

Transformation of Urban Cycling Culture in West Java, Indonesia as a Driver of Product Innovation: A Design Thinking Approach in The Development of Detachable Bikepacking Bags

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ABSTRACT - The transformation of urban cycling culture in West Java, Indonesia, accelerated by post-pandemic lifestyle changes, has shifted bikepacking from a simple adventure activity into a complex socio-cultural phenomenon. This shift is characterised by the emergence of urban-to-wild mobility patterns, increasing reliance on electronic devices during cycling trips, and intensified demand for digital content documentation. These changes have created a significant security gap, particularly when cyclists leave their bicycles in public spaces while conventional framebags are not designed to be fully detached and carried independently. This study aims to: (1) identify the transformation of urban cycling cultural values in West Java before and after the COVID-19 pandemic; (2) analyse gaps in existing framebag products available on the market; and (3) develop a detachable triangular bikepacking bag as an innovative, user-centred solution through a Design Thinking approach. The study employed a Design Thinking methodology with descriptive analysis across five phases: Empathise, Define, Ideate, Prototype, and Test. The Define phase comprised a structured survey of 64 active cyclists, a 5W+1H framework analysis, and a comparative analysis of six international framebag brands. Findings reveal a cultural value shift from adventure-oriented to digital-aesthetic and content-driven motivations. A total of 81.3% of respondents expressed high concern over belongings security, and comparative analysis confirmed that none of the six existing products offered an integrated detachable system. The developed product integrates a modular quick-release system, a dual-mode ergonomic design, and 600D waterproof fabric to address these gaps. Testing results indicate the need for further design iteration on the bag body structure and strap system to optimise load distribution. This study affirms that deep understanding of cultural transformation can serve as a foundation for more relevant and impactful product innovation in cycling accessories.

INTRODUCTION

The COVID-19 pandemic has fundamentally reshaped urban mobility patterns across the globe. Lockdowns, physical distancing mandates, and a collective reassessment of public transport use prompted unprecedented growth in cycling as a primary mode of active travel (Nikitas et al., 2021; Buehler & Pucher, 2021). Cities worldwide responded by rapidly expanding cycling infrastructure, and what initially appeared as a temporary behavioural shift has since consolidated into a lasting transformation in how urban populations move and interact with their environment (Buehler & Pucher, 2021). Beyond its role in transportation, cycling has emerged as a socio-cultural phenomenon a vehicle for identity expression, community formation, and lifestyle documentation in the digital age (Dissanayake et al., 2025). This dual function of cycling, as both a physical practice and a digital lifestyle, is particularly pronounced in Southeast Asia, where rapid urbanisation, expanding middle classes, and high social media penetration have accelerated the transformation of cycling culture (Putra & Mutmainnah, 2022).

In Indonesia, this transformation is especially dramatic. Bicycle sales surged nearly fourfold following 2020, with national bicycle exports rising 32% from 6,498 tonnes in 2019 to 8,582 tonnes in 2020 (Annur, 2021). The West Java province, as one of Indonesia's most densely populated and urbanised regions, has become a prominent locus of this cycling culture shift. Cycling communities ranging from long-distance endurance groups to content-creator collectives have proliferated, transforming the bicycle from a utilitarian object into a symbol of contemporary urban identity (Gumilar et al., 2025). Practices once confined to rural mountain trails or competitive circuits have migrated into the heart of urban spaces cafés, transit hubs, tourist destinations, and social media feeds reflecting a broader redefinition of what it means to be a cyclist in post-pandemic Indonesia.

Within this broader transformation, the specific practice of bikepacking long-distance cycling with minimal gear mounted directly on the bicycle frame has undergone a particularly significant cultural evolution. Prior to the pandemic, bikepacking culture in West Java was characterised by values of raw adventure, self-sufficiency, and community solidarity: cyclists relied on simple, functional gear; social interaction was primarily face-to-face; and documentation of journeys was incidental (Eiger, 2023). The post-pandemic period has disrupted these norms profoundly. Journeys are now routinely documented and published as Instagram Reels, YouTube vlogs, and TikTok content; minimalist-premium aesthetics have become a marker of credibility; and virtual communities have supplemented and in some cases supplanted physical gatherings (Putra & Mutmainnah, 2022). Critically, post-pandemic bikepackers now operate across hybrid urban-to-wild routes that regularly intersect with high-density public spaces such as shopping centres, train stations, and popular tourist sites environments in which bicycles are routinely left unattended while riders enter buildings, rest, or document their journey.

This shift in cycling behaviour has created a critical and largely unaddressed security vulnerability. Contemporary bikepackers carry an increasingly valuable cargo of electronic devices smartphones, action cameras, power banks, and digital documentation items that are routinely stored in the framebag (a triangular bag fitted within the bicycle's main frame triangle). Unlike backpacks or handlebar bags, conventional framebags are semi-permanently attached to the frame via velcro and strap systems, making them impractical to detach quickly when a cyclist leaves the bicycle in a public space. A survey of 64 active cyclists conducted as part of this study found that 81.3% of respondents expressed high concern over the security of their belongings during cycling trips, with 43.8% reporting very high concern and 37.5% reporting high concern. These findings are further contextualised by national crime data: Indonesia's National Police Criminal Investigation Centre recorded 394,001 criminal incidents in 2023 alone (Jauhari, 2023).

The convergence of higher-value electronic cargo, hybrid urban-wild routes, and frequent stops in unsupervised public spaces has produced a security gap that current framebag products have failed to address. Despite the scale and urgency of this gap, the global framebag industry has not responded adequately. A comparative analysis of six leading international framebag brands RockBros, Revelate Designs, Topo Designs, Gramm Tourpacking, and Apidura conducted as part of this study reveals a consistent pattern: innovation has been concentrated on material durability, waterproofing technology, and weight reduction, with no product in the examined range offering an integrated detachable system that allows the bag to be quickly removed and carried as an independent daily-use bag.

As Valentini et al. (2023) note, innovation in cycling accessories remains disproportionately focused on technological enhancements to the bicycle itself, rather than on accessories that address the lived security and usability needs of contemporary urban cyclists. The identified design gap is therefore both empirically documented and theoretically grounded.

Against this backdrop, this study adopts a Design Thinking (DT) approach (Brown, 2008; Micheli et al., 2019) a human-centred, iterative methodology that integrates user empathy, cultural observation, and rapid prototyping into a coherent innovation process to address the identified gap through user-centred product innovation. Design Thinking's five-phase iterative framework is particularly well-suited to complex socio-cultural product challenges, as it foregrounds user needs, cultural context, and iterative validation over prescriptive engineering specifications (Liedtka, 2015).

This study therefore pursues three interconnected objectives: (1) to identify and map the transformation of urban cycling cultural values in West Java, Indonesia, before and after the COVID-19 pandemic; (2) to analyse the design gaps in existing framebag products in relation to the security and usability needs of contemporary urban bikepackers; and (3) to develop and evaluate a detachable triangular bikepacking bag featuring an integrated quick-release modular system and ergonomic dual-mode functionality as an innovative, user-centred design solution. By grounding product innovation in a systematic analysis of cultural transformation, this study contributes to the growing body of knowledge on design-driven innovation, and to sustainable urban mobility more broadly, in alignment with Sustainable Development Goal 11 (SDG 11: Sustainable Cities and Communities) (Dissanayake et al., 2025).

METHODS AND MATERIALS

This study employs a Design Thinking (DT) methodology with descriptive analysis as its overarching research framework. Design Thinking was selected because it is fundamentally a human-centred, iterative problem-solving approach that integrates user empathy, cultural observation, and rapid prototyping into a coherent process of innovation (Brown, 2008; Micheli et al., 2019). Unlike prescriptive engineering methods, Design Thinking is particularly well-suited to research contexts in which the problem is socially embedded, shaped by cultural values, behavioural shifts, and lived user experience rather than technical specifications alone (Liedtka, 2015). Given that this study investigates a product gap arising from cultural transformation in cycling behaviour, Design Thinking provides the methodological flexibility to move between cultural analysis, user need identification, and design development within a single coherent framework. The study proceeds through five sequential yet iterative phases: Empathise, Define, Ideate, Prototype, and Test.

2.1 Phase 1 Empathise: Literature review and digital footprint analysis

The Empathise phase aimed to develop a deep contextual understanding of the transformation in urban cycling culture in West Java, Indonesia, before and after the COVID-19 pandemic. Data were collected through two complementary approaches. First, a systematic literature review was conducted covering academic journals, industry reports, and government publications relating to urban cycling behaviour, post-pandemic lifestyle transformation, and cycling accessories design. Sources were identified through Google Scholar, Scopus, and national academic databases (SINTA), using search terms including urban cycling, bikepacking culture, post-pandemic mobility, and product innovation. Second, a structured digital footprint analysis was performed, examining publicly available content across Instagram, YouTube, TikTok, and cycling community forums to identify emergent behavioural patterns, content trends, and user sentiment regarding cycling accessories and security concerns. This dual approach combining published scholarly evidence with observed digital behaviour enabled a triangulated understanding of how cultural values in bikepacking have shifted and what new user needs have emerged as a consequence.

2.2 Phase 2 Define: Survey, 5W+1H analysis, and comparative product analysis

The Define phase involved two primary data collection instruments designed to translate Empathise-phase insights into a precise problem definition.

2.2.1 Survey instrument

A structured questionnaire survey was administered to 64 active cyclists across Indonesia. Participants were recruited using purposive sampling, with the following inclusion criteria: (1) have engaged in bikepacking or medium-to-long-distance urban cycling (minimum 50 km per trip) at least once in the preceding 12 months; and (2) have used or are familiar with framebag products. This criterion ensured that all respondents had direct, relevant experience with framebag use in real cycling contexts. The survey instrument measured three constructs:

1. **Perceived security concern** regarding personal belongings during cycling trips, rated on a five-point Likert scale ranging from 1 (not concerned at all) to 5 (very concerned)
2. **Travel behaviour patterns** including trip frequency, duration, route type (urban, rural, mixed), and types of public stops made during cycling routes
3. **Product preferences** regarding framebag features, with particular attention to detachability, portability, aesthetics, and security functionality

The questionnaire items were developed based on themes identified during the Empathise phase and reviewed by the supervising lecturer prior to distribution for content validity. Data were collected via online distribution through cycling community platforms and social media groups. Descriptive statistical analysis was applied to summarise response frequencies and percentages.

2.2.2 5W+1H framework analysis

A 5W+1H framework addressing the dimensions of What, Who, Where, When, Why, and How was applied to systematically map the root causes and contextual factors of the identified security problem. This framework structured the synthesis of survey data, digital footprint findings, and observational data into a coherent problem statement.

2.2.3 Comparative product analysis

A systematic comparative analysis was conducted on six internationally recognised framebag brands available on the Indonesian market: RockBros, Revelate Designs, Topo Designs, Gramm Tourpacking, and Apidura. Each product was evaluated across five parameters: (1) design technology, (2) storage capacity, (3) material composition, (4) key features and competitive advantages, and (5) retail price point. This analysis was designed to map the current state of market offerings against the needs identified through survey data, thereby producing an empirically grounded articulation of the design gap.

2.3 Phase 3 Ideate: Concept Generation

The Ideate phase involved manual ideation sketching and structured brainstorming sessions, illustrated in Figure 1. informed by the design brief synthesised from Define phase findings. Concept generation focused on three core functional requirements derived from the survey and 5W+1H analysis: (1) quick-release detachability enabling the bag to be removed from the frame in under five seconds; (2) ergonomic dual-mode functionality allowing the bag to serve as both a mounted framebag and an independent hand-carry or sling bag without transferring contents; and (3) visual aesthetics consistent with the minimalist-premium values of contemporary urban bikepackers. Multiple concept sketches were generated and evaluated against these criteria before the most viable concept was selected for prototype development.

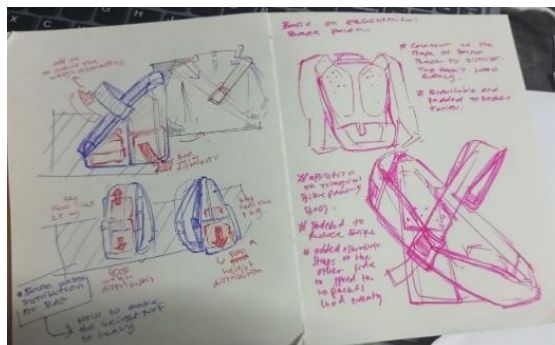


Figure 1. Ideation sketches of the detachable triangular bikepacking bag

2.4 Phase 4 Prototype: Digital Prototype Development

The selected concept was developed into a three-dimensional digital prototype using Rhinoceros 8 software. Product dimensions were derived from 1:1 scale technical drawings encompassing top, front, side, rear, and bottom views. The design incorporated a modular quick-release attachment system, an automatic ratchet buckle for frame mounting stability, and a 600D waterproof fabric body with internal padding for high-value item protection. Strap pattern and main body part patterns were developed in parallel to support eventual physical production. The prototype development process is illustrated in Figure 2 through Figure 4, to be inserted upon finalisation of visual assets.

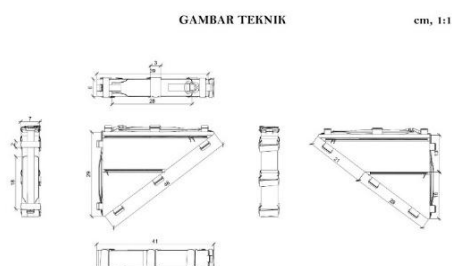


Figure 2. Technical drawing of the detachable triangular bikepacking bag (top, front, side, rear, and bottom views) at 1:1 scale in cm

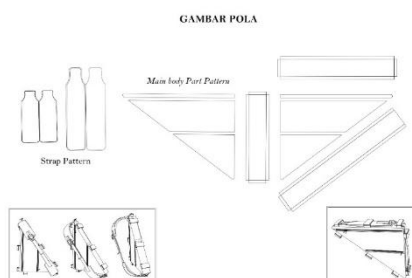


Figure 3. Pattern drawing of the detachable triangular bikepacking bag (strap pattern and main body part pattern)



Figure 4. Product render of the detachable triangular bikepacking bag (mounted on bicycle frame and carried as hand bag)

RESULTS AND DISCUSSION

3.1 Transformation of Urban Cycling Cultural Values in West Java (Empathise)

Digital footprint analysis identified a significant shift in the cultural values associated with bikepacking, occurring in parallel with the broader digitalisation of Indonesian society. Prior to the pandemic, bikepacking culture in West Java was dominated by values of pure physical adventure: cyclists relied on simple functional gear, operated within small tight-knit communities, and used rigid storage systems designed purely for load-carrying capacity. Following the pandemic, the entry of digital content culture, premium minimalist aesthetics, and expansive virtual communities transformed how cyclists engage with their journeys and their equipment, as summarised in Table 1.

Table 1. Transformation of Urban Cycling Cultural Values in West Java, Indonesia

Historical Period	Cultural & Social Values	Primary Cycling Motivation	Symbolic Vehicle Status
Late 19th C – 1930s (Colonial Era)	Exclusivity & Aristocracy	recreation, status display, health	Symbol of Wealth & Luxury. Bicycles were expensive European imported goods.
1940s – 1960s (Post-Independence)	Egalitarianism & Utilitarianism	Basic needs, economic mobility, work/school transportation, patriotic spirit	Symbol of Working People. Onthel/jengki bicycles became widely owned.
1970s – 1990s (Pre-Digital / New Order)	Collectivism (Guyub) & Romanticism	Adventure, self-discovery, escape from urbanisation, solidarity	Symbol of Self-Expression & Community. Emergence of early modification culture.
Digital Era (1990s – Pre-COVID 2019)	Urban individualism; emphasis on performance, competition, and aesthetic modification	Fitness, amateur racing, city exploration via fixie/BMX; competitive clubs emerged across West Java	

continued

COVID-19 Period (2020–2022)	Communal solidarity	Cycling as safe socially-distanced exercise, mental health, and alternative mobility during restrictions
Post-COVID (2023–Present)	Long-distance travel (bikepacking/endurance) & digital documentation	Long-distance adventure combined with content monetisation (Instagram/YouTube)

Source: *Digital footprint analysis and literature review* (Eiger, 2023; Putra & Mutmainnah, 2022; Nikitas et al., 2021; PKM-KC, 2025)

The most significant change lies in the emergence of urban-to-wild mobility: post-pandemic cyclists routinely transition within a single journey from urban environments (cafés, train stations, tourist destinations) to open-air trails. This pattern creates a new vulnerability bicycles are frequently left unattended in public spaces while riders enter buildings, meaning valuable items stored in the framebag become potential targets. These behavioural changes are summarised in Table 2. These findings are consistent with Putra and Mutmainnah (2022), who documented the emergence of cycling as a self-presentation strategy on Instagram during the pandemic in Indonesia, and with Nikitas et al. (2021), who identified cycling's dual function as both transport mode and socio-cultural identity marker in the post-pandemic period.

Table 2. Changes in urban cycling behaviour before and after the COVID-19 pandemic

Behavioural Aspect	Before Pandemic	PandemicAfter	Product Need Implication
Journey Purpose	Long-distance, inter-city, extreme terrain	Mixed: daily urban, short leisure, and touring	Need for a bag adaptable to both contexts
Documentation	Rare; focus on experience	Active: IG/TikTok/YouTube content at every stage	Electronic devices (phone, camera) always carried
Items Carried	Survival gear, minimal electronics	Wallet, phone, camera, power bank, documents	High-value items increasingly carried
Storage System	Permanent framebag; focus on capacity and waterproofing	Need quick access, can be carried inside, aesthetic	Conventional framebag no longer adequate

Based on this behavioural transformation analysis, a demographic and psychographic profile of the contemporary urban bikepacking user was developed as a design reference (Table 3).

Table 3. Demographic and psychographic profile of the urban bikepacking user

Aspect	Characteristics	Relevance to Product Needs
Age	17–60 years; predominantly 17–35 years (active urban cyclists)	Wide age range demands universally ergonomic design
Gender	60–75% male, 25–40% female	Design must accommodate diverse body proportions
Status	Athletes, travellers, bike enthusiasts, students, creative workers	Diverse lifestyles require a multifunctional product (cycling and urban)
Location	Large and mid-sized cities; inter-city and urban-to-wild travel	Hybrid urban-nature journeys require product adaptability

continued

Core Values	Adventure, independence, sustainability, minimalist aesthetics	Product must be aesthetic, functional, and reflective of lifestyle
User Segments	The Explorer, The Minimalist, The Commuter-Weekend Rider, The Storyteller	Four distinct segments require features that address all profiles

Source: *User psychographic analysis (PKM-KC, 2025; adapted from literature)*

3.2 Needs analysis and product gap (Define)

The Define phase deepened understanding of the problems identified during the Empathise phase. A 5W+1H framework was applied to systematically map the root causes of the identified security problem (Table 4), followed by a comparative product analysis to validate that this gap remains unanswered by available market solutions.

Table 4. 5W+1H analysis of belongings security problems in urban cycling activities

Dimension	Question	Finding
WHAT	What is the problem?	Concern over losing high-value items
WHERE	Where does it occur?	Anywhere from more isolated places to public spaces
WHEN	When does it occur?	Every time cyclists leave their bicycle even briefly
WHY	Why does it occur?	Conventional framebags are: (1) permanently attached to the frame; (2) time-consuming to detach; and (3) not designed to be carried as a daily bag; cyclists must choose between leaving items on the bike or the effort of transferring contents
HOW	What is the impact?	Cyclists experience anxiety throughout journeys, reducing enjoyment; Pusiknas data (2023) recorded 394,001 criminal cases, with cyclist theft identified as a recurring incident type (Jauhari, 2023)

Source: *Survey of 64 cyclists (PKM-KC, 2025); Pusiknas Bareskrim Polri (Jauhari, 2023)*

3.3 Design synthesis: How Might We statement

Based on the findings of the Empathise and Define phases, it can be synthesised that the transformation of urban cycling culture has produced a new cyclist profile: one who transitions between urban and natural contexts within a single journey, carries high-value electronic items, actively uses public spaces as rest stops, and holds higher aesthetic expectations for their accessories. Meanwhile, all framebag products available on the market fail to address this active security need. This synthesis produces the central design question underpinning the Ideate phase:

"How might we design a triangular bikepacking bag that is (1) stable and ergonomic when mounted on the bicycle frame; (2) detachable within seconds without transferring contents; and (3) functions as an aesthetically pleasing and secure hand-carried or sling bag in urban environments so that cyclists no longer need to choose between the security of their belongings and the comfort of their ride?"

Product requirement specifications derived from the synthesis of survey data, scenario analysis, and comparative product analysis are summarised in Table 5 and serve as direct references for the Ideate phase.

Table 5. Product requirement specifications based on Define phase findings

Dimension	Question	Finding
Active Security	Bag detaches from frame in under 5 seconds without transferring contents; bag must not remain on bicycle when unattended	High
Multifunctionality	Serves as a framebag when mounted on bicycle AND as a sling or hand-carry bag when detached no repacking required	High
Ergonomics	Fits the triangular frame geometry of various bicycle sizes; distributes weight evenly; comfortable to carry in urban settings	High
Material Quality	600D waterproof fabric body; waterproof zipper; durable quick-release buckles; automatic ratchet buckle for frame mounting stability	Medium
Aesthetics	Minimalist design suitable for both outdoor and urban contexts;	Medium
Capacity	4–6 litres	Medium

Source: Synthesis from survey, scenario analysis, and comparative product analysis (PKM-KC, 2025)

3.4 Product innovation: Detachable triangular bikepacking bag (Ideate & Prototype)

Based on the above findings, the product was developed around three core innovations: (1) a modular quick-release system enabling the bag to be detached from the bicycle frame within seconds without transferring contents; (2) an ergonomic dual-mode design functioning as a framebag when mounted on the bicycle and as a hand-carry or sling bag when detached; and (3) construction from 600D waterproof fabric with an automatic ratchet buckle component for mounting stability.

The ideation process produced a series of concept sketches that were systematically explored before the most viable concept was selected for digital prototype development. The selected concept was subsequently developed using Rhinoceros 8 software, based on 1:1 scale technical drawings encompassing top, front, side, rear, and bottom views. The product is designed with a capacity of 4–6 litres, adaptable to the triangular frame geometry of various bicycle sizes. The ideation sketches, technical drawings, pattern drawings, and product renders are presented in Figure 1, Figure 2, Figure 3, and Figure 4 respectively

3.5 Product evaluation (Test)

Carry and wear trial results indicate that the mock-up prototype tends to be unstable when used under movement conditions. This instability occurs because the asymmetric triangular form of the bag produces uneven weight distribution: when hand-carried, the bag's centre of gravity shifts laterally and causes the bag to swing repeatedly to one side. This directly reduces user comfort and creates difficulties navigating urban environments the primary use scenario for the bag's carried mode.

Analysis of the test results identified two root causes. First, the body form and dimensions of the bag are not yet optimal in accommodating the load's pivot point when lifted. Second, the strap design is not yet capable of distributing and locking the load evenly across the user's body. Based on these findings, design iteration was conducted across both aspects: (1) redesign of the bag body form and dimensions to structurally optimise weight distribution; and (2) redesign of the strap form, dimensions, and attachment system to lock the bag's position more stably when hand-carried or worn as a sling bag.

This design iteration process reflects the cyclical nature of the Design Thinking approach, wherein test results are not viewed as failures but as empirical data driving targeted solution refinement (Brown, 2008). The redesign produced through this iteration still requires further testing to validate whether improvements to the body form, dimensions, and strap system have successfully resolved the stability issues identified during the initial testing phase.

CONCLUSIONS

This study set out to investigate the intersection of cultural transformation and product innovation in the context of urban bikepacking in West Java, Indonesia. Three principal findings emerge from the research.

First, the transformation of cycling culture in West Java is both historically traceable and empirically documentable. What began as a community-bound, adventure-driven activity has gradually evolved into a digital-aesthetic and content-driven lifestyle practice. This cultural shift is not a superficial trend; it reflects a deep and measurable change in how people understand and engage with cycling. The emergence of the urban-wild hybrid bikepacker, a cyclist who moves between urban environments and open trails, documents journeys digitally, and carries high-value electronic gear, represents a genuinely new user profile whose mobility patterns, cargo composition, and public-space behaviour differ substantially from those of pre-pandemic cyclists.

Second, this cultural evolution has created a specific and verifiable product gap. As cycling motivations shifted, so did the practical needs of cyclists. The growing reliance on electronic devices, the increasing frequency of stops in unsupervised public spaces, and the desire for accessories that reflect a minimalist-premium aesthetic have together produced a security and usability need that existing framebag products have consistently failed to address. No product currently available on the market offers an integrated detachable system that allows cyclists to carry their belongings independently when leaving their bicycles unattended.

Third, a Design Thinking approach proved to be an effective and appropriate methodology for translating these cultural and empirical findings into a concrete design solution. By grounding the innovation process in user empathy, cultural observation, and iterative testing, this study was able to develop a detachable triangular bikepacking bag featuring a modular quick-release system, dual-mode ergonomic design, and 600D waterproof construction — a product concept directly responsive to the needs of contemporary urban bikepackers.

The broader contribution of this study lies in its demonstration that cultural transformation, when systematically analysed, can serve as a legitimate and productive foundation for product innovation. In rapidly evolving consumer contexts, understanding how values shift is as important as understanding what users technically require. This study affirms that deep understanding of cultural transformation can serve as a foundation for more relevant and impactful product innovation, while simultaneously opening avenues for developing cycling accessories responsive to the needs of contemporary urban cyclists.

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CONFLICT OF INTEREST

The authors declare no conflicts of interest.

AUTHORS CONTRIBUTION

Airin Putri Zharifah: Conceptualization, Methodology, Writing – Original Draft Preparation. Visualization, Prototype Development. **Syifa'u Rohmah:** Data Curation, Investigation. Muhammad Arya Widura: Writing – Original Draft Preparation. **Andri Pahrulroji.:** Supervision, Writing – Reviewing and Editing.

AVAILABILITY OF DATA AND MATERIALS

Data available on request from the authors

DECLARATION OF GENERATIVE AI

During the preparation of this work, the author(s) used AI writing assistance tools to enhance the clarity of the writing. After using the tools, the author(s) reviewed and edited the content as needed and take full responsibility for the content of the publication.

ETHIC STATEMENTS

This study involved human subjects in the form of voluntary survey respondents (64 active cyclists in Indonesia). No personal identifying information was collected. The study was conducted in accordance with ethical research principles of informed consent and data confidentiality. No formal ethics committee approval was required for this survey-based study.

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