2026 届硕士专业学位研究生学位论文

分 类 号：_____ 学校代码：10269

密　　级：_____ 学　　号：_____

East China Normal University

硕士专业学位论文

Master's Degree Thesis (Professional)

论文题目：Modular Transportation Design for the Global South

院　　系：设计学院

专业学位类别：设计

专业学位领域：设计

学 位 申 请 人：

指 导 教 师：

Thesis for Master's Degree (Professional) in 2026

University code: 10269

Student ID:

East China Normal University

Title: Modular Transportation Design for the Global South

Department/School: **School of Design**

Category: **Design**

Field: **Design**

Candidate:

Supervisor:

中文摘要

本论文探讨了可持续设计与思辨设计如何通过电动滑板车（e-scooter）的开发相结合，旨在挑战围绕“全球南方”的社会文化叙事。本研究借鉴后殖民理论、可持续设计原则以及在中国和毛里求斯进行的民族志研究，探讨产品设计如何作为一种媒介，在抵抗文化霸权的同时，促进全球南方（GS）的经济发展。鉴于当前全球范围内反殖民话语与流行文化的浪潮，这一研究路径显得尤为及时。

电动滑板车在空间、能源和成本方面的高效性，极大促成了其在中国主要城市的普及，并为毛里求斯的社会和经济发展提供了机遇。与非洲许多地区一样，毛里求斯的大部分交通需求仍严重依赖进口二手车。

通过将模块化设计对可修复性和耐用性的重视，与思辨设计激发批判性反思的能力相结合，本论文提出，全球南方的设计师能够挑战霸权，并重新掌握文化叙事的主导权。该项目在理论上为可持续消费、“维修权”运动以及后殖民设计实践的讨论做出了贡献。在实践层面，它提供了一个可复制的框架，用于开发既能满足物质需求又能体现象征意义的交通解决方案。

关键词： 可持续设计、电动滑板车、思辨设计、批判性设计、后殖民主义

ABSTRACT

This thesis explores the intersection of sustainable design and speculative design through the development of an electric scooter (e-scooter), intended to challenge socio-cultural narratives surrounding the Global South. Drawing on post-colonial theory, sustainable design principles, and ethnographic research conducted in both China and Mauritius, this study investigates how product design can serve as a medium for simultaneously resisting cultural hegemony and promoting economic development across the Global South. This approach is particularly timely given the current global surge of anti-colonial discourse and popular culture.

The high efficiency in space, energy, and cost of e-scooters, has greatly contributed to their ubiquity in major Chinese cities, and presents opportunities for the social and economic development of Mauritius, which still depends extensively on imported second-hand vehicles, like much of Africa, for the majority of its transportation needs.

By combining modular design's emphasis on repairability and longevity, with speculative design's capacity to provoke critical reflection, this thesis argues that designers in the Global South can challenge hegemony and reclaim agency over cultural narratives. The project contributes theoretically to discussions on sustainable consumption, the Right to Repair movement, and post-colonial design practice. Practically, it offers a replicable framework for developing transportation solutions that address both material needs and symbolic representation.

Keywords: *[Sustainability][E-Scooter][Speculative Design][Critical Design][Post-Colonialism]*

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1. Introduction

1.1 The Cultural Politics of Transportation

Despite China's emergence as a global leader in green technology, global perceptions of the country — and the Global South more broadly — remain shaped by an orientalist framework[1]. This dynamic has evolved in recent decades, with environmentalism itself becoming a vehicle for reinforcing global hierarchies. Deepak Lal describes this as green imperialism — the imposition of environmental constraints on developing nations by those who have already industrialized[2]. Sustainability is essential for the Global South's development, promoting the efficient use of resources in regions where relative scarcity is a persistent constraint. The challenge lies not in sustainability itself, but in resisting the narratives that use environmentalism to justify limiting the Global South's progress.

These global hierarchies are internalized locally, shaping how people in Mauritius and China view themselves, their possessions, and each other. Nowhere is this more visible than in attitudes toward transportation. Scooters — efficient, affordable, and practical — are stigmatized as "low class" precisely because they do not conform to the Western model of automotive prestige. This classism extends across all products: the "made in China" tag continues to carry connotations of cheapness, even as China leads in green technology. In Mauritius, dependence on imported second-hand vehicles reinforces a cycle where local needs are met by foreign cast-offs, while local alternatives are devalued.

Attitudes are shifting. Across the Global South, artists and writers have achieved global success with explicitly anti-colonial themes, signaling a growing desire to fight for narrative control. This thesis positions its design intervention within this context of persistent stigma and emerging resistance. If scooters are stigmatized not because

of any inherent flaw but because of their association with local identity and labor, then design can do more than solve practical problems. It can challenge the very hierarchies that make such stigma possible — using the e-scooter as a site for asserting agency over how the Global South is seen and sees itself.

1.2 Problem Statement

Electric scooters offer a clear path towards promoting sustainable transportation in the Global South, yet their adoption is hindered by technical hurdles and cultural stigma.

1.3 Theoretical Context and Research Perspectives

This thesis draws on two distinct design traditions, each offering valuable but incomplete approaches to the challenge of sustainable transportation in the Global South.

1. Sustainable design: prioritizes extending product lifecycles through strategies such as modular architecture and design for repair. Researchers have demonstrated that modular design can reduce lifecycle costs and improve reliability, addressing key technical barriers to sustainability[3]. However, technical repairability alone does not guarantee that users will choose to repair; emotional and cultural factors also shape behavior.

2. Speculative and critical design offers a different set of tools, prioritizing the questioning of cultural norms and social hierarchies over explicit problem-solving[4]. Through techniques such as recontextualization, this tradition has shown how design can challenge entrenched perceptions and create emotional resonance. Yet these methods have rarely been applied to functional, everyday products in the Global South.

1.4 Research Gap

The two frameworks outlined above each have distinct strengths, but neither alone addresses the full challenge of designing sustainable transportation for the Global South. Sustainable design prioritizes technical repairability but lacks strategies for fostering the emotional attachment that might motivate users to repair rather than replace. Speculative design offers tools for cultural critique and emotional resonance but has rarely been applied to functional products in Global South contexts.

This thesis addresses this dual gap by proposing a synthesis: combining modular design's emphasis on repairability with speculative design's capacity for cultural critique. Specifically, it investigates whether recontextualizing vernacular materials — concrete, wood, and corrugated steel associated with low-income housing in Mauritius — can create emotional bonds that support sustainable repair practices while challenging the class-based and orientalist narratives that stigmatize local aesthetics.

1.5 Significance

1.5.1 Theoretical Significance

This research contributes to design theory by combining modular and speculative design, two frameworks rarely integrated, to address wicked problems[5] like inequality and environmental degradation. It extends Right-to-Repair discourse beyond engineering to consider cultural dimensions, and applies post-colonial theory to show how design can reinforce or resist global hierarchies.

1.5.2 Practical Significance

For China, this approach supports the shift from production to consumption by strengthening domestic brands and countering "made in China" stigma. For Mauritius, it offers a pathway to reduce dependence on unsafe second-hand imports[6]. More

broadly, by engaging anti-colonial themes popular among Global South youth, it addresses disillusionment seen in movements like "laying flat" and rising NEET rates.

1.6 Design Proposition and Research Questions

1.6.1 Design Proposition

This thesis investigates whether a modular electric vehicle, grounded in the principles of modular design theory and informed by speculative and critical design practices, can challenge class-based and orientalist narratives while supporting sustainable repair practices in the Global South. By combining modular design's emphasis on repairability and longevity with speculative design's capacity for cultural critique, the proposition tests whether functional objects can simultaneously address material needs and symbolic representation.

1.6.2 Research Questions

This study is guided by three research questions, each addressed across subsequent chapters:

1) How do classist and orientalist narratives shape perceptions of transportation in Mauritius and China?
2) How can modular design principles address practical challenges of repair and longevity in Global South contexts?
3) In what ways can speculative design strategies challenge cultural stigma and reclaim narrative control?

1.6.3 Research Goals

This study investigates how modular product design and speculative design theory can be combined to challenge hegemonic narratives and promote economic

development in the Global South. In doing so, it examines the intersection of product design, social equality, and environmentalism.

1.7 Research Methods

This thesis employs a mixed-methods approach combining literature review, ethnographic research, case analysis, and prototyping.

1) **Literature Review:** Examination of historical development and contemporary theory in sustainable design, speculative design, and post-colonialism to establish the theoretical foundation for the study.
2) **Ethnographic Research:** Qualitative research employing semi-structured interviews, shadowing, and auto-ethnography to understand class-based perceptions of transportation in China and Mauritius.
3) **Case Analysis:** Study of modular design applications in consumer products and vehicles to identify successful strategies for repairability and user customization.
4) **Model and Prototype Development:** Creation of physical and digital prototypes to test the feasibility and usability of the proposed design.

I place strong emphasis on qualitative methods, with a deliberate focus on young, well-educated, upper-middle-class participants from China and Mauritius. This demographic focus is grounded in Bourdieu's concept of cultural capital[7], as the upper-middle class acts as gatekeepers of cultural norms and influences broader social hierarchies. While the sample size is modest (n=13), it is appropriate for qualitative research seeking depth over breadth, and allows for rich, contextualized insights into how cultural capital operates within this demographic. The larger number of Chinese participants reflects my base in China and greater access to this population. I am additionally able to leverage my positionality as a Mauritian native who has lived and studied in China for the last year and a half, uncovering in-depth insights into how

this demographic views itself and its relationship to the world.

1.8 Research Framework

Below is a framework illustrating the structure of this paper:

Figure 1. Research framework diagram

2. Sustainable Design

2.1 Environmentalism: origins and core ideas

The modern environmental movement gained significant momentum in the 1970s, driven by growing criticism of postwar consumerism and visible environmental crises. In the United States, the pollution of Lake Erie had become so severe that by the mid-1960s, national publications declared it "dead", its waters choked with algae, its shores littered with dead fish, and its tributaries, like Ohio's Cuyahoga River, catching fire multiple times[7]. Such events shocked the public consciousness and demanded a response. It was in this context that industrial designer Victor Papanek emerged as one of the first to critique the negative social and environmental impacts of industrial design. His influential book Design for the Real World[8] argued that designers must take responsibility for the consequences of their creations, establishing an early connection between sustainability and social equality that remains central to this thesis.

Mounting social pressures led to institutional changes, including the establishment of the U.S. Environmental Protection Agency and the first Earth Day in 1970. That same year, the now-ubiquitous recycling logo was introduced, helping popularize the "Reduce, Reuse, Recycle" (3Rs) framework. Subsequent decades saw the evolution of these ideas through the Cradle to Cradle movement[9], which advanced the concept of a circular economy. This historical context is essential for understanding later developments in modular design and the Right to Repair movement. Both respond to the same concerns Papanek raised: that design must address not only functionality and profit, but also environmental impact and social equity.

2.2 Right to Repair and Modular Design

The rapid pace of technological innovation has led to a corresponding rise in electronic waste. This problem is compounded by corporate strategies that deliberately hinder product repairability, through proprietary screws, adhesive-based assembly, restricted access to spare parts, and software that disables devices when third-party components are detected. Critics view these practices as both monopolistic and anti-democratic.

In response, the Right to Repair movement has gained momentum in the US and Europe. The movement advocates for legislation and corporate policies that ensure consumers and independent repair shops can access the parts, tools, and information needed to fix their own products. Its goals are to reduce waste, lower costs for consumers, and promote more democratic ownership of goods. The European Commission estimates that premature disposal of consumer goods in the EU alone produces 261 million tons of CO2 emissions annually, costs consumers €12 billion, consumes 30 million tonnes of resources, and generates 35 million tonnes of waste[10]. It is within this context that modular product design (MPD) has gained renewed attention as a strategy for enabling repairability and extending product lifecycles.

Figure 2. iPhone parts pairing chart. Source: iFixit.

One of the most frequently cited examples of anti-repair practices is Apple. The company has faced sustained criticism for using proprietary screws, extensive adhesive, and software-based "parts pairing" that limits the functionality of third-party replacements. Spare parts have been tightly controlled, and technical documentation has been withheld from independent repair shops. Organizations like iFixit and The Repair Academy have led efforts to expose these practices and advocate for policy change.

In April 2024, following sustained pressure, Apple announced that it would begin making used genuine parts available for repairs, remove software restrictions that require serial number matching for certain repairs, and provide diagnostic tools[11]. While advocates welcomed the move, many consider it insufficient, noting that Apple retains significant control over the repair ecosystem through its parts pairing requirements for other components.

Similar issues extend beyond consumer electronics. In January 2025, the U.S. Federal Trade Commission (FTC), along with the attorneys general of Illinois and Minnesota,

sued agricultural equipment manufacturer John Deere. The FTC's complaint alleges that Deere's practices have "limited the ability of farmers and independent repair providers to repair Deere equipment, forcing farmers to instead rely on Deere's network of authorized dealers for necessary repairs"[12]. The complaint states that by restricting access to its proprietary software repair tool, Deere has unlawfully maintained monopoly power in the repair market for its equipment, driving up costs and causing critical delays for farmers. Critics argue such practices are not only environmentally harmful but also fundamentally undermine the principle of ownership. These debates over repairability are central to this thesis. Modular design offers a potential pathway to address many of the challenges identified by the Right to Repair movement, provided it is implemented with user access and longevity in mind. The following section examines how modular design has been applied in practice.

2.3 Repair in the Global South: An Existing Culture of Necessity

Across the Global South, informal repair economies are deeply embedded systems that sustain access to technology and extend product lifespans. This pattern is well-documented across regions: in Kenya's Jua Kali sector, in India's repair networks, and in communities across Southeast Asia and Latin [13] [14] [15]. China is no exception. In Shenzhen's Gangxia village, dense clusters of repair shops create sophisticated circular ecosystems where devices are repaired, exchanged, and passed between users before ultimately being discarded, serving the city's migrant population with affordable second-hand appliances [16].

The persistence of these repair cultures is fundamentally shaped by socioeconomic factors. Where new products are financially out of reach for large segments of the population, repair becomes essential infrastructure for maintaining access to technology, transportation, and household goods. The informal repair economies that have emerged in response demonstrate remarkable sophistication—decentralized

networks of technicians who develop adaptive technical knowledge, source salvaged components, and extend product lifespans through ingenuity rather than formal training.

The relevance of modular design to these contexts is critical. As products become more digitized and proprietary, even the most skilled informal technicians find themselves unable to repair devices that previous generations could have fixed with basic tools. The problem is not that Global South communities lack repair skills or will; it is that they are being systematically locked out of repair by design choices made far from their local realities. Modular products—designed with accessible fasteners, standardized components, and clear documentation—can align with the capabilities of informal technicians rather than rendering their skills obsolete. For China, Mauritius, and similar contexts, modular design is not about creating a new repair economy, but about ensuring that the existing one can continue to function in an increasingly complex technological landscape. The goal is to support the decentralized repair networks that already sustain access, affordability, and employment across the Global South.

2.4 Application of Design-for-Repair

Several researchers have proposed frameworks for understanding what makes products repairable and how design can support longer lifecycles. Ma and Kremer[17] found that modular product design (MPD) has a positive impact on environmental and social sustainability across various product categories, including bicycles, motors, and consumer electronics. However, they note that effectiveness depends heavily on lifecycle management. Scott and Weaver[18] and Lefebvre et al.[19] have each identified three significant actors in repair ecosystems: (1) consumers, (2) markets and/or producers, and (3) product design and characteristics. Building on this work, Hernandez et al.[20] identified five key challenges to device repairability:

Table 1. Challenges to Device Repairability

Challenge	Description
1	Lack of Knowledge on How Products Work
2	Lack of Spare Parts, Technical Information, and Restricted Contract
3	Lack of Economic Incentives to Repair a Product
4	Lack of Emotional and Economic Attachment to Products
5	Lack of Design and Manufacturing Features Allowing Repairs

Note. Adapted from Hernandez et al.[21]

These challenges serve as the primary framework for this thesis's design considerations. The following case studies examine how commercial products and projects attempt to address these factors.

Figure 3: Google ARA modular phone prototype. Source: TechRadar (2023).

A prominent example of MPD is the Google Project ARA phone (Figure 3), which pioneered the concept of modular consumer electronics. It allowed users to swap out components for repair or performance upgrades in a "plug and play" model. Inspired

by Dutch designer Dave Hakkens' earlier Phonebloks concept[22], ARA generated significant interest but was never commercially released. Google cited technical complexity and prohibitively high costs. While ARA focused on design for repairability, it did not address access to spare parts or create economic incentives for adoption.

Figure 4: Framework laptop interior (Source: Framework Computer)

A more successful version of MPD in consumer electronics is the Framework laptop (Figure 4), popular among enthusiasts for its performance-to-cost value. Like ARA, it uses a grid-like layout where components plug into each other. All parts are fastened with accessible screws rather than glue or hidden clips, ensuring ease of repair and modification. By relying largely on off-the-shelf components, Framework provides good access to affordable replacement parts, leveraging the economies of scale of the existing computer industry.

Figure 5: Toyota IMV truck (Source: Toyota)

Moving on to transportation, Toyota released the IMV truck (Figure 5), designed for the African market, featuring a simple layout and basic off-the-shelf components. The use of heavily standardized parts—already common throughout Africa—negates the need for complicated custom components like injection-molded bumpers or stamped body panels. This no-frills approach leverages the vast networks of "bush mechanics" operating in remote areas, who can repair vehicles using locally available parts.

Figure 6: World Bicycle Relief Buffalo 2 (Source: World Bicycle Relief)

Finally, the World Bicycle Relief (WBR) Foundation's Buffalo 2 bicycle (Figure 6) aims to promote economic development through improved transportation access. While bicycles are inherently modular, WBR designed the Buffalo 2 with extra-durable components suited for rural conditions and high loads. Unlike Toyota, which relies on existing market networks, WBR proactively partnered with local bicycle shops across Africa to provide parts and train staff on repairs, using its own funds to supply bikes to users[23].

3. Speculative Design and Critical Design

3.1 Inspiration and Purpose

Critical and speculative design emerged at the Royal College of Art in London during the 1990s, gaining widespread attention with the 2013 publication of Dunne and Raby's Speculative Everything [24][25][26]. This approach subverts traditional design practice by prioritizing the questioning of social power structures rather than explicit problem solving. The research duo observe that the end of the Cold War created a "vacuum of ideology," leaving neo-liberal capitalism as the dominant global system with few collectively imagined alternatives [4]. This sentiment is mirrored in Mark Fisher's observation that "it is easier to imagine an end to the world than an end to capitalism" [27], and in Francis Fukuyama's "end of history" thesis, which argued that humanity had reached an ideological stasis [28].

Figure 7: The futures cone as illustrated in Dunne & Raby's Speculative Everything (2013). Source: UK Government Policy Lab (2016).

Central to Dunne and Raby's framework is the distinction between different categories of futures. Drawing on futures studies, they map potential futures across four overlapping cones: the probable, the plausible, the possible, and the preferable[4] The preferable future is where speculative design operates: not predicting what will happen, but using design to open debate about what should happen.

Figure 8. BMW's GINA concept car. Source: New Atlas (2008).

Dunne and Raby drew inspiration from a range of sources across art, architecture, and design. Concept cars demonstrate how design can visualize possible futures, though typically for commercial rather than critical purposes. BMW's GINA concept car, with its flexible fabric skin, exists between functional prototype and speculative provocation. Similarly, visionary architects like Superstudio and Lebbeus Woods produced drawings of unbuildable buildings that were acquired as artworks, demonstrating that architectural value need not reside in buildability[4].

Their work was also shaped by the convergence of art and design in the 1990s. They credited artists including etoy, Mel Chin, Maywa Denki, and Liam Gillick for developing critical strategies that unsettle the relationship between companies and consumers. Found object art and conceptual art influenced their methodology of

appropriating familiar forms and recontextualizing them as vehicles for inquiry. Raby's background in architecture brought a sensibility for designing entire parallel worlds, while Dunne's experience in industry exposed the limitations of mass production.

Table 2. Affirmative vs. Critical Design

A	B
Affirmative	Critical
Problem solving	Problem finding
Provides answers	Asks questions
Design for production	Design for debate
Design as solution	Design as medium
In the service of industry	In the service of society
Fictional functions	Functional fictions
For how the world is	For how the world could be
Change the world to suit us	Change us to suit the world
Science fiction	Social fiction
Futures	Parallel worlds
The “real” real	The “unreal” real
Narratives of production	Narratives of consumption
Applications	Implications
Fun	Humor
Innovation	Provocation
Concept design	Conceptual design
Consumer	Citizen
Makes us buy	Makes us think
Ergonomics	Rhetoric
User-friendliness	Ethics
Process	Authorship

Note. Adapted from Dunne & Raby[4].

3.2 Core Techniques and Outcomes

Central to speculative design practice is a set of techniques that prioritize inquiry over resolution. Dunne and Raby map potential futures across four overlapping cones: the probable, the plausible, the possible, and the preferable. The preferable future is

where speculative design operates—not predicting what will happen, but using design to open debate about what should happen.

Table 3. Core Techniques of Speculative Design

Technique	Description
"What If" Questions	Posing speculative propositions to open debate about possible futures rather than presenting solutions
Physical Fictions	Creating tangible objects that function as "invitations to make-believe"
Parallel Worlds	Designing not just objects but entire alternative realities with their own logics
Counterfactuals	Exploring scenarios that diverge from reality to question why things are the way they are
Reductio Ad Absurdum	Taking ideas to logical extremes to expose flaws or hidden assumptions
Functional Fictions	Objects that work practically while carrying critical meaning

Source: Adapted from Dunne & Raby[4].

Outcome forms include:

Para-functional prototypes: objects that function but also carry critical commentary

Post-optimal prototypes: designs that move beyond efficiency/usability toward social/ethical questions

A significant example of these techniques in practice is Dunne and Raby's installation Is This Your Future?[29], commissioned by the Science Museum in London. The work presented three speculative energy futures through a twelve-part installation: one powered by hydrogen, one by recycled human waste, and one by

animal blood. Each scenario was rendered through photographs and functional objects that served as "invitations to make-believe"[4]. The recycled poo scenario, inspired by a visit to a chicken farm that generated electricity from chicken waste, imagined a world where human waste becomes valuable enough that people would want to keep it, disconnect from the sewage system, and even offer it as a gift[30]. A children's lunchbox with compartments for lunch and poo served as a playful provocation, encouraging young visitors to consider the cultural and ethical consequences of energy systems.

Figure 9: Dunne & Raby, Is This Your Future? (Recycled poo lunch box), 2004. A dual-compartment lunch box labeled “Lunch” and “Poo”. Source: Science Museum Group Collection.

Rather than offering solutions, these artifacts functioned as functional fictions—objects that work practically while carrying critical meaning. They were designed not for production but for debate, asking visitors to consider not whether

alternative energy was possible, but what kind of social, economic, and domestic lives might accompany it. The installation demonstrated that speculative design could serve as a tool for public engagement and policy discussion, generating insights about user behavior and societal values rather than simply artistic provocation.

Figure 10: Deepa Butoliya, Critical Jugaad (Gas masks from single-use water bottles). Source: Butoliya (2017).

This approach—using design to question rather than solve—has since been adopted across a range of research contexts. Design researcher Deepa Butoliya has challenged the field to engage with Global South practices like jugaad—frugal, improvisational innovation—arguing that speculative design must learn from contexts where scarcity and contingency are material realities, not hypothetical scenarios[31]. Her gas masks, fashioned from discarded water bottles, are not functional masks but provocations: they ask what it means to improvise protection when systems fail, pointing to how citizens already become designers out of necessity.

Beyond academia, speculative design has been embraced by government bodies including the European Commission's EU Policy Lab, which uses speculative artefacts to help policymakers "pro-actively prepare for futures to come" across multiple Directorates General[32]. The UK Government's Policy Lab, which introduced speculative design to government in 2014, has employed these methods for public engagement on issues ranging from ageing populations to the future of work[33][34]. These examples affirm that speculation can function not only as critique but as a generative research tool across sectors—a role this thesis adopts in its own design process.

3.3 Cultural and Class Subversion in Practice

The principles of critical design are not confined to academic contexts—they can be found in commercial practice, where designers from marginalized backgrounds use their platforms to challenge cultural assumptions and revalue overlooked aesthetics. Two examples, from different corners of the diaspora, illustrate this approach.

Figure 11: Sandy Liang x Baggu Mini Bow Bag. Source: Fashionista (2023).

New York-based fashion designer Sandy Liang's work is deeply rooted in her Chinese-American upbringing. Her sold-out collaboration with Baggu featured patterns reminiscent of the "plaid flower market" textiles commonly worn by elderly Chinese women in neighborhoods like Chinatown . These patterns are typically associated with a specific class and generational identity, often dismissed as unfashionable or "low-class." Liang's collections consistently draw on her heritage—she has presented shows inside Congee Village, a restaurant with deep connections to Chinatown's immigrant community. By re-contextualizing these textiles on desirable, contemporary products, Liang elevates them from markers of low-income taste to objects of cultural appreciation, turning symbols of working-class immigrant life into sought-after design objects .

Figure 12: Lulasclan Zaariah Throw Pillow, Milala Collection. Source: Visi

A parallel example comes from South African textile designer Bonolo Chepape, founder of the homeware brand Lulasclan. Chepape started the brand after struggling to find homeware that represented African contemporary aesthetics. Drawing on her Pedi cultural roots and childhood memories of her grandmother's home in Limpopo, she creates bold, geometric-patterned cushions, tablecloths, and rugs that celebrate African design on its own terms . Her work directly challenges the notion that "good taste" means muted, Western-approved aesthetics; she recalls that galleries initially considered her use of colour "too bold" for interior spaces.

Liang recontextualizes Chinatown textiles and Chepape elevates South African cultural patterns through accessible commercial products. Both of these designers use humble, culturally-significant materials and motifs to question dominant narratives about value and taste. Liang validates immigrant aesthetics often dismissed as low-class, while Chepape demonstrates that African design need not conform to Western minimalism to be considered sophisticated. This directly parallels the goal of my thesis.

3.4 Comments

The theoretical frameworks and case studies examined in this chapter establish the foundation for this thesis's design intervention. Dunne and Raby's speculative design provides the methodological tools for questioning dominant narratives and imagining alternatives—a practice that uses "what if" questions to open debate about the kinds of futures people might want, or want to avoid. The examples of Sandy Liang and Bonolo Chepape demonstrate that designers from marginalized communities can successfully challenge hierarchies of taste by recontextualizing humble, culturally significant materials into desirable commercial products, proving that value can be reimagined from within the Global South and its diaspora.

Yet the field of speculative design is not without its contradictions. Institutions like

the MIT Media Lab, which houses projects such as the Drone Aviary that advocate for environmental justice and community empowerment, are simultaneously deeply embedded in the military-industrial complex—receiving funding from the Department of Defense, NASA, and defense contractors while producing critical work about inequality and oppression. This irony is not unique to design. Across disciplines—from development studies to post-colonial theory—elite Northern institutions have built entire academic careers and institutional reputations on the study of systems they remain structurally entangled with.

Design researcher Deepa Butoliya has challenged this dynamic directly. Her concept of Critical Jugaad—drawn from the Hindi term for frugal, improvisational innovation—asks what speculative design might look like when grounded in scarcity rather than abundance, in improvisation rather than planning[31]. Where Dunne and Raby's speculative design imagines alternative futures from a position of Northern privilege, Butoliya points to practices already thriving in the Global South: informal repair networks, adaptive reuse, and making-do. She argues that these are not deficits to be overcome, but forms of design intelligence that speculative practice could learn from. Her critique exposes a deeper tension: when elite institutions discuss systems of oppression, they often do so from a safe distance—studying inequality without being accountable to it, theorizing liberation without risking their own institutional positions. The result is a form of intellectual extraction: knowledge produced about the Global South and marginalized communities, often without meaningful accountability to those communities.

The examples of Liang and Chepape demonstrate that value can be reimagined from within the diaspora; Butoliya's critique reveals the limits of Northern speculation; and my own positionality as a Mauritian designer offers a path forward: using speculative design not to theorize inequality from a distance, but to build objects that function within it. The modular e-scooter that follows is an attempt to put this into practice.

4. Sino-Mauritian Ethnography

4.1 Introduction

- Contemporary Attitudes: Semi-structured interviews to uncover classist attitudes in China and Mauritius regarding e-scooters and Chinese products
- Historical Basis: More exploratory analysis of Mauritian material culture, drawing on personal experience, observation, and selective facts to identify opportunities for critical design intervention

4.2 Ethnographic Findings: Class and Stigma in Transportation

4.2.1 Interview Methodology

Table 5. Interviewees

	n	18-35	35-65
China	8	8	0
Mauritius	5	2	3

Semi-structured interviews were conducted individually in person, over the phone, or online, in English, French, and Mauritian Creole depending on participant preference, and translated to English when needed. The semi-structured format with open-ended questions allowed for flexibility to explore key themes without unduly influencing responses. These themes included: preferred modes of transportation, perceptions of different vehicles, associations between products and social class, and preferences for local versus foreign goods.

A small sample, skewed toward well-educated students and young professionals from middle to upper-middle class backgrounds was selected due to their cultural capital[8], acting as gatekeepers of legitimate taste.

4.2.2 Decoding

Interview notes were analyzed by decoding recurring patterns to uncover underlying themes. This involved systematically reviewing the notes to identify implicit assumptions, shared attitudes, and unspoken associations embedded in how participants discussed transportation. Through this interpretive process, two primary themes consistently emerged across both Chinese and Mauritian participants: safety concerns and class associations.

Table 6. Decoding Views on Scooter and Motorcycles

Themes	Codes	Quotes
Class & Practicality	Safety	“it can quickly become dangerous”
		“I’m to scare to try riding because of the speed. I’m scared for my life”
		They don’t care about rules, crossing traffic and cutting of pedestrians whenever.
		“I f*cking hate those things, I almost died the other day”
	Poor Behaviour	They don’t care about rules, crossing traffic and cutting of pedestrians whenever.
		"I feel like people who ride scooters are of low quality "
		"Some people riding on sidewalks”
	Style	"Scooters are not particularly stylish"

4.2.3 Analysis

The interview data reveals a consistent tension between practicality and classism, where safety concerns and poor behavior serve as surface-level justifications for deeper biases. Participants across both China and Mauritius expressed fears about scooter safety and criticized rider behavior, yet these concerns were often paired with class-based judgments. One participant stated, "I feel like people who ride scooters are of low quality," while another dismissed scooters as "not particularly stylish." These comments suggest that the stigma attached to scooters is not rooted in their functionality—they are efficient, affordable, and practical—but in their association with lower-income users.

This pattern reflects a broader phenomenon documented across post-colonial contexts. As the Filipino psychologist E.J. David has written, colonial mentality manifests as "an automatic and uncritical emulation of Western values and likewise an automatic and uncritical denigration of indigenous Filipino values"[32]. The Filipino scholar E. San Juan Jr. similarly describes how over half a century of U.S. colonial rule resulted in "inculcating a 'colonial mentality' among Filipinos," characterized by "the idolization of anything and everything 'American'"[33]. This dynamic—where local practices are devalued while foreign alternatives are elevated—parallels what participants expressed about transportation: Japanese cars are prized, European brands are aspirational, while local and affordable options are stigmatized.

The themes of classism and practicality identified here serve as the analytical lens through which I will examine Mauritian post-colonial identity in the following section. As the literature on colonial mentality suggests, these hierarchies are not merely local but are embedded in global power structures that position Western products and practices as inherently superior. This framing helps explain why scooters—efficient, practical, and widely used across the Global South—remain stigmatized, while

imported cars carry prestige regardless of age or condition.

4.3 Mauritian Post-Colonial Identity: Material Culture Through the Lens of Class and Practicality

4.3.1 Key Findings

A key repeating patterns is that societal and cultural elements that are more local are perceived as less sophisticated and more vulgar.

Table 7. Key Findings of Mauritian Post-Colonial Identity

	Low Class	High Class
Language	Mauritian Creole, non-European languages	English and French
Education	Lack of education, small local schools	British curriculum, International school, overseas post-secondary
Career	Farming, fishing, manufacturing, tourism	Finance, Law, Medicine, Engineering
Housing	Wood/corrugated steel in countryside/low-income neighbour-hoods	Concrete house in capital/wealthy neighbour-hoods
Transportation	Motorcycle, bus, hitchhiking, carpooling	Personal car

Having been colonized by both France and England for extended periods of time, contemporary Mauritian society has been deeply shaped by the post-colonial legacy

of these powers. It is no surprise that Western influence and classicism are deeply intertwined in the social power dynamics of the nation. Through the lens of class and practical concerns, I will briefly investigate the hierarchical relationships from table 7, paying particular attention to how they are reflected in Mauritius' material culture. This analysis will come from my personal observations, semi-structured interviews with 3 middle aged Mauritians, and cross referencing historical and contemporary data.

4.3.2 Education and Labour

The colonial foundation of the Mauritian economy was centered on sugar-producing slave plantations, established to enrich first the French, then the British[34]. The education system developed in parallel, structured to serve the same colonial logic. Post-independence, the national priority shifted to growing the local economy by catering to global markets, centering on a four-pillar strategy: sugar, tourism, manufacturing, and financial services[35].

Education became the mechanism through which individuals could access the opportunities created by this economic structure. Public schools follow the British curriculum and use the Cambridge examinations[36], creating a hyper-competitive environment that controls access to local and foreign universities, and by extension, regulates entry to high-paying professions in finance, law, medicine, and engineering. Families with means often send their children to international schools in Mauritius or abroad, increasing the likelihood of attending a high-ranking foreign university, which has long been viewed as more prestigious than the local university[37]. These structures have also shaped what Mauritians wear. The British-based education system established Western-style school uniforms; the economy oriented toward global markets demands Western formal attire for professional work. The colonial legacy—in which westernization was framed as synonymous with modernity—has

even manifested itself in wedding attire and rituals, despite the majority of the population being people of color[37].

Figure 13. Bay full of small fishing boats (Pirogue). Source: Bonjour Maurice (2024).

On the opposite end of the spectrum, those with limited access to educational resources work mainly in blue-collar jobs, such as agriculture, manufacturing, fishing, gardening, hospitality, and domestic service. While essential to the economy, these jobs earn substantially less money and low social status. Naturally, materials related to blue collar work have long held associations of poverty and low class. One of the most visually striking examples are the traditional boats known as Pirogue, often used for subsistence or small scale fishing (Figure 13). These small rafts are typically painted bright colours, with contrasting lateral stripes.

The desire for a better life—to earn more, to work less physically demanding jobs, to secure one's children's future—drives families to invest heavily in education. This pursuit of practical improvement is understandable and, for many, necessary. Yet it simultaneously reinforces the very class hierarchies it seeks to escape. These pressures have led to a further shift: as Mauritians increasingly avoid blue-collar work,

the gap has been filled by laborers from Bangladesh and other parts of South Asia, concentrated in sectors such as construction, manufacturing, agriculture, and domestic service. Consequently, Bangladeshi clothing has become, in the eyes of many Mauritians, a clear symbol of low class—a visible marker of who performs the labor that keeps the economy running but is socially devalued.

4.3.3 Language and Music

Besides labour, education has also reinforced clear class distinctions in language. The status of Mauritian Creole as the default vernacular—spoken by the vast majority and requiring no formal education—distinguishes those who speak English and French fluently, since those languages demand significant education and resources to master. In linguistic terms, Creole serves the role of a basilect, while English and French serve as acrolects[39]. Creole itself is a colonial legacy, born from the institution of slavery under French rule, where a small white minority ruled over an enslaved majority. The enslaved were deliberately deprived of formal education; French was never taught, only heard in the form of commands, orders, and fragmented speech. The language born from a system designed to keep one group powerless and another in power cemented its role as the vernacular. After the abolition of slavery, the arrival of Indian and Chinese indentured laborers under British rule reinforced this dynamic. They adopted Creole as their lingua franca, adding words from Indian languages and Chinese dialects to its lexicon[40].

As a result of such hierarchical relationships, many well educated Mauritians have long refused to speak Creole, as a matter of pride to distinguish themselves. One respondent in his late 50s claims that in his generation, the completion of Secondary School was still relatively rare and considered a great academic achievement, so by extension many households of Secondary School graduates often refuse to speak creole and exclusively speaking “proper” French as a point of pride and class

distinction. Such negative views have historically also extended to Creole music, known as Séga. Explicitly prohibited under French colonial law, gatherings for Séga music and dance were practiced in hiding, earning the derogatory title of “backyard music”[41][42]. Sega music was additionally shunned by the Catholic Church, itself another legacy of French Colonialism[43]. At the heart of this controversy is the traditional Sega dress, characterized by its long, flowing form and the ribbon of ripples along its hem. This dress is typically brightly coloured, often featuring flower motifs, and is held on it’s ends and spun around while dancing (Figure 14).

Figure 14. Séga dancer. Source: Pinterest (2015).

Figure 15. Nuit du Séga. Source: Lespas (2024).

These views have gradually significantly evolved since independence from the British, however, it remains a controversial topic. A major milestone was the establishment of the first Nuit du Séga (Evening of Séga) in 1964, sponsored by the Mauritian Tourism Board and attended by over 6,000 spectators. In 2014, Séga was inscribed by UNESCO as an Intangible Cultural Heritage of Humanity, recognizing its significance as "the emblematic music and dance of the people of Mauritius"[44]. The same year, the government of Mauritius officially recognized Mauritian Creole

(Morisien) as a national language, and in subsequent years, it has been introduced as a subject in primary schools[45]. These developments represent a significant reclamation of cultural identity. The Sega dress is now worn with pride at cultural festivals and national celebrations. Its transformation mirrors that of the language and music from which it emerged: what was once hidden is now celebrated.

Yet such acceptance is not universal. As discussed in the previous section on education and labour, mastery of the colonial languages—English and French—brings significant financial advantages. Both are gateways to better jobs, higher incomes, and quality of life. For many Mauritians, fluency in these languages is not simply cultural but economic. Views remain split—between generations, between classes, and within families—reflecting the unresolved contradictions of a post-colonial society.

4.3.4 Housing

One of the most evident visual markers of inequality is housing. Economic classes are both geographically and architecturally segregated. There is not only a strong urban-rural divide in wealth and access to resources, but even within urban regions. Low-income neighborhoods are known as “la cité” and highly stigmatized. The distinct use of materials and design enforce this visual segregation. Low-income homes are built out of wood beams and planks, and extensively employ sheet of corrugated steel as roofing and for walls (Figure 16). This is often shoddily constructed without the oversight of an architect or engineer, prone to rats and pests, and unable to provide adequate protection from the elements in an extremely cyclone prone region.

Figure 16. Corrugated steel being used as a fence. Source: Still from Sayaa (2024).

On the other hand, middle class homes are constructed of concrete beams and cinder block homes. These homes are much more sturdy during cyclones, resistant to rats and pests, and more closely resemble the European ideal of modern architecture. Naturally, everyone who has the resources builds modern concrete block homes, which simultaneous reinforces and blurs this divide. Beyond materials and style, there is also a divergence in planning and funding. Lower-income earners upgrade incrementally. A wood and corrugated steel home may be transformed over decades: first a single wooden column replaced with concrete, then a wall of corrugated steel swapped for cinder blocks, then another column, then another wall. Each upgrade is funded when money can be set aside, taking decades instead of months to complete the transformation.

Figure 17. Author's Childhood Home Under Construction. (1998).

Middle class households typically have sufficient resources to pay a lump sum to construct their concrete homes all at once, which results in a home that can be intentionally designed and built in a timely manner. However, middle class also typically leave rebar from the columns protruding about the roof, so that additional floors could be later added. This practice is codified in Mauritius's building regulations, which allow for "starter bars"—steel reinforcement left protruding from columns to accommodate future vertical extensions[46].

4.3.5 Transportation

Transportation in Mauritius reflects many of the same hierarchies evident in education, language, and housing. Cars, vans and pickup trucks are particularly popular due to their ability to travel long distances, carry many passengers and a lot of cargo. This is particularly useful in a country with notoriously unreliable public transit, with frequent complaints about waiting over an hour for a bus[47]. This issue is compounded by the fact that buses are privately operated, and often wait at major stations to fill up prior to departure rather than following a fixed schedule, to maximize profits[48].

However, cars are also very expensive in Mauritius due to the need to import from overseas and high taxes. Customs and excise duties on imported vehicles can reach up to 100 percent of the vehicle's value[49]. Additionally, the corporations have historically provided company cars to senior-level white-collar employees. This combination of practicality, high cost, and corporate provisions, has made car ownership a marker of status. European brands like BMW, Mercedes-Benz, and Audi dominate the luxury segment, reserved for top executives and the wealthy elite. But for the broader market, Japanese brands, particularly Toyota, hold the greatest prestige. A used Toyota Corolla or Hilux is often preferred over a brand-new alternative from a less reputable manufacturer, a testament to the reputation of Japanese engineering for reliability, durability, and resale value.

Motorcycles are the mode of choice for those who cannot afford cars, making them a common sight across urban regions (Figure 18). They are affordable, fuel-efficient, and better suited to navigating congested roads. Yet they are also the most dangerous form of transport on Mauritian roads and lack the power and comfort for long-distance travel—a significant limitation in a country where commuting distances are often considerable. The same affordability that makes motorcycles accessible to blue-collar workers also exposes them to greater risk, inconvenience, and stigma.

Figure 18: Street view of Port Louis. Source: Wikimedia Commons (2021).

What emerges is a pattern consistent with the other domains explored in this chapter. Practical concerns do not stand apart from classism; they are woven into it. What is local, affordable, and less safe is coded as inferior; what is foreign, expensive, and exclusive is coded as aspirational. The practicality of motorcycles and scooters—their efficiency in space, fuel, and cost—is overshadowed by the cultural baggage attached to them.

4.3.6 Comments

The structural inequality in Mauritius that I have explored in this chapter is due to a mixture of practical concerns and prejudicial views, deeply intertwined with historic colonialism and ongoing global capitalism. Many topics I have discussed are quite sensitive, and are deeply entrenched in global power structures. At the heart of this system is the desire to to earn more, work less hard and live a more comfortable life. Such ironic sentiments are not unique to Mauritius, as Lee Kuan Yew famously declare that “Do not speak Singlish. If you do, you are a loser"[50], believing that "proper" English was necessary for international trade and investment[51]. The

combination of these global power structures and individual practical needs inadvertently serve to reinforces both a global cultural hierarchy and local classism.

In many ways, China also reflects these social dynamics due the local material realities and global market demand. Despite the great achievement in past decades, China still has very high geographical and educational inequality. Even manufacturing jobs, a cornerstone of Chinese development, are often seen as a of last resort amongst the youth. A 2022 survey found that only 20.41% of workers under 25 expressed willingness to become factory workers, and among those unwilling, 13.46% cited social status concerns[52]. The practical needs and social perceptions in China have contributed to great economic development, but they also greatly impact the use transportation, providing a clear class indicator. However, being a foreigner, and not intimately familiar with the ins and out of Chinese society, I will be specifically focused on integrating Mauritian elements in my design to challenge conceptions in my country.

While the acceptance and even embrace of local culture is often heavily reliant on romanticizing aesthetics, which is a very slippery slope and dangerous direction. This topic is also very intertwined with my family history, upbringing and personal experiences, so I can understand how ridiculous it is and how deep rooted it is. I grew up in a french speaking household, due to my parent's belief in the utility of a more global language, have many cousins who have studied at local international schools or studied abroad, while others have studied at local public schools. My parents and grand parents from both sides all grew up in shoddily constructed wooden houses, as was the norm at the time, gradually upgraded their living. As much as I critique these issues, I am not at all immune to it either, I am part of the same hypocrisy.

5. Environmental Scan and Market Analysis

5.1 What is: Market Analysis in China and Mauritius

5.1.1 Overview: Two Contrasting Markets

China is the world's undisputed leader in electric vehicle production and consumption, accounting for more than half of global EV sales in 2024[53]. Electric scooters have become ubiquitous across Chinese cities, powering extensive last-mile delivery networks and serving as primary daily transport for millions of commuters, students, and rural residents.

Mauritius presents a fundamentally different picture. Like much of Africa, the island nation lacks heavy industry and relies extensively on imported second-hand vehicles to meet its transportation needs. The market is dominated by used cars and motorcycles—primarily from Europe, Japan, and Australia—which arrive with existing wear, outdated technology, and limited safety features[7]. Electrification is slowly gaining traction, but adoption remains small.

Table 8. Comparison of Shanghai and Mauritius' Two Wheeler Market

Location	Total Two-Wheelers	Total Population	Vehicles per Capita	Percentage of Fleet
Shanghai	10 million+	24.80 million	1 per 2.5 people	—
Mauritius	253,943	1.26 million	1 per 5 people	34.6%

Sources: 汽车之家[54]; Statistics Mauritius[55]; Shanghai Municipal Statistics Bureau[56]

Understanding China's mature ecosystem can inform design decisions for Mauritius's emerging market, while the comparison reveals where adaptation is necessary.

5.1.2 China's E-Scooter Market Structure

Sit-down scooters (moped-style) dominate due to their comfort, stability, and cargo-carrying capacity. These are the preferred choice for daily commuting and commercial use, with the majority of sales falling under the "electric motorcycle" and "electric moped" regulatory categories. Stand-up kick scooters occupy a smaller niche, primarily used by younger riders for short-distance travel and last-mile connectivity. Motor Power and Regulatory Classification. Electric two-wheelers fall into three regulatory categories under China's "New National Standards" (新国标), as defined in the national 强制性标准《电动自行车安全技术规范》(GB 17761-2024)[57]:

Table 9. Chinese Two Wheeler Classifications

Classification	Max Speed	Motor Power	Typical Use
Electric Bicycle (电动自行车)	≤25 km/h	≤400W	Short commutes
Electric Moped (电动轻便摩托车)	25–50 km/h	400–800W	Daily commuting, Delivery
Electric Motorcycle (电动摩托车)	>50 km/h	>800W	Long-distance, delivery

End Users and Applications. The user base is diverse and segmented:

Table 10. Key Users in China

User Group	Key Characteristics	Design Implications
Commuters	Urban professionals, students, daily travel	Reliability, comfort, ease of use
Delivery Workers	Meituan, Eleme, courier services — high daily mileage, heavy use	Durability, quick battery swapping, cargo capacity
Elderly Users	Retirement communities, leisure riders	Stability, low step-through height, simple controls
Rural Users*	Limited public transport, multi-purpose use	Affordability, ruggedness, easy repair

Delivery services represent a particularly critical application segment. As of February 2026, the national total of food delivery riders exceeded 13 million, with Meituan alone reporting 7.45 million riders[58]. This commercial use creates distinct requirements for durability, battery life, and repairability that differ from personal commuting.

5.1.3 Key Life-Cycle Data for China's E-Scooter Market

The current lifespans of scooters in China reveal a significant gap between how long these vehicles could last and how long they actually remain in use. Understanding why this gap exists requires examining several interconnected factors: legal regulations, usage patterns, and the natural degradation of individual components.

Table 11: Current Scooter Lifespans

Vehicle Type/Use	Lifespan	Key Factors
Budget e-scooter (under ¥2000)	3-5 years	Battery degradation, component aging leads to performance decline
Mid-range e-scooter (¥2000-5000)	5 - 8 years	Frame aging, rising repair costs
High-frequency delivery use	1.5 - 2 years	Annual mileage 20,000-30,000km, motor demagnetization, frame fatigue

Source: Pacific Automotive[59]

As Table 11 shows, budget scooters are discarded after just 3-5 years, while even mid-range models rarely exceed 8 years. Most striking is the fate of delivery scooters, which endure 20,000-30,000 km annually and are replaced every 1.5-2 years—far below their mechanical potential. These actual lifespans stand in stark contrast to what regulations permit. China's 2025 scrappage regulations establish clear legal limits that far exceed real-world outcomes:

Table 12: Vehicle Types and Legal Lifespans

Vehicle Type	Legal Lifespan	Notes
Electric Bicycle (电动自行车)	10 years (license validity)	License validity 8-10 years in some regions; requires safety inspection upon expiration; can be renewed if qualified, scrapped if unqualified
Electric Moped / Motorcycle (电轻摩/电摩)	13 years (mandatory scrappage)	Follows motor vehicle management standards; early scrappage required if cumulative mileage exceeds 100,000 km

Source: Pacific Automotive[59]

The contrast is clear: regulations allow 10-13 years of use, but actual practice rarely exceeds half that. This gap points to deeper issues in how these vehicles are designed and maintained. The explanation lies partly in the lifespans of individual components. Table 13 breaks down how long key parts last before they need replacement:

Table 13: Core Component Lifespans

Component	Type	Lifespan
Battery	Lead-acid	~1 year
Battery	Lithium	~3 years
Motor	—	3-10 year warranty
Frame	Ordinary steel pipe	~8 years
Frame	High-quality alloy steel	~10 years

Source: Zhang Xiliang, Executive President of the Ningbo Electric Vehicle Industry Association. Ningbo News[60]. Estimates are based on industry experience rather than controlled testing.

The significance of this data becomes clear when read alongside Table 11. The components that wear out fastest—batteries and motors—have lifespans of only 1-3 years, while the frame, which forms the structural core of the vehicle, can last 8-10 years or more. A delivery scooter's frame might still be functional after two years, but its battery and motor are worn out—and because these parts are difficult to replace, the entire vehicle is discarded.

This mismatch is the central opportunity for modular design. If the frame is designed to outlast multiple generations of components, and if those components can be easily replaced when they fail, the overall lifespan of the vehicle can be extended dramatically. Rather than discarding an entire scooter when a battery dies or a motor wears out, users would only need to replace the failed part. The legal potential of 10-13 years could become an actual reality.

Figure 19. Average E-Scooter Life-Cycle in China

5.1.4 Chinese E-Scooter Visual Ethnographic Analysis

Despite all the publicly available data, it is quite difficult to understand the ubiquity of the e-scooter without personally witnessing it. Over the the last two years, I have had the opportunity to travel to many major cities, including Beijing, Shanghai, Guangzhou and Chengdu, as well as numerous villages and rural regions, and witness the widespread use of e-scooters across the country. In this section, I will break down my analysis of the behavior, uses and form factors of scooters in Shanghai, to compliment the data presented earlier and get a more comprehensive understanding.

Figure 20: Small scooter parking lot at ECNU (Photo by author).

First of all, electric scooters, with a moped-style underbone frame are the overwhelmingly dominant style of motorized two wheeler in Shanghai, with gas powered scooters and motorcycles being a rare site. Commercial vehicles are highly concentrated around distribution centers while consumer vehicles are commonly found in residential neighborhoods (小区), university campuses, shopping malls and metro station.

Figure 21. Scooter carrying packages (Photo by author).

The most common style of heavy duty commercial scooters, used for carrying large quantities of cargo such as groceries, packages, and occasionally tools or construction materials. This style of scooter, features a wide deck and extremely large frame that extends from over the front and rear wheels (Figure 21). The rear bed unfolds to double in width. All of these features facilitate the ability to attach baskets, bins, insulated boxes, or large items, and ultimately maximize cargo carrying capacity (Figure 22).

Figure 22. Scooter carrying old machinery (Photo by author).

On the other end of the spectrum, the small almost toy-like scooters, visible in Figure 23, are extensively used for short trips. This style of particular popular amongst students and young adults. The frame is extremely small, with a narrow deck and only a singe tube holding up the small driver's seat. While a small basket can hold a few essential personal belongings, cargo carrying capacity is non-existent. The tiny rear seat is suitable for the 12 year old legal age limit for rear passengers[61]. However, it is quite common for this law to be disregarded and see two adults sharing a scooter.

Figure 23. Small scooters in front of ECNU library (Photo by author).

The mid-sized e-scooters come in a variety of shapes, with the frame sometimes extending over the rear wheel (Figure 24), but very often stopping in front of the rear wheel (Figure 25). This style of scooter is very popular amongst mid to long distance commuters, and has the largest variety of styles and uses. It is frequently employed by takeout delivery drivers for companies like Meituan or Eleme. It is often capable of carrying a year passenger, although not always, and can often be modified for an extended range and greater speed, sometimes exceeding legal speed limits outlined in the previous section. However, cargo carrying capacity is quite limited, beyond insulated cases and small trunks, either below or behind the seat.

Figure 24. Mid-size scooter with full length frame and insulated case on deck. (Photo by author).

Figure 25. (Photo by author). Mid-size scooter with short frame and insulted case hanging behind seat. (Photo by author).

5.2 Mauritius: An Existing Culture of Longevity

If China's market reveals the gap between what is possible and what actually happens, Mauritius presents a different picture—one where vehicles are already kept in use for extended periods, driven not by design but by economic reality.

No official data exists on motorcycle age specifically, but Statistics Mauritius provides clear evidence of long-term use across other vehicle classes. As Table 14 shows, over half of all cars in Mauritius—54.6%—are 10 years or older. Among commercial vehicles, the pattern is even more striking. Table 15 shows that a third of all buses have been in service for more than 15 years.

Table 14: Age Distribution of Cars, Dual Purpose, and Double Cabs (December 2024)

Vehicle Age	Number	Percentage
Less than 5 years	94,947	23.9%
5 to 9 years	85,412	21.5%
10 years or more	216,907	54.6%
Total	397,266	100%

Source: Statistics Mauritius, Road Transport and Road Traffic Accident Statistics 2024[62].

Table 15. Age Distribution of Buses in Service (2024)

Bus Age	Number	Percentage
Under 15 years	1,349	66.6%

Bus Age	Number	Percentage
Over 15 years	677	33.4%
Total buses in service	2,026	100%

Source: Statistics Mauritius, Road Transport and Road Traffic Accident Statistics 2024[62].

This longevity is driven by economics: new vehicles are expensive, so keeping existing ones running is the practical choice. Over time, this has created a culture where long lifespans are the norm and repair is embedded in daily practice. Mechanics are skilled at keeping old vehicles running. Spare parts networks serve this aged fleet. "Repair first, replace only when necessary" is not an ideal—it is how things work.

This existing culture is the foundation for modular design. The challenge is not to convince Mauritians to keep vehicles longer—they already do. The challenge is to provide vehicles designed to support the practices they already have: easier to repair, with components that can be replaced individually rather than requiring whole-unit disposal.

6. Project Concept

6.1 Project Scope and Approach: Designing for Contingency

The preceding chapters have established the theoretical foundations, ethnographic insights, and market conditions that inform this design project. However, both sustainable design theory and speculative design are both still very much dominated by the global north. These views are gradually changing as the Global South develops. I previously mentioned the rise of recognition of informal making and repair practices in section 3.4. The role of local knowledge and cultural heritage are also increasingly studied for the promotion of sustainable development, including the work of Dr Pombo. Speculative design is also critiqued for reinforcing the very hierarchy between designer and user that it claims to question[63], as well as being Euro-centric, overlooking the practices of the Global South[28]. I will first establish the realities of global south, based on the research presented, then overview how these findings will be translated to the final design project.

Figure 26. Unfavourable: Subversion of Possibility Cone

If speculative practice is to serve Global South contexts, it must begin not from abundance but from scarcity; not from control but from contingency. This means not only considering neo-liberalism, environmentalism and classism, but additionally considering post-colonialism and informal making or repair practices. Figure 20 highlights the North-South power dynamics highlighted throughout this research.

This project is designing not for optimism alone, but for contingency. The following 'what if' questions highlight current and future vulnerabilities, and are organized around three interconnected themes: trade and supply chains, post-colonial identity, and informal repair.

Table 16: What If Questions

1.	What if Mauritius were suddenly cut off from international vehicle imports?
2.	What if fossil fuels became prohibitively expensive or unavailable?
3.	What if the informal repair networks that sustain daily life could be supported rather than undermined by design?
4.	What language would Mauritians speak if not for European colonialism? What would be the language of education, law, and prestige?
5.	What styles of clothing would dominate formal and informal settings if not for colonial influence? What would "professional" or "modern" dress look like?

Together, the reframed cone of possibilities (Figure 20) and the "what if" questions (Table 16) serve as the methodological bridge between the research findings presented in previous chapters and the design strategies that follow. No matter what happens to the world, political instability, disruption in trade, shipping, access to oil or raw material, energy, production and transportation are still integral to people’s livelihoods. Using this framework, this project is designed to integrate into the existing realities of Mauritius, and cater to grow under all possibilities, not only preferable but even unfavourable outcomes.

6.2 Design Strategies

The requirements outlined in the previous section have been translated into four interconnected strategies (table 17). While presented separately for analytical clarity, in practice they overlap and intertwine, functioning as an integrated framework.

Table 17: Four-Pronged Design Strategy

Strategy	Primary Function
1. Fictional World Building	Stress-test the design against multiple possible futures to derive non-negotiable performance requirements
2. Modular Architecture	Enable repair and component replacement using locally available parts and tools
3. Lifecycle Evolution	Allow the vehicle to grow and change with the user's needs over time
4. Recontextualization	Challenge class-based and colonial hierarchies that stigmatize local materials and aesthetics

Fictional world building establishes the constraints that give the remaining strategies their urgency. By asking what happens if imports cease or fossil fuels become unavailable, it demands that modular architecture serve genuine necessity rather than novelty, that lifecycle evolution enable adaptation under scarcity, and that recontextualization carry meaning beyond aesthetics.

Modular architecture provides the technical foundation for lifecycle evolution. Without standardized interfaces and accessible fasteners, a product cannot grow with its user. At the same time, modularity enables recontextualization: interchangeable components allow the same functional platform to carry different symbolic meanings. Lifecycle evolution addresses both practical usability and emotional attachment. Modular architecture enables repair, but users must also want to repair. By allowing

the product to evolve with its owner over time—adapting to changing practical needs as well as shifting tastes—this strategy ensures the vehicle remains useful across different life stages while fostering the attachment that makes repair feel worthwhile. It also deepens recontextualization: a product that changes over time can engage with identity as something fluid rather than fixed. Recontextualization gives the other strategies their critical purpose. Modular architecture and lifecycle evolution could serve purely functional ends—efficient, repairable, adaptable. But without recontextualization, they would not challenge the hierarchies that stigmatize local aesthetics. By appropriating materials and forms associated with working-class life and placing them on a desirable functional object, this strategy reframes what counts as valuable. In doing so, it also strengthens lifecycle evolution: products that carry cultural meaning are less likely to be discarded. Together, these four strategies form a unified framework. The following section demonstrates how they are made tangible through three distinct configurations.

6.3 Concept Development: Manifesting the Strategies

The platform is built around a deliberately simple architecture. Its frame uses straight steel tubes in standard diameters, welded into a grid-like structure that requires no complex casting or proprietary profiles. This simplicity extends to the attachment system. Body panels and accessories mount using standard fasteners and uniform interfaces, eliminating hidden clips, single-use retainers, and specialized tools. This simplicity is intentional. It allows production and repair to happen anywhere—not only in industrialized factories but also in small workshops, backyard garages, and informal repair stalls. A welder with basic equipment can fabricate the frame. A user with common hand tools can replace a battery, swap a motor, or change body panels. The skills required are those already present in the informal repair economies documented in Section 2.4, not specialized knowledge locked behind proprietary

systems. This approach responds directly to the conditions established in earlier chapters.

Figure 27. Concept Project Lifecycle Diagram

This approach fundamentally alters the lifecycle of the scooter. Where conventional scooters in China established in section 5.1.3 follow a linear path from purchase, use, and discard, this scooter is intended to outlast generations, with all parts, including the frame, capable of being replaced over time, to change with the user needs and tastes (Figure 27). Three base configurations, outlined in table 18, demonstrate the expressive range of styles and uses that this design makes possible. They all share the same frame, but thanks to the modular architecture, they have completely interchangeable components and body panels. These configurations, however, are only a starting point. They demonstrate what the platform can do, but they do not limit what it can become. The underlying structure is intentionally open, inviting further development by the people who will ultimately use it.

Table 18: Three Configurations

Configuration	Geometric Shape	Primary Reference
Heavy-Duty	Rectangle	Utilitarian vehicles (jeeps, trucks); concrete architecture
Sport	Triangle	Sport cars, fighter jets;
Economy	Sphere	Mass-market economy cars (VW Beetle, Vespa); streamlined, efficient forms

The three base configurations each take a basic geometric shape that is a common form factor for vehicles (Table 18). These shapes, rectangular, triangular, and spherical, have emerged through decades of automotive and industrial design, shaped by aerodynamic constraints, manufacturing efficiencies, and cultural associations.

The heavy-duty configuration prioritizes cargo capacity and structural simplicity, evident in utilitarian vehicles like trucks and jeeps. The Sport configuration conveys speed and agility, recurring in sports cars and fighter jets. The spherical configuration suggests efficiency and streamlined form, embodied in mass-market icons like the Volkswagen Beetle and Vespa.

All of these basic shapes are themselves derived from utilitarian needs, and each is coded with its own aesthetic, utility, and class signals. They are then overlaid with references to Mauritian material culture. This combination of symbolism reflects and recontextualizes different facets of Mauritian class identity while calling into question the global power structures that enforce it.

Figure 28. Initial Concept Sketch

7. Design Project

7.1 Technical Breakdown

7.1.1 Parts and Components

To meet a wider variety of functions, the e-scooter is based on the general requirements of the relatively larger Chinese GB 24155-2020 standard. The scooter's length, height, seat position and materials are all based on the norms of scooters of this class. I will first go over the technical specs of the frame and then go over the use of off-the shelf components, and finally go over the body panels.

Table 19: Parts and Component Breakdown

Part	Material
Frame	Q345 Steel
Body	ABS Plastic
Battery	72V26Ah Lead-acid Battery
Headlight	7 inch Headlight
Motor	Wheel Hub Motor 1200W
Wheels	18 inch Wheel
Shock	300 mm Rear Shock
Brake	180 mm F&R Disc Brake

The selection of off-the-shelf components prioritizes existing supply chains already operating across the Global South, with many components being used across different

types of vehicles or products. The 7-inch headlight, for example, was once standard across multiple vehicle classes. While its use has decreased in recent years as brands adopt custom headlight assemblies, it remains common on many motorcycles and is easy to find through existing parts networks.

Beyond immediate availability, this approach also considers future adaptability. As user needs change or local market conditions evolve, components can be upgraded or downgraded accordingly. A owner who begins with the lead-acid battery for affordability can later switch to lithium-ion for longer range. A delivery worker might upgrade to a heavy-duty motor, while a student could choose a more economical configuration. This flexibility ensures the scooter remains relevant across changing circumstances without requiring complete replacement.

7.1.2 Frame

Figure 29. Technical drawing of the frame with key dimensions.

The moped-style underbone frame is constructed from Q345 steel, a high-strength alloy chosen for its excellent weldability. While aluminium is lighter, it is also

significantly more expensive, harder to weld and requires specialized welding equipment, while steel can be welded with basic tools found in any workshop. This makes the frame repairable and reproducible in small-scale fabrication settings, from rural repair stalls to backyard workshops. The main tube has an outer diameter of 38.1 mm (1.5 inch) diameter, is slightly larger than the 32–35 mm tubes typical in Chinese scooters to support a longer lifespan. It is also a global standard, ensuring that replacement tubing and aftermarket clamps are widely available across the Global South.

Table 20: Frame Material Specs

Specification	Detail
Material	Q345 Steel
Main tube diameter	38.1 mm (1.5 in)
Reinforcement tubes	25.4 mm (1 in) at stress points
Design lifespan	10+ years

The frame also extends over the rear wheel, to support a variety of rear attachments. Key stress points—including the head tube, deck, and swing arm pivot—are reinforced with additional 25.4 mm tubes welded alongside the main structure. Metal tabs, hinges, and threaded bosses are welded directly onto the frame to accommodate the rear shock, swing arm, battery tray, and body panels. Threaded attachment points include extra material thickness, allowing for re-tapping if threads are damaged over years of use. The full breakdown is in the table 20 below.

7.1.3 Body Panels

The body panels are made of injection-molded ABS plastic, selected for its impact resistance, weatherability, and compatibility with multiple fabrication methods. Unlike the model-specific body panels common on Chinese scooters—which require expensive tooling and become unavailable when models are discontinued—these panels use universal mounting dimensions. A broken panel can be replaced with any panel from any configuration. A local fabricator with basic thermoforming equipment can produce new panels without access to the original molds.

While injection molding is the most efficient method for mass production, the uniform mounting dimensions mean that panels can also be produced using vacuum forming, fiberglass layup, or even hand-shaped sheet metal. A small workshop in Mauritius could produce replacement panels using a simple vacuum former and locally sourced ABS sheets. A backyard fabricator could create custom panels from aluminum or steel.

This flexibility extends to the most basic fabrication methods. In contexts where even vacuum forming is unavailable—such as remote rural areas or periods of supply chain disruption—users can fabricate panels from whatever materials are at hand. Wood, corrugated steel, recycled plastic, or any rigid material can be cut, shaped, and mounted using the standardized attachment points. The design does not require industrial manufacturing. It accommodates the conditions documented in Section 2.4, where informal repair networks sustain access through ingenuity and available resources.

7.2 Design Assembly

Panels mount directly onto the frame using standard screws or bolts, secured into

welded bosses on the frame structure. They interlock with one another through overlapping edges and alignment tabs, creating a cohesive shell without exposed mounting hardware. This layered attachment system serves two purposes. First, it distributes structural loads across multiple panels, reducing stress on any single attachment point. Second, it allows panels to be replaced individually—a damaged side panel can be removed without disturbing the rest of the shell.

The panels assemble into 4 groups: the front, deck, seat hub, and side and rear assemblies (Figures 30-31). The seat hub additionally has internal storage, and the rear mount allows for a variety of different configurations. This includes a rear seat, a narrow rack, wide bed, large bin or an insulated box (Figure 32). The extended frame provides the necessary strength to meet all of those functions while promoting longevity.

Figure 30. Deck assembly diagram

Figure 31. Front, hub and side-rear assembly diagram

Figure 32. Rear Mount Interchangeable Parts

7.3 Base Configurations

7.3.1 Heavy Duty

Figure 33. Heavy Duty configuration

This first configuration, Heavy Duty (Figure 33), employs a series of intersecting rectangular prism. The vertical walls, and widened deck lend themselves to greater cargo carrying capacity, whether it be baskets, bins or even the Chinese style insulated bins used for grocery and takeout delivery. These intersecting blocks that protrude at different points additionally serve to critique the economic divide visible through architecture. The colors and textures are made to resemble 3 materials: concrete, wood and galvanized corrugated steel. In this context, the intersecting blocks are a metaphor for a housing unit, the modern architectural form, as well as the cinder blocks. The clash of wood and steel visualizes class conflict, recontextualizing the materiality of homes and buildings that are otherwise geographically and economically separated. It is ironic that all these materials are in fact modern, even the planks and beams used are thanks to modern machinery.

7.3.2 Sport

Figure 34. Sport configuration

The Sport configuration (Figure 34) employs an overlapping array of triangular shapes and lateral lines to embody key visual elements of the Mauritian pirogue—the traditional fishing boat. This includes visible lines and indents throughout the body, as well as a silhouette that narrows toward the bottom of the side panels, terminating with a stripe, to represent the side profile of the bottom of the pirogue hull. The seat hub, and the seats themselves also utilize the silhouette of the hull pad flipped upside down, creating a continuous shape that flows up from the deck all the way to the rear. The use of bright red recalls the vibrant colors of these boats.

This recontextualizes an iconic symbol that has historically been a tool of survival for many, traditionally associated with subsistence fishing and poverty, but increasingly romanticized. Yet many still scrape by making a living using these simple vessels, whether operating small tourist excursions or subsistence fishing. The angular, aggressive forms typically associated with sports cars and fighter jets are here merged with the lines of a working-class watercraft, depicts a dichotomy in aspiration, romanticism and harsh realities.

7.3.3 Economy

Figure 35. Economy configuration

The final configuration, (Figure 35), utilizes streamlined shapes of overlapping spheres. Born out of a drive for aerodynamics, are a quintessential element of Western modernization. The popularization of this aesthetic extended beyond improving vehicle efficiency to serve as a visual marker of Western technological advancement and style. This aesthetic is contrasted by ripples emblematic of traditional Sega dress, held on both sides and twisted in a dancing motion.

Within this context, these visual cues are recontextualized to represent the clash of aesthetics represents the inherent contradictions of economic development and cultural identity in post-colonial societies. The historic association of Western technology and style with wealth and progress in the Global South, an association that has extended to the widespread adoption of Western clothing in education, formal environments, and everyday life, also serves to devalue and dehumanize the local cultures in various ways.

7.4 User Survey and Usability Testing

Participants responded to ten questions about their attitudes toward customization and emotional attachment to products (see Appendix B for the complete survey instrument and Appendix C for full results).

7.4.1 User Survey

The survey revealed strong positive attitudes toward modular and customizable design. Upgradability and the ability to change a product's appearance over time emerged as the most influential factors, each scoring 4.5 out of 5, with all participants indicating these features would make them more likely to purchase and more likely to keep a product longer. Personalization was also highly valued, with average scores of 4.2 across multiple measures—its importance, its influence on purchase likelihood, and its ability to create emotional connection. The potential for refresh options to reduce replacement scored 4.3, suggesting that updateable design could meaningfully extend product lifecycles.

Notably, the connection between emotional attachment and repair behavior was evident. Participants reported sometimes avoiding repair due to low attachment (3.7), supporting the thesis that functional repairability alone is insufficient—emotional durability matters. However, willingness to pay extra for customization scored only 3.0, indicating price sensitivity and suggesting that modular features are valued but must be delivered at reasonable cost. Overall, the findings support a design approach that combines practical modularity with opportunities for personal expression and evolution over time.

7.4.2 Simulated Usability Testing

The same six participants who completed the user survey also took part in a simulated usability test. Two common maintenance tasks were evaluated: swapping the rear

cargo module and changing a body panel. Both tasks required only a standard screwdriver with a hex bit. Each task could be completed in under two minutes with minimal effort. Participants rated the cargo module swap at 1.3 out of 5 in difficulty, and the body panel change at 1.8 out of 5. These results indicate that the design successfully achieves its goal of enabling repair and reconfiguration with basic tools and minimal technical knowledge, aligning with the modular architecture strategy established in Section 6.2.

Table 21: Difficulty Rating

Finding	Result	Difficulty (average)
Rear module swap	1 tool, 4 screws	1.3/5
Body panel change	1 tool, 6 steps	1.8/5

7.5 Life Cycle Scenario

This section presents a hypothetical scenario illustrating how a single scooter platform might evolve over time to meet the changing needs of different users within a family, demonstrating the lifecycle evolution strategy established in Section 6.3.

Table 22. Product Lifecycle Scenario: Users and Configurations

Phase	User	Configuration
1	Father (delivery worker)	Heavy-Duty
2	Eldest daughter (university student)	Economy
3	Younger brother (teenager)	Sport

The father initially buys the scooter for work as a takeout delivery man. The scooter is purchased in its Heavy Duty configuration, with a rear seat and an insulated box tied to the deck. He is able to work, conduct errands and occasionally drive one of his kids somewhere. After a few years of hard work, he changes to delivering mail since the work is much less time sensitive, and allows him to pace himself instead of rushing all day long. He swaps the rear seat for a large bed, that he can directly strap on large cargo, or have a large bin attached to hold small packages. When he retires, he passes the scooter to his daughter who attends the local university. The daughter removes the rear bed, replaces the worn out battery and tires, and replaces the body to the Economy configuration so she can go to school and hang out with her friends. She enjoys a gentle and inconspicuous look so she can go about her day without calling attention to herself. A few years later, her younger brother who is a teenager, is keen to show off to his friends, upgrades the battery, motor, and tires, and changes the body to the Sport model. He often tunes and modifies the scooter to optimize performance and races his friends.

7.6 Renders

Figure 36. Collage of configurations

Figure 37. Rendered diagram of internal parts

Figure 38. Exploded view render

7.7 Model Making

Scale models of all three base configurations were 3d printed at scale, to clearly demonstrate the basic grid-like structure, and how panels can be attached and interchanged.

Figure 39. Final Showcase

7.8 Final Showcase

The final showcase was titled “Mo na pa kapav kompran”, a long and convoluted way of saying “I don’t understand” in Mauritian creole, to further point out the ridiculousness of global and local inequality, and all the power structures that hold it up, such as neo-liberalism, green imperialism, Orientalism, classism, and last but not least people’s desires to improve their lives within such a system.

Figure 40. Final Showcase

8. Discussion and considerations

8.1 Limitations of Study

The approval and licensing of commercial road-legal e-scooters require extensive testing of production-ready prototypes to ensure that the design and quality of manufacturing meet safety standards. This process falls outside the scope of this thesis; therefore, development for commercial production would require collaboration with qualified manufacturers, mechanical engineers, and tooling engineers. Such collaboration could lead to modifications of the structure to meet usability, sustainability, and critical objectives.

Furthermore, Mauritian identity—like that of China and other nations in the Global South—is subject to continuous change in both self-perception and global perception. The reliance of Global South economies on material extraction, manufacturing, tourism, and trade maintains existing global hierarchies. Design interventions alone cannot directly eliminate the structural causes of these inequalities, though they may contribute to challenging them.

For reasons of scope and focus, this study does not address the fetishization of Global South and POC cultures—a phenomenon that presents particular challenges in the current global context, given the recent explosion of online interest in Chinese culture and the corresponding rise in tourism to China. This limitation, however, also points toward opportunities for future research.

8.2 Future Research Prospects

Future research could apply the four-pronged strategy developed here—modular framework, standard parts, and cultural critique—to other product categories central to life in the Global South, such as mobile phones, household appliances, or agricultural equipment, each presenting opportunities to challenge both corporate

control and the symbolic dominance of Western brands. Such applications would further explore the connection between sustainability and economic development. As anti-colonial sentiment continues to gain traction globally, designers from the Global South are increasingly positioned to reclaim narrative control. However, this moment also carries the constant threat of cultural appropriation, as global brands rapidly absorb and commodify marginalized aesthetics without context or credit. Another promising direction lies in what might be called design dog whistles—strategic ambiguities embedded in products that communicate different meanings to different audiences, allowing designs to circulate commercially while carrying subversive messages for those attuned to local cultural hierarchies. Finally, while this thesis has focused on Mauritius, its framework could be tested across other post-colonial contexts in Southeast Asia, Latin America, or the Caribbean, adapting the symbolic vocabulary to local materials, histories, and class dynamics.

8.3 Conclusion

This thesis has proposed a synthesis of two design frameworks—sustainable design's emphasis on technical repairability and speculative design's capacity for cultural critique—and tested this synthesis through the design of a modular e-scooter for the Global South. The project demonstrates that functional objects can simultaneously address material needs and symbolic representation: modular architecture enables repair and longevity, while recontextualized vernacular materials challenge the class-based and orientalist narratives that stigmatize local technologies.

The ethnography conducted in China and Mauritius reveals that stigma against scooters is not rooted in practical inadequacy but in internalized global hierarchies. This finding supports the thesis's central proposition: that design interventions must address perception as well as function.

Yet perception alone is insufficient. Environmental problems—climate change,

resource depletion, waste—are fundamentally matters of policy, infrastructure, and systemic change. Yet the products that populate daily life continually frame environmental responsibility as a matter of individual behavior: recycle this, buy that, reduce your carbon footprint. This framing obscures the structural dimensions of ecological crisis while placing the burden on individual consumers. By grounding speculative strategies in the existing repair cultures of the Global South, this project attempts to bridge the gap between individual action and collective transformation. The modular e-scooter is not offered as a solution to systemic inequality, but as a provocation: what if the objects we use every day were designed not only to be repaired individually, but to reveal the systems that make repair necessary? What if design asked not only what individuals can do, but what systems might enable different ways of living?

While further development and testing would be required for commercial production, this research contributes a methodology for integrating critical design into utilitarian contexts—extending Right-to-Repair discourse beyond engineering to consider the emotional and cultural dimensions of sustainability. It offers a replicable framework for designing products that are both practically durable and culturally meaningful, while asking the deeper question that speculative design opens: what futures do we want to build, and what must we build to get there?

Ethics Statement

This thesis engages with sensitive topics—including class, nationality, and post-colonial identity—with the explicit goal of challenging stigma and promoting more diverse standards of value. Throughout this research, I have prioritized the dignity and wellbeing of all participants and communities involved.

This work is rooted in my positionality as a Mauritian native who has lived and studied in China. My analysis is inevitably shaped by this background. I do not claim complete objectivity; instead, I have been transparent about my position throughout, leveraging insider perspective while remaining accountable for its limitations.

All ethnographic research was conducted with clear, informed consent. Participants were made fully aware of the purpose of the interviews, how data would be used, and their right to withdraw at any time. Anonymity has been carefully preserved through pseudonyms and removal of identifying details.

The design strategies employed are intended to critique class-based hierarchies, not to aestheticize or exploit marginalized communities. I am not attempting to dehumanize or appropriate the experiences of any group. The working-class communities whose aesthetics inform this design are fellow citizens whose ingenuity and labor shape the world we share.

I do not claim to speak for marginalized communities, but rather to propose design strategies informed by my lived experience and training. The design prioritizes tangible user benefits—repair access, affordability, and safety—alongside symbolic critique. Any failure to represent these communities with the nuance they deserve is my own.

Acknowledgments

First and foremost, I would like to express my deepest gratitude to my supervisor for their invaluable guidance, patience, and support throughout this two-year journey. Their insightful feedback consistently pushed me to sharpen my thinking and elevate my work to a higher standard. I am especially grateful for their encouragement to pursue a topic that sits at the intersection of personal experience and academic inquiry—a combination that made this research deeply meaningful to me.

I am also thankful to my faculty and my university for providing an enriching environment in which to grow as a researcher and designer. The commitment to fostering critical and culturally aware design practice has profoundly shaped my approach to this thesis and to my broader professional aspirations.

This research would not have been possible without the generosity of the participants who volunteered their time and shared their honest perspectives during interviews. Their willingness to discuss sensitive topics around class, identity, and perception provided the qualitative depth that grounds this entire project. I hope this work does justice to the insights they entrusted to me.

I owe a special thanks to my friends and colleagues who offered encouragement, acted as sounding boards, and helped me navigate the complexities of cross-cultural research. Living and studying abroad over the past year and a half has been transformative, and I am grateful to everyone who has helped me feel at home. Finally, and most importantly, I thank my family. To my parents, who have supported me unconditionally.

Appendixes

Appendix A: Semi-Structured Interview Guide

1. What mode of transportation do you use most often? Why?

2. How do you perceive different vehicles, such as cars, motorcycles, and scooters?

3. What comes to mind when you see someone riding a scooter?

4. How would you describe the difference between locally-made and foreign products?

5. When buying a product, do you consider where it was made? Does it matter to you?

6. What does "quality" mean to you in a vehicle or product?

7. Have you ever repaired a vehicle or electronic device yourself? If so, what was the experience like?

8. What would make you more likely to repair a product rather than replace it?

9. How do you feel about products that are designed to be easily repaired?

10. Is there anything else about transportation, class, or local products you'd like to add?

Note: These questions served as a guide rather than a rigid script. Follow-up questions were used to clarify responses and explore unexpected themes.

Appendix B: Survey Question

Survey Questions (All 1–5 Scale)

Section A: General Attitudes Toward Customization

1. When buying a product (phone, scooter, etc.), how important is it that you can personalize its appearance?

2. Would the ability to change the look of a product (like swapping body panels) make you more likely to buy it?

3. If you could upgrade individual components instead of replacing the whole product, how much would that influence your purchase decision?

4. How likely would you be to pay extra for a product that allows you to customize its appearance?

5. How often have you chosen not to repair a product because you didn't feel emotionally attached to it?

Section B: Emotional Connection

6. How strongly do you feel connected to products you've personalized in some way?

7. Would having the ability to change your product's appearance over time make you want to keep it longer?

8. If a product could evolve with your changing tastes, how strongly would that create a bond with the brand?

9. How often do you feel bored with the appearance of your possessions after owning them for a while?

10. Would being able to refresh your product's look (like new colors/panels) make you less likely to replace it?

Appendix C: Survey Results

Q#	Question Summary	Avg. Score (1–5)	Distribution (n=6)	Key Insight
1	Importance of personalization	4.2	5: 2, 4: 3, 3: 1, 2: 0, 1: 0	83% rate personalization as important/very important
2	Customization increases purchase likelihood	4.2	5: 2, 4: 3, 3: 1, 2: 0, 1: 0	83% more likely to buy customizable products
3	Upgradability influences purchase	4.5	5: 3, 4: 3, 3: 0, 2: 0, 1: 0	100% say upgradability influences purchase
4	Likelihood to pay extra for customization	3.0	5: 0, 4: 2, 3: 2, 2: 2, 1: 0	Mixed willingness to pay premium
5	Avoided repair due to low attachment	3.7	5: 1, 4: 3, 3: 1, 2: 1, 1: 0	67% have frequently avoided repair due to low attachment
6	Personalization creates connection	4.2	5: 2, 4: 3, 3: 1, 2: 0, 1: 0	Strong emotional connection to personalized items
7	Ability to change extends ownership	4.5	5: 3, 4: 3, 3: 0, 2: 0, 1: 0	100% would keep product longer if it could evolve

Q#	Question Summary	Avg. Score (1–5)	Distribution (n=6)	Key Insight
8	Brand bond through adaptability	4.0	5: 2, 4: 2, 3: 2, 2: 0, 1: 0	Strong brand loyalty potential
9	Boredom with possessions	3.7	5: 1, 4: 2, 3: 3, 2: 0, 1: 0	50% experience boredom sometimes/often
10	Refresh option reduces replacement	4.3	5: 2, 4: 4, 3: 0, 2: 0, 1: 0	Strong potential for extending product life

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