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Exploring the impact of student accommodations delivery restrictions on last-mile delivery

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Background: Despite the rapid growth of e-commerce and increasing reliance on online shopping among university students, many student accommodation environments impose delivery restrictions that hinder last-mile delivery (LMD), particularly by prohibiting staff from accepting parcels on behalf of residents.

Objective: This study examined the impact of delivery restrictions on students' LMD experiences and online shopping behaviour, with specific focus on delivery outcomes, behavioural adaptations and delivery preferences.

Methods: A quantitative research approach was adopted using a self-administered online questionnaire. Data were collected from 474 university students residing in Auckland Park and Braamfontein, South Africa. The questionnaire captured information on delivery experiences, coping mechanisms, online shopping frequency and preferred delivery features.

Results: The findings indicate that delivery restrictions pose significant barriers to seamless LMD, disrupt students' academic and leisure routines, and contribute to delivery delays, high delivery fees and long waiting times. These challenges often result in reduced online shopping frequency and, in some cases, abandonment of online purchases.

Conclusion: The study concludes that delivery restrictions within student accommodation negatively affect the convenience, reliability and overall satisfaction associated with LMD services, ultimately influencing students' repurchasing intentions. The findings underscore the need for more flexible, affordable and student-centred delivery solutions, such as smart lockers and improved communication systems, to better accommodate this market segment.

Contribution: This study provides empirical insight into the under-explored impact of accommodation-based delivery restrictions on student consumers and highlights opportunities for improving LMD service design in urban student markets.

Keywords: last-mile delivery; student accommodation; delivery restrictions; online shopping behaviour; customer satisfaction.

Introduction

Over the past decade, e-commerce has transformed the global retail landscape, reshaping how goods are purchased, distributed and delivered. At the centre of this transformation lies last-mile delivery (LMD), the final and most consumer-facing stage of the logistics process, which directly influences service quality and customer satisfaction (Deloitte 2020). However, ensuring efficient and reliable LMD remains a persistent challenge for retailers and logistics providers, particularly in regions where infrastructural, regulatory or residential factors restrict access to consumers (Samuels, Takawira & Mbhele 2024). These challenges are evident especially in urban areas, where population density, safety concerns and delivery access restrictions can hinder smooth operations. The global adoption of online shopping continues to accelerate, with a growing share of consumers worldwide embracing e-commerce platforms.

In developing countries such as Malaysia, approximately 80% of the population engages in online shopping (Naseri et al. 2021), indicating the rapid expansion of digital retail channels. By contrast, developed countries in Europe reported e-commerce turnover grew more moderately by 6% in 2022, reaching approximately €899 billion, as inflation and reduced consumer spending slowed overall growth despite continued expansion in online service sales (Ecommerce Europe 2023). Developed countries benefit from advanced logistics, widespread internet access and mature

digital payment systems, while developing countries continue to face unique challenges related to delivery reach, digital literacy and infrastructural limitations (Banga & Banga 2022). These disparities highlight the importance of considering regional development levels when examining online shopping trends.

In South Africa, the e-commerce sector expanded by 66% between 2018 and 2021, growing from R14.1 billion to approximately R40 billion and accounting for 4% of all retail in the country (Business Insider SA 2021). Takealot, a leading South African online retailer, reported 32% year-on-year revenue growth to US$385 million (approximately R6.7 billion), reflecting its strategic operations, expansion of subscription services, and responsiveness to evolving consumer demands (Ndlovu 2025). The global growth of e-commerce has been driven by increased Internet and smartphone penetration, social media influence, digital marketing, globalisation and enhanced logistics networks (Gupta et al. 2023). These technological and social drivers have significantly influenced the purchasing behaviour of young people, shaping their decisions regarding product selection, timing and purchase channels (Chopra, Gupta & Manek 2020; Farah et al. 2018).

Farah et al. (2018) investigated internet usage and online shopping, revealing that university students aged 18–30 are among the most active internet users and online shoppers, representing a key segment of young consumers in the digital marketplace. Similarly, Chopra et al. (2020) emphasised that this group increasingly relies on online channels for product discovery, peer reviews and price comparisons, shaping how and when they shop. Convenience, affordability and access to promotions are key motivators, particularly for students navigating demanding academic schedules and limited budgets (Al Asheq et al. 2022; Lim et al. 2024; Tian & Zhang 2024). For the purpose of this study, the term student refers to a young consumer aged between 18 and 30 years, who represents the primary user base for online delivery services.

As consumers shift towards online shopping for convenience and time-saving benefits, traditional brick-and-mortar stores have experienced a corresponding decline in sales (Moeti, Mokwena & Malebana 2021). In this evolving landscape of online shopping, customer satisfaction is influenced by factors such as convenience, accurate real-time information, data security, competitive pricing, responsive support services and reliable delivery (Vakulenko et al. 2019). Fast and timely deliveries are essential, with many customers preferring same day or next day delivery options (Olsson, Hellström & Vakulenko 2022). Companies that strategically optimise LMD operations often report enhanced customer loyalty, higher sales and improved profitability (Puri 2022).

Last-mile delivery refers to the final stage of the transport process, encompassing the movement of goods from a fulfilment centre or retail establishment to customer's chosen location, typically their home or office (Deloitte 2020). Consumers expect fast and flexible delivery options, accompanied by features such as real-time tracking and transparent communication (Tsao & Tseng 2021). Diverse delivery options such as home delivery, click-and-collect, locker points and express delivery have been shown to enhance customer engagement (Milioti, Pramatari & Kelepouri 2020). According to DispatchTrack (2020), a global provider of real-time delivery management solutions, 51% of consumers avoid e-retailers with limited delivery options, whereas 96% remain loyal to e-retailers that provide a positive delivery experience. These findings highlight the growing importance of efficient and customer-centric delivery processes in shaping online shopping behaviour globally.

In South Africa, where e-commerce continues to expand, similar trends are observed, with consumers expecting flexible, reliable and transparent delivery options (Samuels et al. 2024). Tailored and efficient LMD services significantly boost customer retention and overall satisfaction (Puri 2022; Wang, Zhang & Huang 2021). The LMD process is therefore essential in shaping customer experience and influencing satisfaction levels (Pourmohammadreza, Jokar & Van Woensel 2025). However, in certain contexts, particularly student accommodation, which formed the focus of this research, LMD is often constrained by residential restrictions. Many university campuses and student residences enforce strict policies that limit courier access for safety reasons, preventing vehicles from entering campuses or staff from accepting parcels on behalf of residents.

Similar restrictions have been reported internationally. For instance, Cherrett et al. (2017) found comparable restrictions at the University of Southampton in the United Kingdom (UK), as did the University of Bristol (2023) in the UK and Gao (2022) at the military school campus in China. Students often face various challenges in receiving parcels, frequently having to collect them outside the campus grounds, sometimes far from their accommodation, causing significant inconvenience. In China, studies indicate that approximately 25.84% of students are required to collect parcels off campus, often encountering long queues and congestion at distribution points, especially after class hours (Gao 2022; Xiang & Wu 2018). These delivery challenges are applicable to a South African context that compromises the convenience and reliability of the LMD experience for students, causing dissatisfaction and prompting behavioural shifts, such as opting for alternative delivery services or abandoning online purchases altogether.

Given students' growing role in the online consumer shopping base, these delivery challenges warrant urgent attention. Deloitte (2021) reported that 13% of online shoppers in South Africa are aged 18–24, while 31% are aged 25–34. Similarly, Cowling (2024) found that 18–24-year-olds account for 30.9% of social media users, and those aged 25–34 years represent 30.7%. These figures highlight the increasing digital engagement and purchasing potential of young consumers. Hence, efficient delivery solutions and responsive

customer service are crucial for e-retailers seeking to improve satisfaction and build long-term loyalty within these young consumers. While there is a growing body of literature on online consumer behaviour, service quality and repurchase intentions (Pentz, Du Preez & Swiegers 2020), relatively fewer studies have explored the specific logistical challenges of LMD experienced by students.

Internationally, researchers have explored the impact of logistics on student online shopping experiences (Cherrett et al. 2017; Choi 2019; Jalil 2018; Mahdi Zarei, Chaparro-Pelaez & Agudo-Peregrina 2020), yet within the South African context, it remains limited. Locally, studies have primarily focused on general online shopping trends, consumer trust and delivery efficiency, without addressing the specific challenges students encounter when accessing deliveries from restricted accommodation settings. This gap provides the rationale for this study, highlighting the need to investigate how delivery constraints affect students' online shopping experiences and behaviours. This study explores the impact of delivery restrictions on LMD experiences of university students residing in student accommodation in Johannesburg, specifically in Auckland Park and Braamfontein areas.

National data indicate that young consumers aged 15–34 in South Africa control an annual spending pool of approximately R303 billion, with students alone contributing an estimated R41 billion annually (BusinessTech 2014; Student Village & Youth Dynamix 2023). According to Gregory and Rogerson (2019), Auckland Park and Braamfontein are student-dense areas, hosting students from the University of Johannesburg, University of Witwatersrand and private institutions such as Milpark Education Business School, Rosebank College and the South African School of Motion Picture Medium and Live Performance (AFDA). Understanding students' delivery experiences is essential, as they constitute a significant portion of the online shopping population and represent a growing market with future purchasing power (Dlamini & Chinje 2019; Heyns & Kilbourn 2022). Moreover, as Gen Z's demographic continues to shape the direction of digital commerce, the importance of adapting delivery strategies to meet their specific needs becomes evident.

Therefore, this study explored the impact of delivery restrictions on LMD among students living in student accommodations in Auckland Park and Braamfontein, Johannesburg. By focusing on this often overlooked yet growing segment of the e-commerce market, the study contributes to existing literature and provides insights for stakeholders in e-commerce industry regarding how delivery constraints influence students' experiences, satisfaction and repurchase intentions. The article is structured as follows: a review of relevant literature, a presentation of the research methodology, a discussion of the findings and their implications, and finally practical recommendations and direction for future research.

Literature review

This literature review examines the existing research on online consumer behaviour and LMD, with particular attention to the logistical challenges faced by students. Globally, studies have shown that delivery efficiency, service quality and flexible last-mile options significantly influence customer satisfaction and repurchase intentions (Aljohani 2024; Bin 2024; Olsson et al. 2022). In China, for example, approximately 25.84% of students are required to collect parcels off campus, often facing long queues and congestion at the distribution points (Gao 2022; Xiang & Wu 2018). Locally, research has primarily focused on general online shopping trends, consumer trust and delivery efficiency of young consumers (BusinessTech 2014; Dlamini & Chinje 2019; Heyns & Kilbourn 2022). While these studies provide valuable insights into the behaviour and expectations of young consumers, understanding the strategic role of LMD in e-commerce is critical for addressing the specific logistical challenges that affect students' satisfaction and loyalty.

The strategic role of last-mile delivery in e-commerce

Last-mile delivery has become a critical differentiator in e-commerce, shaping both customer satisfaction and retailer's competitiveness. It is widely recognised as the most costly and complex segment of logistics because of the challenge of delivering small parcels to dispersed residential areas (Klein & Popp 2022). Consumers demand speed, affordability and convenience through services such as same-day delivery, flexible time slots, parcel tracking and contactless delivery (Vrhovac et al. 2023; Wang et al. 2021). Research consistently demonstrates that efficient, reliable and transparent delivery processes strengthen customer loyalty, whereas even a single poor delivery experience can significantly deter repeat purchases (MetaPack 2020; Mogire, Kilbourn & Luke 2023). These insights establish LMD not only as a logistical necessity but also as a central determinant of e-commerce success.

Students' unique delivery challenges in accommodation settings

While LMD is important for all consumers, some university students across the world face distinctive barriers shaped by institutional restrictions and infrastructural limitations. Some student accommodation prohibits staff from receiving parcels on behalf of students, forcing students to collect packages themselves, often from centralised or off-campus pickup points (Gao 2022; Xiang & Wu 2018). This creates time costs and inefficiencies, with students reporting long queues, congestion and significant inconvenience, particularly after class hours (Cherrett et al. 2017). International evidence echoes these challenges: case studies from the UK and China highlight issues such as parcel security risks, a lack of storage space and inconsistent courier schedules (Gao 2022; University of Central Lancashire 2021). Although such restrictions are framed as necessary for campus security, they compromise delivery convenience and negatively affect students' overall satisfaction with e-commerce/shopping

(Hellopeter.com 2022). These findings underscore the need to consider students as a unique consumer segment whose delivery experiences differ from those of the general population.

Students' preferences and expectations of last-mile delivery

Research suggests that students place particular value on flexibility, transparency and communication in online shopping and delivery services. Flexible scheduling is vital given their academic routines, with evidence showing strong preference for evening delivery slots between 17:00 and 19:00, when students are most likely to be at home (Cherrett et al. 2017). The popularity of parcel lockers and nearby pickup points also reflects students' desire for convenience and autonomy (Bouhouras et al. 2024; Dablanc et al. 2017). In addition, visibility through real-time tracking and frequent notifications helps students manage their time effectively, reducing delivery anxiety and fostering trust in service providers (Allen, Piecyk & Piotrowska 2017; Vanelslander, Deketele & Van Hove 2013). These expectations highlight that student consumers not only simply seek fast and affordable deliveries but also last-mile service quality that aligns with their academic and social routines while studying.

Service quality models in last-mile delivery research

Customer satisfaction in LMD has often been evaluated through service quality frameworks. The SERVQUAL model (Parasuraman, Zeithaml & Berry 1985) introduced key dimensions such as reliability and responsiveness but was developed primarily for interpersonal services such as banking. To address technology-driven contexts, E-SERVQUAL (Zeithaml, Parasuraman & Malhotra 2002) expanded the framework to include efficiency, fulfilment, privacy and system availability, making it more relevant for e-commerce (Lin et al. 2016). However, critics argue that E-SERVQUAL still underrepresents physical logistics performance, such as timeliness and condition of goods (Ojochide & Decster 2023). To fill this gap, the Physical Distribution Service Quality (PDSQ) model (Bienstock, Mentzer & Bird 1997) focuses specifically on distribution dimensions, including order accuracy, timeliness and product condition. For student consumers, whose delivery experiences are shaped as much by logistics restrictions as by digital interactions, PDSQ provides a particularly valuable lens.

The literature establishes that while LMD is a central factor in shaping e-commerce success globally, students in restricted accommodation settings face distinctive barriers that alter their expectations and satisfaction. Their demand for flexible, transparent and responsive delivery services underscores the importance of tailoring solutions to their needs. Service quality models provide theoretical grounding, yet existing approaches such as SERVQUAL and E-SERVQUAL inadequately capture the logistical dimension of student deliveries, suggesting the relevance of integrating frameworks like PDSQ into research. These insights highlight a significant gap in South African students, where little empirical work has examined the intersection of delivery restrictions, last-mile logistics and student consumer behaviour.

Research methodology

This study employed a descriptive survey research design to explore the impact of delivery restrictions on student accommodation in Auckland Park and Braamfontein, Johannesburg. The research instrument was developed using the electronic physical distribution service quality (e-PDSQ) framework and Expectation-Confirmation Theory (ECT), which are suitable for exploring last-mile challenges experienced by students in restricted accommodation settings. The instrument comprises originally developed items that captured the key dimensions of e-PDSQ such as reliability, responsiveness, flexibility, security and convenience. While ECT constructs are related to expectations, perceived performance and satisfaction. A quantitative approach was adopted, grounded in a positivist paradigm and deductive reasoning, to facilitate statistical analysis of structured data. The unit of analysis consisted of students residing in student accommodation in Auckland Park or Braamfontein who had made online purchases and had used LMD services at least three times in the past 12 months (2023–2024).

This criterion ensured participants had relevant and recent experiences with LMD services. The aim was to include students with diverse demographic backgrounds such as age, gender, academic level and cultural background to ensure comprehensive and representative findings. Participants were recruited across multiple and diverse student accommodations such as on-campus and private student accommodations to enhance representativeness and ensure relevance to the research objectives. Stratified and convenience sampling techniques were combined to balance representativeness and feasibility. Stratification ensured inclusion across diverse institutions and residence types in Auckland Park and Braamfontein, while convenience sampling facilitated access to respondents through digital platforms. The combination of both approaches supports the generalisability of the findings to the broader student population in similar urban settings, while noting the study's focus on Johannesburg as a contextual boundary.

Cochran' formula was used to determine the most appropriate target sample size, as the exact population of students in the two areas was unknown, and the target sample size was calculated as 384. A self-administered online questionnaire was distributed via WhatsApp, Instagram and LinkedIn. Validity was established through expert review and a pilot test of the questionnaire by distributing the online questionnaire to 10 students. Based on the feedback, minor modifications were made to improve comprehension.

Reliability was assessed using Cronbach's alpha, with coefficients above 0.7 for all dimensions, indicating strong internal consistency. Data were collected cross-sectionally between December 2024 and January 2025; a total of 474 valid responses were collected, and data were analysed using Statistical Package for the Social Sciences (SPSS), version 29.

Ethical considerations

Ethical clearance to conduct this study was obtained from the University of Johannesburg, College of Business and Economics Ethics Committee (No. 2024-TSCM022).

Results discussion

Descriptive statistics summarised demographic variables such as gender, age, residential area, type of student accommodation, source of income and monthly expenditure on basic needs such as food, toiletries and transport. As demonstrated in Table 1, the majority of respondents were female (69.8%), while 29.3% identified as male, and 0.8% did not disclose their gender. This aligns with previous research, indicating that female participation is higher in the online survey (Becker 2022; Heyns & Kilbourn 2022). Research on LMD and repurchase intentions, online shopping perceptions and campus express delivery services have shown a consistent pattern of higher female response rate, ranging from 58% to 71.11% during the year, suggesting a higher female representation in studies related to e-commerce and delivery services (Chelvarayan, Jie & Fern 2021; Rajendran & Wahab 2022).

TABLE 1: Respondents' demographic information.

Items	Description	Frequency	%
Gender	Male	139	29.3
	Female	331	69.8
	Prefer not to say	4	0.8
	Total	474	100.0
Age	18–21	216	45.6
	22–25	240	50.6
	26–29	13	2.7
	30–34	5	1.1
	Total	474	100.0
Residential area	Auckland Park	284	59.9
	Braamfontein	190	40.1
	Total	474	100.0
Type of student accommodation	University residence	135	28.5
	Private student accommodation	169	35.7
	Student apartments and flats	100	21.1
	Communes	69	14.6
	Other	1	0.2
	Total	474	100.0
Source of income	Allowance from parents or relatives	236	49.8
	Allowance from the bursary	213	44.9
	Working	24	5.1
	Other	1	0.2
	Total	474	100.0
Monthly income to spend on basic needs	> R499	19	4.0
	R500–R999	90	19.0
	R1000–R1499	131	27.6
	R1500–R1999	122	25.7
	R2000–R2999	63	13.3
	R3000–R3999	25	5.3
	R4000–R4999	6	1.3
	≤ R5000	18	3.8
	Total	474	100.0

The age distribution of respondents indicates that 50.6% were between 22 and 25 years, while 45.6% were between the ages of 18 and 21. These findings align with previous studies indicating that individuals aged 18 to 24 are the most active online shoppers (Cherrett et al. 2017; Deloitte 2021) and reflect the typical student age range of 20–24 years in South African higher education (Department of Higher Education and Training [DHET] 2024). This suggests that the age distribution of respondents reflects the typical age profile of university students in South Africa. Regarding financial support, 49.8% of the respondents receive an allowance from parents or relatives, 44.9% receive bursary allowances, and 5.1% earn an income through employment. Monthly expenditure on essential items was predominantly between R500 and R1999, with 27.6% of the respondents indicating that they spend between R1000 and R1499 on essentials. This is followed by the respondents spending between R1500 and R1999 per month, while 19.0% spend between R500 and R999 monthly. Students' online shopping behaviour is influenced by affordability and available income, which likely affect purchasing frequency and product selection. These financial patterns are important for understanding their online/parcel delivery preferences and constraints. The next section focuses on their experience with LMD, highlighting the delivery issues students commonly face. The following section explores students' shopping behaviour.

Online shopping behaviour

The findings show that online shopping is a regular and routine practice for students in Johannesburg. As shown in Figure 1, 42% of students are shopping two to three times per month and 34% doing so weekly; nearly four in five students engage with e-commerce platforms at least monthly. These findings suggest that the majority of students engage in online shopping regularly, with a substantial proportion shopping at least once a week, indicating a high level of

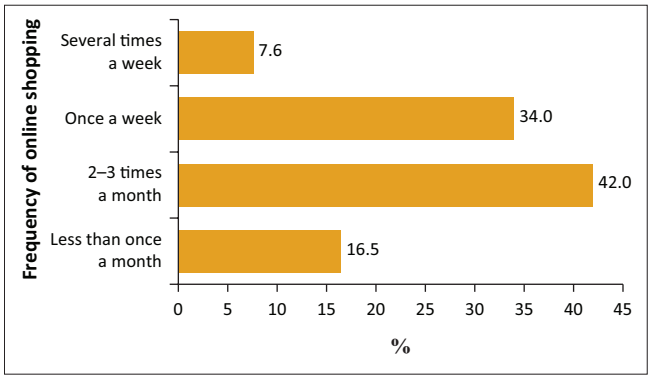

FIGURE 1: Frequency of online shopping among students.

engagement with e-commerce platforms. This pattern is consistent with national trends, as Deloitte's (2021) found that over 70% of South African online consumers shop at least once a month, and 27% shop weekly. The research findings therefore suggest that students, as digital natives, are even more active than the general population in their use of e-commerce platforms. This high level of engagement reinforces the importance of LMD performance for this demographic group, as delivery outcomes are not occasional but central to their everyday consumption routines. For LMD research, this indicates that service failures or restrictions in student accommodation are not isolated inconveniences but affect students' day-to-day consumption behaviour.

As shown in Figure 2, the product categories reveal that convenience is the dominant driver of student e-commerce behaviour. Food and drink purchases (35.3%) were the most common, followed closely by groceries (23.4%) and fashion items (23.5%). These results align with emerging market trends where quick-commerce platforms (e.g. UberEats, MrD, Checkers Sixty60, Pick n Pay ASAP) are reshaping urban consumption (Musikavanhu & Musakuro 2023). Students' heavy reliance on food delivery is particularly significant because it establishes an expectation of immediacy and reliability in the LMD service/process. Fast food orders, often delivered within 30–60 min, contrast sharply with the delays and collection difficulties students encounter when receiving parcels in restricted accommodation settings. This mismatch in expectations may amplify dissatisfaction with traditional parcel deliveries.

Electronics (5.9%), books (3.3%) and health-related items (2.7%) play only a minor role, diverging from global studies where electronics and apparel often lead online sales (Dharmesti et al. 2021). These differences can be attributed to students' limited disposable income, as shown in the demographic profile, which pushes them towards affordable, recurring purchases rather than high-value goods. Interestingly, categories such as electronics (5.9%) and books/stationery (3.3%) were far less frequently purchased. This diverges from findings in developed markets where clothing and electronics dominate the online shopping behaviour (Dharmesti et al. 2021). A likely explanation for the research in this study is the income and budget constraints are evident in the demographic data, with most students reporting monthly expenditure on essentials below R2000. High-value or discretionary purchases are less common, which suggests that affordability and necessity rather than luxury drive online shopping choices for the sample in this study.

When examining platforms as demonstrated in Figure 3, the predominance of food delivery apps (20.8%) and local quick-commerce services such as Takealot (15.4%), Checkers Sixty60 (13.4%), and Pick n Pay ASAP (11.6%) highlights that students depend heavily on local digital platforms for daily living essentials. The use of international fashion platforms such as Shein (10.6%) and AliExpress (0.2%) reflects students' desire for affordability and variety, even if it means longer delivery lead times. This mix of quick local deliveries and slower international purchases illustrates a dual consumer identity: students expect instant gratification for food and groceries while showing patience and price sensitivity for non-urgent categories such as fashion.

From a LMD perspective, these patterns highlight critical tensions. Students are accustomed to the convenience of quick, app-based deliveries that reach them at their residences, yet parcel delivery for goods such as fashion or electronics is often hampered by accommodation restrictions, requiring them to collect parcels off-site. This contradiction between high-frequency e-commerce uses and restricted delivery access helps to explain why delivery restrictions are experienced as particularly frustrating by students. Their high digital engagement and expectations for convenience leave little tolerance for failed deliveries, long queues or rigid collection systems.

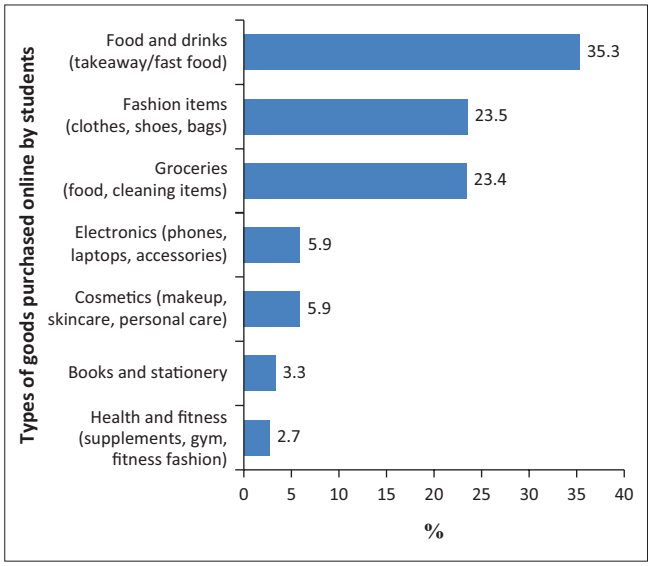

FIGURE 2: Types of goods purchased online.

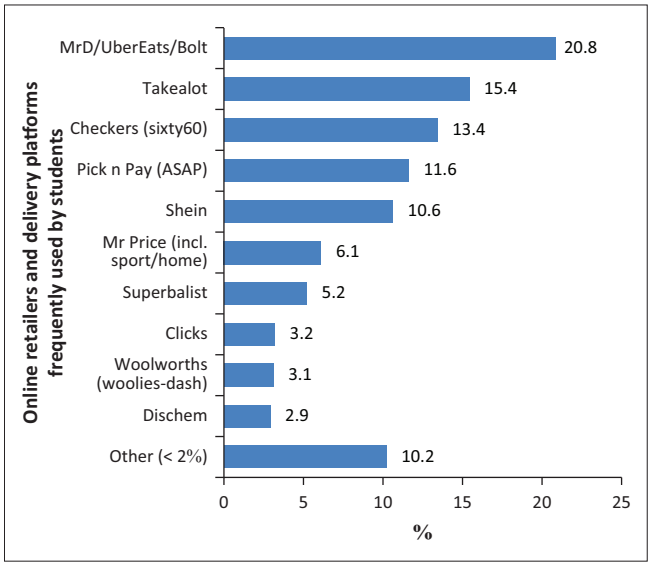

FIGURE 3: Online shops frequently used by students.

Students' last-mile delivery experience

In Figure 4, the results suggest that while students report moderate satisfaction with LMD overall (M = 3.43), deeper examination reveals significant weaknesses in access-related dimensions. Students expressed reasonable satisfaction with delivery options (M = 3.67) and tracking (M = 3.52), which indicates that retailers are offering some level of choice and visibility. However, when it comes to issues shaped by restricted accommodation policies, scores decline markedly. The ease of arranging delivery (M = 3.28), communication about access issues (M = 3.24), and flexibility of delivery services to adjust to restrictions (M = 3.21) all scored below the midpoint, suggesting that students experience friction at precisely the points where accommodation rules intersect with delivery operations. This supports prior research showing that restricted access sites create planning difficulties and reduce service adaptability.

The lowest satisfaction levels were observed in service recovery mechanisms. The speed of re-delivery after a failed attempt received the lowest rating (M = 3.03), followed by delivery fees (M = 2.96) and returns/refunds (M = 2.95). These scores point to two key frustrations, high costs and weak service responsiveness. For students, who are highly price-sensitive, expensive or inflexible delivery undermines trust and discourages repurchasing. Moreover, slow re-delivery processes exacerbate the inconvenience caused by restrictive residence access, amplifying dissatisfaction. This finding is consistent with Brink (2018), who emphasises that shipping and handling fees significantly influence online shoppers' purchase decisions.

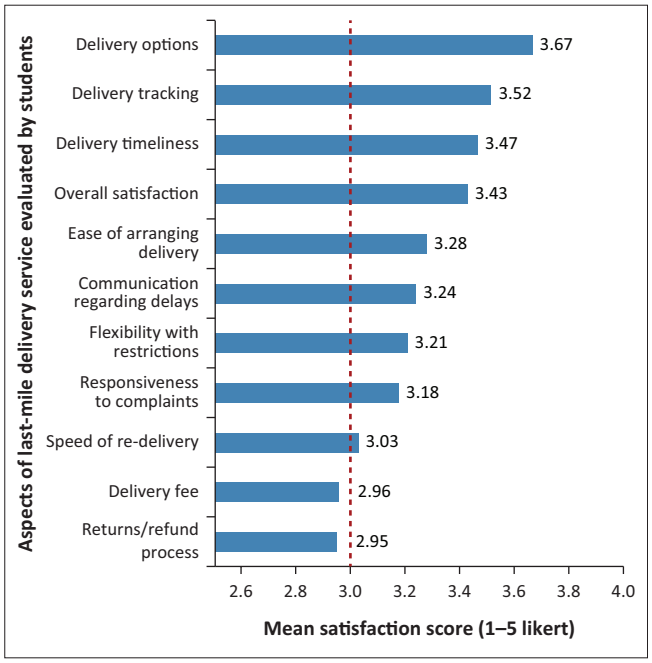

FIGURE 4: Descriptive statistics for students' satisfaction with various aspects of last-mile delivery services.

Decision to avoid online purchases because of unsatisfactory delivery options

The behavioural data reinforces this interpretation, as shown in Figure 5 that nearly two-thirds of respondents (65.8%) reported having avoided online purchases because of unsatisfactory delivery options. As shown in Figure 6, the most frequently cited reasons were high delivery fees (39.4%) and long delivery times (30.8%), consistent with global findings that cost and speed are the leading causes of cart abandonment (Berthiaume 2023). The high prevalence of cost-related avoidance is especially relevant given the limited incomes students reported in the demographic section, confirming that affordability is a structural barrier in their online shopping behaviour. Difficult returns (10.6%) and poor tracking of parcels (9.6%) further highlight the role of reliability and transparency in shaping purchase decisions, reinforcing the importance of customer trust in last-mile services.

The respondents further illustrated that although less common, severe delivery failures, including scams, theft, rude couriers, and lost or incorrect parcels, further erode confidence. While these incidents affect a minority, their presence highlights a vulnerability unique to students, limited control over the delivery environment because of accommodation restrictions. Such negative experiences, even

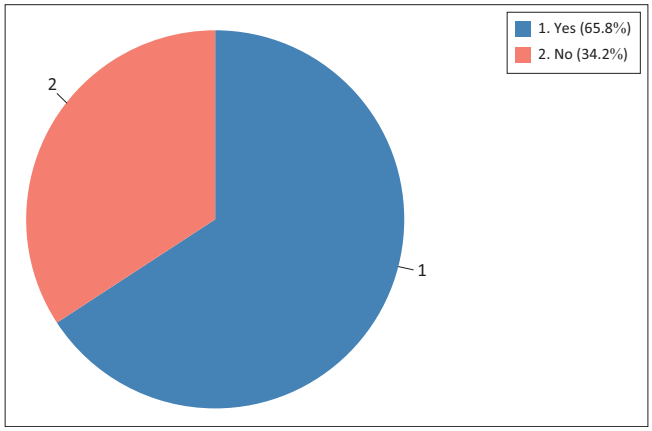

FIGURE 5: Unsatisfactory delivery options.

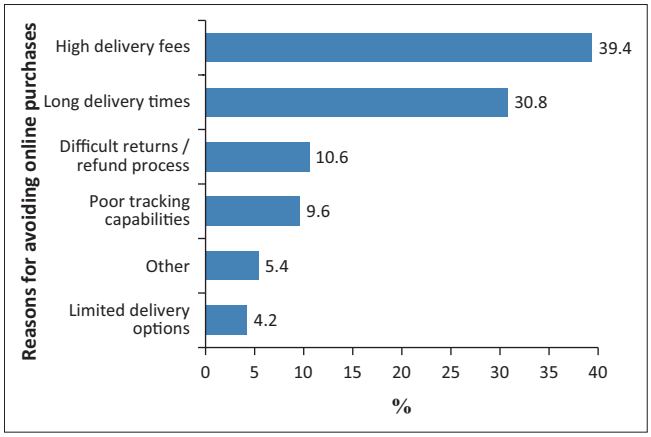

FIGURE 6: Reasons for avoiding online purchases.

if infrequent, can carry disproportionate weight in shaping attitudes towards e-commerce in this demographic. Taken together, these findings reveal a critical contradiction. The findings highlight that students are digitally engaged and frequent online shoppers, yet their LMD experiences are undermined by systemic barriers: restricted access to residences, high fees, slow recovery from failed deliveries and poor communication from providers. This mismatch between high demand and poor service quality leads directly to lost sales and weakened loyalty. For online retailers and logistics providers, the implication is clear, without flexible, affordable and responsive last-mile solutions tailored to student environments, a significant portion of this growing youth market segment will disengage or divert to competitors offering better experiences.

The strategies used to improve the students' last-mile delivery experience

As illustrated in Figure 7, 62.4% of the respondents revealed that they reside in student accommodation that has restrictions. This finding suggests that the majority of students live in residences where security personnel are not authorised to receive parcels in their absence. While these rules are intended to safeguard students (Crystal Services 2024), they inadvertently reproduce a logistical challenge widely reported in other contexts, such as restricted campus deliveries in China and military schools (Gao 2022). By limiting access, students are often forced to adapt their shopping behaviour or collection practices, echoing the global 'not-at-home' problem (Das & Fianu 2018). Such restrictions can create significant inconvenience for students, as they may be unable to receive deliveries when not present at their accommodation.

The findings in Figure 8 reflect a divide between adaptation and disengagement of students' shopping behaviour. While 44.3% reported no significant change in shopping behaviour, a quarter shifted to alternative arrangements such as pickup points, and another quarter reduced online purchases. This suggests that while some students are resilient and flexible, others withdraw from e-commerce altogether, which has implications for both consumer access and retailers targeting this demographic. The dominant coping strategy was reliance on social networks, 56.5% asked friends or roommates to receive deliveries on their behalf. This reflects forms of collaborative consumption and trust-based exchange but raises questions about dependency, uneven responsibility and the potential strain placed on peer relationships. More concerning is that 13.1% admitted to missing classes or academic commitments to wait for deliveries, highlighting a direct tension between educational engagement and logistical barriers of their deliveries.

Table 2 shows that alternative delivery methods such as lockers (4.2%), click-and-collect (5.1%) or alternative addresses (6.5%) were less commonly used. This low uptake points to possible gaps in infrastructure in Johannesburg's student hubs or limited awareness of available services. Qualitative comments reinforced this, with students timing purchases to align with their schedules or negotiating short absences from class. While resourceful, these approaches reflect compromises that still disrupt learning or social life rather than offering seamless solutions.

Table 3 reveals that a small proportion of respondents (1.1%) employ other adaptive strategies not captured in the main categories. These include carefully timing orders to align with personal availability '*I place my order when I'm free*', negotiating brief absences from class to collect deliveries '*I still go to class, and go fetch it when they* call, which takes 10 minutes', and rescheduling deliveries 'They deliver it some other time'. These qualitative responses highlight students' resourcefulness in developing personalised solutions to delivery challenges. The findings of the study indicate that delivery restrictions in student accommodation create logistical challenges that require various adaptations. The predominant reliance on friends and roommates suggests that social networks serve as an important informal support

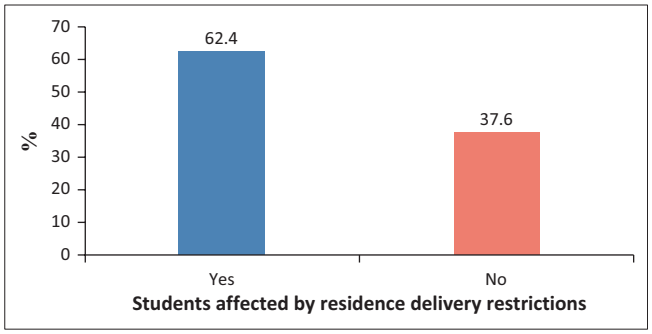

FIGURE 7: Residence delivery restrictions.

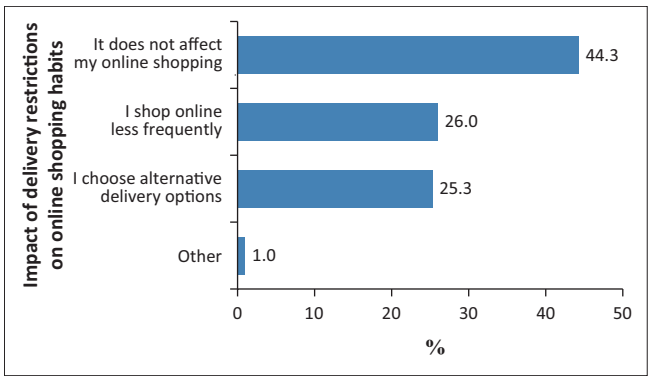

FIGURE 8: Impact of delivery restrictions on online shopping habits.

TABLE 2: Managing package deliveries without staff assistance.

Strategy	Frequency	%
I miss class or other commitments to be present for deliveries	62	13.1
I ask friends or roommates to receive packages	268	56.5
I use alternative delivery addresses (e.g. a friend's house)	31	6.5
I use locker or pickup point services	20	4.2
I rather use the click and collect options	24	5.1
Other	5	1.1
Total	410	86.5
System	64	13.5
Grand total	**474**	**100.0**

system for navigating delivery constraints. However, the fact that some students miss academic commitments to receive deliveries, points to potentially negative educational consequences of current delivery policies and practices in the student accommodation environment.

Satisfaction levels with the restriction were low, as shown in Figure 9; although 40.7% were neutral, dissatisfaction (29.8%) far outweighed satisfaction (15.9%). This discontent in satisfaction mirrors international findings where customers express frustration at delivery failures and added costs (Das & Fianu 2018). For students, however, the stakes extend beyond convenience to academic performance and well-being. A delivery system that compels students to choose between attending lectures and receiving parcels is not sustainable.

The findings highlight that students prioritise flexibility and convenience in LMD. As shown in Figure 10, the most preferred option was flexible delivery time slots and rescheduling (21.4%), underscoring the need to align services with students' irregular academic schedules (Allen et al. 2017). Allowing residence staff to receive packages (20.7%) also ranked highly, reflecting a willingness to trust intermediaries if it reduces failed deliveries and disruptions (Crystal Services 2024). Preferences for lockers or pickup points (17.7%), extended delivery hours (15.4%) and real-time tracking (15.2%) demonstrate demand for accessible, transparent and technology-driven solutions that improve reliability (Cherrett et al. 2017; Gao 2022). By contrast, a dedicated package room in residences (9.6%) was least favoured, suggesting that students prefer scalable, low-cost options over space-intensive infrastructure.

Overall, the studies' results reinforce calls for student-oriented logistics strategies, where delivery systems adapt to the rhythms of student life rather than requiring students to adjust to rigid delivery practices (Filiopoulou et al. 2022). In sum, the findings reveal clear student preferences for flexibility, trusted intermediaries and technology-driven solutions, while showing limited appetite for infrastructure-heavy options. These insights highlight persistent service gaps and point towards targeted interventions that can make LMD more efficient and student-friendly. The next section outlines recommendations for universities, logistics providers and policymakers to address these challenges.

TABLE 3: Additional ways of managing package deliveries without staff assistance.

Strategy	Frequency	%
Additional strategies used by students to manage package deliveries without staff assistance	469	98.9
I always make means to avail myself, I still go to class, and go fetch it when they call, which takes 10 min-because I stay on campus	1	0.2
I am always notified when the delivery will be made, and it fits my schedule	1	0.2
I order whenever I will be able to collect myself which can be an inconvenience at times and have to miss class or other commitments to be present for deliveries	1	0.2
I place my order when I'm free	1	0.2
They deliver it some other time	1	0.2
Total	**474**	**100.0**

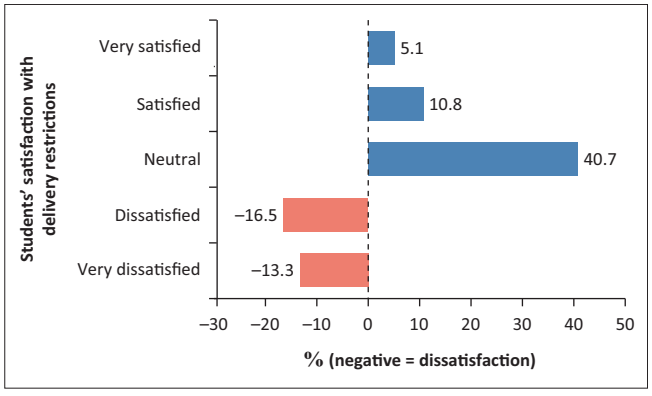

FIGURE 9: Satisfaction of the delivery restriction.

Recommendations

The survey revealed that 62.4% of students live in residences where staff cannot receive parcels, leading to missed deliveries and, for 13.1%, missed academic commitments. This underscores the need for on-site solutions such as smart lockers or package rooms (Cherrett et al. 2017; Gao 2022), revised policies allowing staff acceptance with digital verification (Crystal Services 2024), and extended collection hours to evenings and weekends (Bouhouras et al. 2024). Satisfaction scores for arranging deliveries (M = 3.28), communication about delays (M = 3.24) and flexibility under access restrictions (M = 3.21) indicate service gaps. Couriers should introduce customised delivery windows aligned with student schedules (17:00–19:00), improve real-time communication and expand re-delivery options (Allen et al. 2017). Partnerships with universities to establish decentralised parcel hubs or micro-lockers in dense student areas such as Auckland Park and Braamfontein would reduce delays and reliance on peer handovers.

Over half of respondents (65.8%) avoided purchases because of unsatisfactory delivery options, citing high fees (39.4%) and long lead times (30.8%). E-retailers should respond with student discounts or free delivery thresholds, transparent pricing and simplified return policies to rebuild trust and

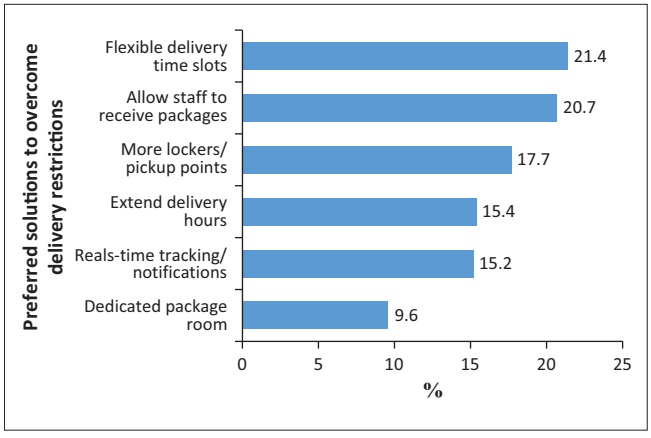

FIGURE 10: Preferred solutions for delivery restriction.

encourage repeat purchases (Berthiaume 2023; Dablanc et al. 2017). Finally, 26.0% reported shopping less frequently and 25.3% used alternatives because of delivery restrictions, highlighting systemic gaps in student-oriented logistics. Policy incentives for shared lockers, community hubs or crowdshipping solutions (Das & Fianu 2018; Filiopoulou et al. 2022) could balance accessibility with security, while reducing students' reliance on informal peer networks (56.5%).

Future research

The data collected for the study also showed that some students face academic trade-offs, such as missing classes or delaying study commitments because of restrictive delivery systems. This points to an underexplored consequence of last-mile inefficiencies: their potential effect on educational outcomes. Future research should therefore examine the link between delivery restrictions and academic performance, while also conducting comparative analyses of student housing delivery models internationally to identify scalable best practices. Further research of digital solutions such as locker apps, peer parcel-sharing platforms, and AI-driven delivery scheduling is recommended, as these could formalise the adaptive strategies already observed among students (Huang & Nuangjamnong 2023).

Conclusion

This study has shown that delivery restrictions in student accommodations significantly disrupt LMD, influencing both online shopping behaviour and satisfaction levels among university students in Johannesburg. Analysis of 474 survey responses revealed that prohibitions on staff receiving parcels, combined with high delivery fees and long waiting times, undermine the convenience and reliability that students expect from e-commerce. These constraints drive behavioural shifts such as reduced online shopping frequency, reliance on informal peer networks, and in some cases, academic disruptions where students miss classes to receive deliveries. While students demonstrate resilience by adopting coping strategies, including alternative delivery addresses, pick-up points and assistance from roommates, these adaptations expose broader inefficiencies in last-mile systems for student populations. The recommendations arising from this study call for student-centred delivery solutions within residences, improved flexibility and communication by logistics providers, affordability and transparency from e-retailers and supportive infrastructure and policy interventions from urban planners.

By connecting delivery inefficiencies to consumer trust and academic well-being, this research expands the discourse on LMD beyond operational performance to the lived experiences of student consumers. Theoretically, the study contributes by applying and extending the PDSQ and ECT frameworks to a unique student housing context, demonstrating their relevance for analysing both logistics performance and behavioural adaptation in constrained environments. Without targeted interventions, restrictive delivery practices risk eroding satisfaction and repurchase intentions among one of South Africa's most digitally active demographics. Future studies should therefore explore the comparative effectiveness of international housing delivery models and assess the longer-term implications of delivery restrictions on both educational outcomes and consumer behaviour. The findings emphasise that LMD in student accommodation is not only a logistical challenge but also a determinant of digital inclusion, consumer confidence and academic engagement.

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Competing interests

The authors declare that they have no financial or personal relationships that may have inappropriately influenced them in writing this article.

CRediT authorship contribution

Tamara L. Sirenya: Writing-original draft. Juanita van der Walt: Writing review & editing & supervision. Elmarie Kriel: Writing – review & editing & supervision. The authors confirm that this work is entirely their own, have reviewed the article, approved the final version for submission and publication, and take full responsibility for the integrity of its findings.

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Data availability

The data that support the findings of this study are available on request from the corresponding author, Tamara Lulutho Sirenya. The data are not publicly available due to ethical restrictions, as they contain information that could compromise the privacy of research participants.

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