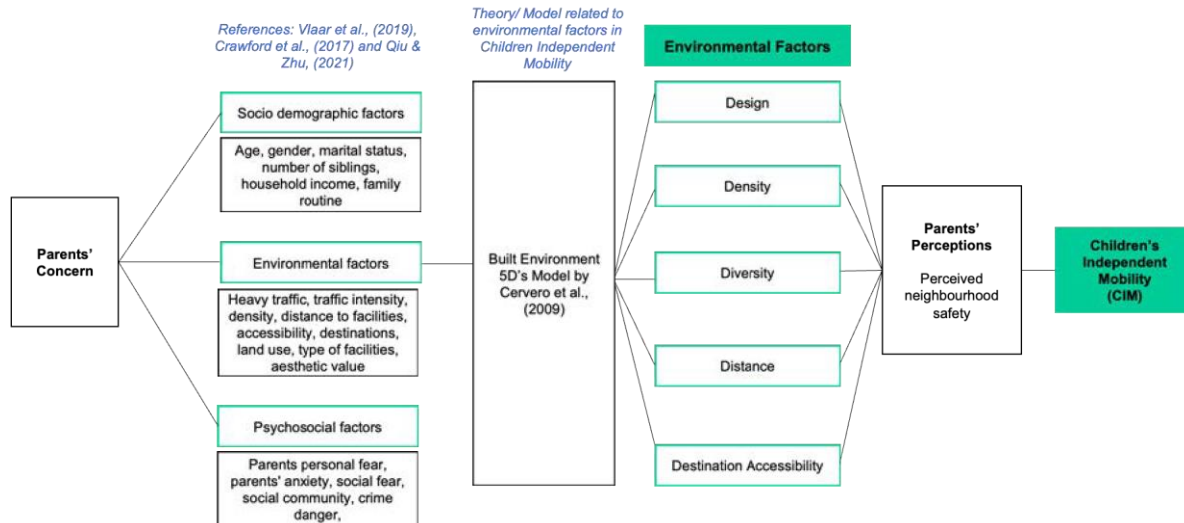
## 2. METHODOLOGY

This innovation analysis literature review (LR) to identify a conceptual framework that addresses parents' concerns regarding CIM and employs the Design Thinking approach, specifically the EDIPT method (Empathise, Define, Ideate, Prototype, Test), to develop a prototype. The LR analysis is employed to discern a conceptual framework surrounding parents' apprehensions toward CIM. This framework is guided by Design Thinking principles, explores crucial components essential for effective smart journey device implementation for children. By understanding the unique challenges faced by children in navigating their environments independently and the need for enhanced safety measures, the framework delves into aspects such as risk assessment, emergency response protocols, data privacy considerations, and user interface design to ensure optimal usability. The understanding of user needs and underlying problems is developed through observation and feedback in Emphasise, the first of the five stages (Dam R.F., 2024). Empathise which is regarding the parents' concern on CIM is analysed using LR. Data is analysed to pinpoint the core problem. Ideate presents diverse ideas to solve the problem from different perspectives, using the specific requirements of CIM and the SMART Safe Journey Device. Prototype is completed using simulation on the user interface while highlighting possible features to support CIM and will be later used for testing end-user feedback.

## 3. FINDINGS

Part 1: Emphasise and Define (Framework on Parents' Concern and Perception towards CIM)

Through extensive analysis, we have developed a conceptual framework on parents' concerns and perceptions regarding Children Independent Mobility (CIM). This framework analyses multilayered aspects of parental worries, encompassing safety, social judgments, and practical challenges.



**Figure 1** Framework on Parents' Concern and Perception towards CIM

## Part 2: Ideate (Framework on Innovation of SMART Safe Journey Device)

Building upon the findings in Part 1, we have embarked on the ideation phase to develop an innovative framework for the SMART Safe Journey Device. This framework adheres to the principles of being Specific, Measurable, Achievable, Relevant, and Time-bound (SMART). By incorporating these criteria, our framework aims to revolutionize child safety by offering a technologically advanced solution that ensures optimal protection and monitoring capabilities.

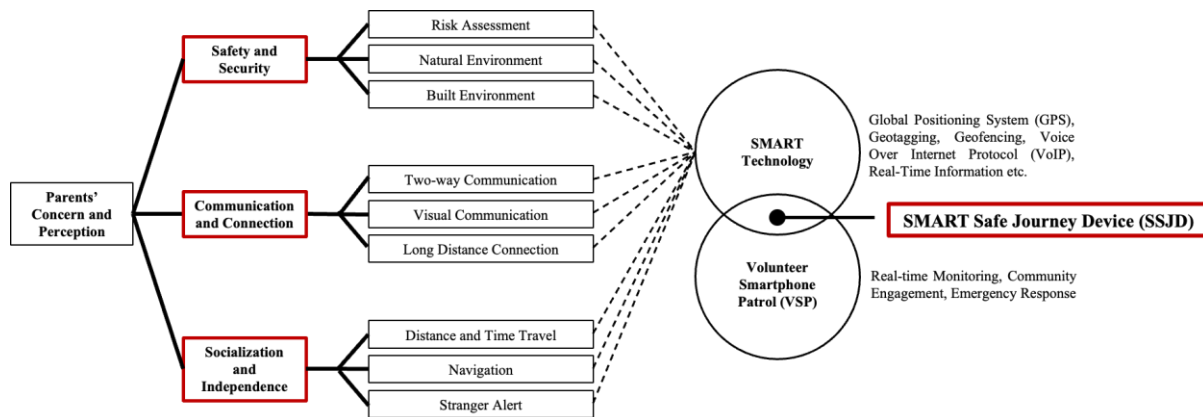


Figure 2 Framework of SMART Safe Journey Device (SSJD) Prototype

## 4. CONCLUSION

This innovative framework not only addresses safety management but also promotes inclusivity and community resilience, laying the foundation for a more vibrant and secure environment for children to thrive. Through the integration of smart technology and self-sustaining neighbourhoods, we can create environments where children can roam freely and learn independently.

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Surat kami : 700-KPK (PRP.UP.1/20/1)

Tarikh : 20 Januari 2023

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