

Digital Fast Fashion Consumption Among Gen Z: A Rasch-Based Study on E-Commerce Strategy Adaptation

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ABSTRACT

Purpose— This study aims to analyze the impact of Generation Z's digital fast fashion consumption tendencies on the business model of fashion e-commerce in Indonesia. Specifically, it evaluates the validity and reliability of an instrument measuring the influence of influencer credibility, brand trust, loyalty, and variety-seeking behavior using the Rasch Model approach. The core objective is to assess how latent consumer behaviors shape and drive the structure and adaptation of fashion e-commerce business models.

Design/methods/approach—A descriptive quantitative approach was applied, utilizing a survey method involving 103 Generation Z respondents who actively shop for fashion via social media platforms. The instrument consisted of a 5-point Likert scale questionnaire covering constructs such as influencer credibility, brand trust, loyalty, and variety-seeking. Data were analyzed using the Rasch Model via Winsteps software to measure unidimensionality, INFIT/OUTFIT MNSQ values, reliability, and to visualize respondent ability and item difficulty through the Wright Map.

Findings—The instrument showed high reliability (person reliability = 0.89; Cronbach's Alpha = 0.93) and met the unidimensionality assumption. Most items demonstrated acceptable statistical fit (INFIT and OUTFIT MNSQ within 0.7–1.3), indicating strong psychometric consistency. This ensures that the findings are based on accurate and reliable measurements, which is crucial for behavior-based research.

Research implications/limitations—This study is limited to Indonesian Generation Z and uses only a 5-point Likert scale. Future research could expand to other digital platforms and explore the moderating role of sustainability values or long-term loyalty intentions.

Originality/value—This research contributes to the development of digital fashion consumer behavior measurement methods using the Rasch Model and provides strategic insights for fashion e-commerce actors to align business models with the psychometric and behavioral characteristics of Generation Z.

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Introduction

The fast fashion industry has experienced remarkable growth over the past two decades, driven by rapid production cycles, low pricing strategies, and short-lived trend dynamics. This transformation is further accelerated by digitalization, enabling consumers to access and purchase fashion items instantly via e-commerce platforms. Meskini et al. (2024) emphasized that traditional fashion companies with large-scale production structures can outperform sustainable brands in revenue by up to 23 times. However, the success of fast fashion raises significant social and environmental concerns, including textile waste, overproduction, and labor exploitation (Nasir et al., 2024; de Angelis et al., 2023).

Generation Z, widely recognized as digital natives, plays a pivotal role in shaping digital fast fashion trends. Not only do they consume fashion products, but they also reproduce trends and influence online communities through digital content. According to Wimpertiwi et al. (2023), platforms like TikTok and Instagram accelerate trend circulation, directly impacting fashion e-commerce demand. This is corroborated by Sari et al. (2024), who found that Gen Z's impulsive buying behavior is strongly linked to high digital exposure. Fenta et al. (2024) further observed that digital social dominance makes Gen Z highly responsive to brands that are fast, unique, and visually appealing.

Despite their environmental awareness, Gen Z often exhibits a discrepancy between sustainable intentions and actual behavior a phenomenon referred to as green hypocrisy. De Oliveira et al. (2022) reported that although 40% of consumers express concern for the environment, only 4% actually purchase sustainable products. Laheri et al. (2024) argued that while Gen Z is aware of the environmental consequences, emotional impulses and expressive needs drive them toward fast fashion choices. This behavioral inconsistency poses strategic challenges for fashion e-commerce platforms in bridging ideal values with real consumer actions.

To adapt to these consumption patterns, fashion e-commerce business models have undergone rapid innovation. Platforms now feature personalized recommendations, dynamic discounts, and live shopping to enhance user engagement (Putera et al., 2023). Sumartini and Mandasari (2023) observed that brand loyalty is no longer the primary driver for Gen Z consumers, who instead prioritize speed, interactivity, and convenience. Cruz-Cárdenas et al. (2022) emphasized that current consumer expectations are shaped more by digital experience than emotional brand attachment.

In decision-making processes, Gen Z is heavily influenced by psychological factors such as emotional value, self-identity, and uniqueness. Helinski et al. (2025) found that self-expression through fashion is a key motivation for purchase. Similarly, Makhitha (2024) noted that brands supporting personal branding tend to be more favored. Vicente-Molina et al. (2013) further emphasized that Gen Z's fashion consumption is driven by the convergence of social values and digital identity.

Influencers, particularly micro-influencers, play a crucial role in shaping fashion preferences and purchasing decisions. Asma et al. (2023) highlighted that smaller, authentic communities are more trusted than high-profile celebrities. Dotty and Handayani (2023) showed that micro-influencers are more effective in promoting visually driven products like fashion. However, influencer marketing also presents challenges, as popularity does not always equate to expertise. Some influencers promote trendy but impractical items, leading to mismatched consumer expectations (Yoo, 2023).

In Indonesia a country with a large Gen Z population and high digital adoption the fashion e-commerce market is complex and evolving. Hidayat and Susanti (2023) reported high demand for instant delivery, easy return policies, and user-friendly interfaces. At the same

time, Shirvanimoghaddam et al. (2020) warned that Indonesia is one of Asia's largest textile waste contributors, with a low rate of clothing reuse. These insights highlight the urgent need for innovative digital fashion logistics and management systems.

Environmental concerns surrounding digital fast fashion continue to grow. Stella et al. (2024) noted that only 1% of textile waste is recycled into new clothing, with the rest ending up in landfills. Cayaban et al. (2023) pointed out that the pursuit of low prices and high variety puts pressure on sustainable supply chains. According to Bodhanwala and Bodhanwala (2022), brands that integrate circular economy principles and digital storytelling can simultaneously enhance brand value and consumer trust.

In this context, sustainability can become a competitive advantage for fashion e-commerce, if framed appropriately. Suki (2016) suggested that pride and moral fulfillment are key motivators for green product purchases. Nonetheless, firms must avoid greenwashing, which can severely damage brand reputation (Nasir et al., 2024). Meskini et al. (2024) emphasized the need for government incentives to support sustainable fashion, ensuring they remain competitive with well-funded conventional brands.

Given this background, this study aims to empirically examine how Generation Z's digital fast fashion consumption tendencies influence the structure and strategies of fashion e-commerce business models in Indonesia. The study focuses on the interplay between psychological factors (values and identity), social factors (influencers and digital communities), and digital aspects (platforms and service features). Drawing from Cruz-Cárdenas et al. (2022), Fenta et al. (2024), and Helinski et al. (2025), this research seeks to provide strategic insights for developing more relevant, responsive, and adaptive e-commerce business models in the digital fashion era.

Methods

This study adopted a descriptive quantitative approach to examine the impact of Generation Z's digital fast fashion consumption tendencies on the structure and strategy of fashion e-commerce business models. As noted by Nasir et al. (2024), this approach is well-suited for empirically evaluating consumer behavior in the post-pandemic e-commerce ecosystem.

The target population consisted of Indonesian Generation Z consumers aged 17 to 26 who are active on social media platforms—especially TikTok and Instagram—and have made online purchases of fashion products in the past few months. A purposive sampling technique was used to ensure that respondents met these criteria. A total of 103 valid responses were collected, with a 10% error tolerance due to time constraints.

The instrument used in this study was an online questionnaire developed via Google Forms, adapted from validated behavioral indicators in prior studies (Sumartini & Mandasari, 2023; Putera et al., 2023). The instrument consisted of 10 closed-ended statements using a 5-point Likert scale, ranging from “Strongly Disagree” (1) to “Strongly Agree” (5), and grouped into two sub-variables:

- Digital Fast Fashion Tendency (6 items): capturing trend-following behavior, impulsivity, and innovation-based loyalty (items N1, N2, N3, N4, N6, and N10).
- Fashion E-Commerce Service Preferences (4 items): reflecting expectations on delivery speed, return flexibility, and digital features (items N5, N7, N8, and N9).

Table 1. Research Questionnaire Items

This table presents the items used in the questionnaire, categorized into two constructs: (1) Digital Fast Fashion Tendency and (2) Fashion E-Commerce Service Preferences, based on Gen Z consumer behavior in online fashion purchasing.

Table 1. Research Questionnaire Items

Variable	Statement	Code
Digital Fast Fashion Tendency	I often follow the latest fashion trends through short-form content (Reels, Shorts, TikTok).	N1
	I tend to purchase fashion products online immediately after seeing them go viral on social media.	N2
	The speed of catalog updates (frequent new collections) on e-commerce platforms influences my shopping decisions.	N3
	I feel comfortable making impulsive purchases of trendy and digital fashion products.	N4
	Flash sale promotions and “live now” notifications often prompt me to open shopping apps.	N6
	I prefer fashion e-commerce platforms that regularly innovate in clothing design to match Gen Z trends.	N10
Fashion E-Commerce Service Preferences	I always check product availability before making a purchase.	N5
	I choose online stores that offer fast delivery, such as same-day shipping.	N7
	I think it is important if an online store facilitates product exchanges or returns.	N8
	I am more confident buying clothes online when there is a virtual try-on feature.	N9

To ensure validity and reliability, the questionnaire was pilot-tested on 20 early respondents. After refinement, the finalized version was distributed online in May 2025 to the main sample. The data were analyzed using the Rasch Model, applying Winsteps software to examine:

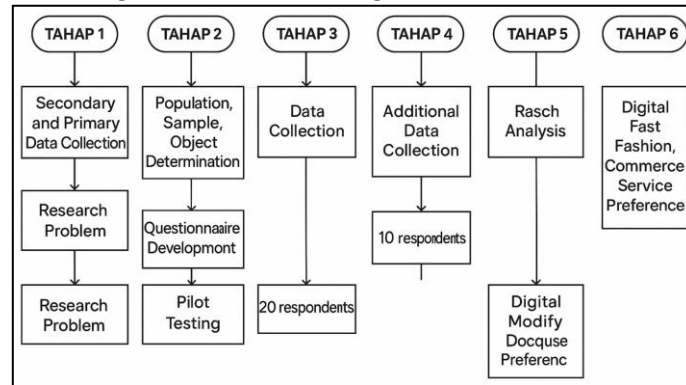
- Item and person reliability
- Fit statistics (INFIT and OUTFIT MNSQ)
- Unidimensionality
- Item-person distribution using the Wright Map

An item was considered statistically valid if its INFIT and OUTFIT MNSQ values were within 0.5–1.5 logits. Reliability was confirmed when the person and item reliability exceeded 0.70. This method allowed for the transformation of ordinal data into interval scales, enabling more accurate psychometric analysis (Bond et al., 2020; Cavanagh & Waugh, 2011).

The overall research process was organized into six main stages. The study began with problem identification and a literature review, focusing on key theoretical concepts such as digital consumption behavior, brand loyalty, variety-seeking tendencies, influencer credibility, and e-commerce service preferences. These concepts were used to develop the conceptual

framework and measurement constructs. In the second stage, the research population, sampling criteria, and questionnaire instrument were defined. The target population included Indonesian Generation Z who are active on social media and digital shopping platforms. The questionnaire was designed using a Likert scale and constructed based on the two main sub-variables: digital fast fashion tendency and fashion e-commerce service preferences.

Figure 1. Research Design and Process Flow



In the third stage, a pilot test was conducted using responses from 20 participants to examine early signs of validity and detect potential bias. This stage ensured clarity and consistency in item formulation. After finalizing the instrument, the fourth stage involved distributing the questionnaire to 103 qualified respondents via online platforms. The sampling method remained purposive to reach relevant digital consumers.

The fifth stage consisted of data analysis using the Rasch Model, which enabled the transformation of ordinal Likert-scale responses into interval data, enhancing measurement accuracy. The Rasch approach was also employed to assess item fit (INFIT and OUTFIT MNSQ), unidimensionality, and reliability of both items and respondents. In the final stage, the results were interpreted through statistical outputs and visualized using the Wright Map, allowing a comparison between item difficulty and respondent ability. These insights were used to explore how digital consumption patterns among Generation Z influence the structure and responsiveness of fashion e-commerce business models.

Result

The data collected through the questionnaire involved a total of 103 respondents. All respondent characteristics were further analyzed using the Rasch Model, which transforms ordinal data from the Likert scale into interval data (Bond et al., 2020). Based on probability theory, the Rasch Model enables the prediction of responses to each measurement item by using both respondent and item parameters on the same logit scale (Cavanagh & Waugh, 2011). This model also allows for checking statistical fit between items and respondents, which serves as a key indicator for ensuring the reliability and validity of data in studies on digital fashion consumer behavior.

The analysis process was conducted using Microsoft Excel and Winsteps 3.7 software. Only data that met validity and reliability criteria were included in the subsequent analysis of fashion e-commerce business model structures that are adaptive to Generation Z's behavioral tendencies.

Table 2 below presents the demographic characteristics of the respondents. Out of the 103 participants, 64.1% were female and 33% were male, with 2.9% preferring not to disclose their gender. The majority of respondents (56.9%) were aged between 17–20 years, followed by 33% aged 21–25 years, and 9.8% aged 26–28 years. Regarding occupation, 78.6% identified

as students, while a smaller portion consisted of full-time workers (12.6%), part-time workers (5.8%), and fresh graduates (2.9%). In terms of income or monthly allowance, 30.4% of respondents reported earning between Rp. 500,000 and Rp. 1,000,000, while 25.5% earned less than Rp. 500,000, and 24.5% earned between Rp. 1,000,000 and Rp. 3,000,000. Only 5.9% of respondents earned more than Rp. 5,000,000, and 4% had no income at all.

Table 2. Respondent Profile

Variable	Frequency	Percentage
Gender		
Male	34	33.00%
Female	66	64.10%
Prefer not to answer	3	2.90%
Age		
17–20 years	58	56.90%
21–25 years	34	33.00%
26–28 years	10	9.80%
Occupation		
Student	81	78.60%
Fresh Graduate	3	2.90%
Part-time Worker	6	5.80%
Full-time Worker	13	12.60%
Monthly Income / Allowance		
< Rp. 500,000	26	25.50%
Rp. 500,000 – Rp. 1,000,000	31	30.40%
Rp. 1,000,000 – Rp. 3,000,000	25	24.50%
Rp. 3,000,000 – Rp. 5,000,000	10	9.80%
> Rp. 5,000,000	6	5.90%
None	4	4.00%

Summary Statistics

Based on the Rasch Model analysis of 103 respondents, the results indicated high reliability and sufficient distribution of respondent abilities. The person reliability was 0.77 (real) and 0.81 (model), demonstrating that the instrument effectively differentiates among respondent abilities and shows consistent responses across items. The Cronbach's Alpha (KR-20) value was 0.79, indicating good internal consistency, making the instrument suitable for measuring digital consumption behavior among Generation Z in the fast fashion context.

The person separation index was 1.84 (real) and 2.05 (model), suggesting that the instrument is capable of dividing respondents into at least two levels of behavioral tendency. The mean measure was 0.70 logits, with a standard deviation of 1.05, indicating that the average respondent had slightly above-average ability. The respondent ability ranged from – 1.32 to 5.32 logits, reflecting a wide variation in behavioral tendencies among the sample.

Both INFIT and OUTFIT mean-square (MNSQ) values averaged 1.00, with a standard deviation of 0.10, and fell within the acceptable range of 0.5 to 1.5, confirming that response patterns fit well with model expectations. The person raw score-to-measure correlation was 0.94, further supporting the reliability and predictive power of the measurement.

These statistical indicators confirm that the instrument used in this study is valid, reliable, and effective in assessing the digital fast fashion consumption behavior of Generation Z and its implications for the fashion e-commerce business model.

Rating Scale Summary

The analysis of the Likert scale structure confirmed that all five response categories functioned optimally within the Rasch Model framework. Each category showed a progressively increasing observed average, starting from -0.59 for category 1 (“Strongly Disagree”) to 1.52 for category 5 (“Strongly Agree”). This pattern indicates that respondents consistently used the scale to express varying levels of agreement, in line with expected item difficulty and personal ability measures.

The Andrich threshold values also demonstrated logical progression, rising sequentially from -1.45 (category 2) to 1.67 (category 5). This confirms that the transitions between categories were ordered appropriately and that there was no category disordering or overlap, a key requirement for valid category functioning in Rasch measurement.

From a fit perspective, all OUTFIT mean-square (MNSQ) values for the five categories were within acceptable limits, remaining below 2.0. The highest OUTFIT MNSQ was recorded in category 1 (1.41), which slightly exceeded the other categories but remained acceptable due to the low frequency of use (only 5% of total responses). This suggests minimal practical impact on the overall model fit.

Overall, these results demonstrate that the 5-point Likert scale used in this instrument performs well, providing clear discrimination among levels of agreement. It allows for accurate representation of respondents’ attitudes toward digital fast fashion behavior and e-commerce service preferences, and can be reliably applied in similar future studies targeting Generation Z.

Unidimensionality

The results of the Principal Component Analysis (PCA) of standardized residuals confirmed that the instrument used in this study met the criteria for unidimensionality, a fundamental assumption of Rasch Model analysis. The raw variance explained by measures was 42.0%, which exceeds the commonly accepted minimum threshold of 20% in Rasch-based evaluations. This indicates that the majority of the variation in responses is explained by a single dominant latent construct measured by the instrument.

In addition, the raw unexplained variance in the first contrast was 14.2% (eigenvalue = 2.47), which remains below the 15% cut-off used to detect the presence of meaningful secondary dimensions. The subsequent contrasts showed even lower unexplained variances—8.9%, 7.5%, 6.6%, and 5.6%, respectively—further supporting the absence of strong competing dimensions or sub-constructs.

These findings suggest that the set of questionnaire items collectively measures a unified construct: Generation Z’s digital fast fashion consumption tendencies and preferences for fashion e-commerce services. The structure of the instrument is therefore considered psychometrically sound and suitable for further statistical analysis using Rasch Model techniques.

Item Fit Statistics

The Rasch Model item analysis indicated that the questionnaire items functioned within acceptable fit parameters. The average INFIT mean-square (MNSQ) was 1.00, and the average OUTFIT MNSQ was 1.02, which are very close to the ideal value of 1.00. These values suggest that most items aligned well with model expectations, providing consistent measurement of the intended construct.

The range of item-level MNSQ values fell between 0.82 and 1.50, with the majority of items lying within the preferred interval of 0.7–1.3. One item, N8, recorded the highest OUTFIT MNSQ value of 1.64, slightly exceeding the recommended threshold of 1.5, and had an INFIT

MNSQ of 1.50. Although this may indicate potential misfit, the item was retained due to its content relevance and its contribution to capturing the full behavioral spectrum of respondents. In contrast, items such as N2, N4, and N6 showed INFIT values below 1.00, suggesting overfit, which, while statistically conservative, still indicates that these items contributed consistently to the overall measurement.

The point-measure correlation (PT-Measure Corr.) values further confirmed item quality. The average PT-Measure Corr. was 0.49, with item N4 achieving the highest correlation (0.68) and item N8 the lowest (0.36). All items showed positive correlations, indicating that each item contributed in the same direction as the underlying latent trait.

In terms of response agreement, the observed exact match rate was 45.8%, while the expected match was 43.4%, meaning nearly half of the respondents answered in alignment with model predictions. This outcome supports the conclusion that the instrument's items were appropriately targeted, and that the item set as a whole was valid and reliable for measuring digital fast fashion tendencies and e-commerce service preferences among Generation Z respondents.

Person Measure

The Rasch Model person-level analysis illustrated the distribution of respondent abilities based on their total scores and estimated measures. Respondents who scored 50 out of 50 points, such as ID @043P2M4ABX and @075P1M1IDX, achieved the highest ability estimate at 5.32 logits, representing the upper end of the scale. This indicates that these individuals strongly agreed with all items and exhibited the highest tendency toward digital fast fashion behavior and service preferences.

On the other end of the spectrum, respondents with the lowest total score, such as ID @0931M1M2AX, received a measure of -1.32 logits, placing them at the lower bound of the ability distribution. This variation reflects the breadth of agreement patterns among the sample and indicates the instrument's ability to differentiate between low and high behavioral tendencies.

The point-measure correlation (PT-Measure Corr.) values for individual respondents varied depending on how well their responses aligned with the expected model pattern. Respondents with extreme scores (either very high or very low) often had lower correlation values, suggesting a limited contribution to the model's overall stability. However, the presence of such extreme values is common and acceptable in Rasch analysis, provided they do not dominate the sample distribution.

The exact match rate, which represents the proportion of responses that exactly matched the Rasch model's expectations, averaged 45.8%, with a standard deviation of 21.1%. This indicates that many respondents answered consistently with predicted patterns, while others demonstrated some deviation—typically expected in behavior-based survey data. Overall, the variation in person measures confirms that the instrument was capable of capturing diverse behavioral profiles among Generation Z respondents regarding fast fashion and digital service usage.

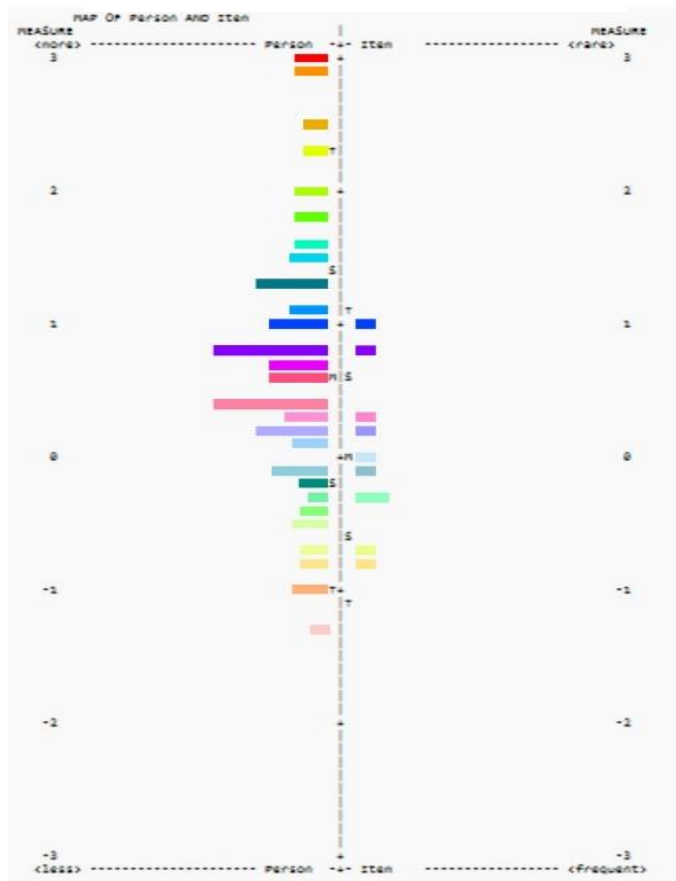
Variable Map (Wright Map)

The Wright Map, or person-item map, presents a side-by-side visualization of respondent ability (on the left) and item difficulty (on the right) on the same logit scale. The map illustrates how well the item distribution aligns with the abilities of the sampled respondents.

In this study, the distribution of respondents was concentrated between 0 and +2 logits, with an overall range spanning from -2 to +3 logits. This indicates that most respondents

demonstrated a moderate to high level of agreement with the questionnaire items, reflecting a relatively strong inclination toward digital fast fashion behavior and service preferences.

Figure 2. Person–Item Map (Wright)



On the other hand, the distribution of item difficulty was narrower, ranging approximately from -1 to $+1$ logits. This narrower spread suggests that the majority of items were relatively easy to agree with, especially for respondents with higher behavioral tendencies. The skewed alignment where most respondents were positioned above the majority of item simplifies that the items did not fully capture the higher end of the ability spectrum.

This imbalance reveals an opportunity to improve the instrument by introducing more challenging items for example, items that probe deeper commitment to sustainable fashion or more complex digital service expectations. Such additions would help enhance the discriminatory power of the instrument, particularly for respondents with high digital behavior intensity.

Overall, the Wright Map demonstrates that the current instrument is sufficiently aligned with the sample's behavioral distribution but could benefit from refinement to better differentiate among high-ability respondents in future studies.

Discussion

The findings of this study offer valuable insights into the dynamics of Generation Z's digital fast fashion consumption and its influence on the fashion e-commerce business model. The Rasch analysis confirmed that the measurement instrument used was both valid and reliable, with satisfactory person and item fit indices, unidimensionality, and a logically functioning Likert scale. The high person reliability and clear separation index demonstrate that the instrument effectively distinguished between varying levels of consumer behavior tendencies within the sample. This reinforces the importance of psychometric rigor in measuring complex constructs such as digital shopping patterns and service expectations.

The Wright Map revealed that while the current set of items successfully captured the dominant behavioral trends of most respondents, it lacked the ability to discriminate at the higher end of the ability spectrum. This suggests that Gen Z consumers are increasingly attuned to digital innovations and fast fashion cues, rendering many questionnaire items relatively easy. The implication is that future instruments should include more nuanced or challenging items—such as those involving sustainability dilemmas, digital ethics, or brand authenticity—to better reflect the evolving expectations of this demographic.

The results also highlight a broader behavioral paradox known as the green attitude behavior gap. Despite rising environmental awareness among Generation Z, the study reaffirms that their purchasing behavior remains largely influenced by speed, visual appeal, and social influence—particularly through platforms like TikTok and Instagram. This aligns with prior studies (e.g., Zimand-Sheiner & Lissitsa, 2024; Chi et al., 2024) that emphasize the emotional and expressive dimensions of fast fashion consumption. Consequently, sustainability messaging alone may not suffice to shift actual purchasing behavior unless it is accompanied by emotionally resonant and socially embedded narratives.

For fashion e-commerce platforms, these findings carry several strategic implications. Companies must adapt their business models to align not only with technological trends but also with the digital identities and social expectations of Gen Z. This includes investing in immersive experiences (e.g., virtual try-ons, real-time content), micro-influencer partnerships, and responsible storytelling that bridges ethical values with lifestyle aspirations. Furthermore, integrating Rasch-based psychometric tools can help platforms better segment their audience, personalize marketing strategies, and design services that respond dynamically to consumer behavior shifts in the fast fashion era.

Conclusion

This study examined the influence of Generation Z's digital fast fashion consumption tendencies on the adaptation of fashion e-commerce business models in Indonesia. Using the Rasch Model, the study validated a psychometrically sound measurement instrument that captured key constructs such as influencer credibility, variety-seeking behavior, digital convenience, and brand loyalty. The results demonstrated high levels of item reliability, person reliability, and unidimensionality, confirming that the instrument effectively measured latent consumer behaviors relevant to the fast fashion digital ecosystem.

The findings revealed that while Gen Z respondents exhibited a strong tendency toward impulsive and visually driven fashion choices, their loyalty to brands remained moderate and situational. This supports previous research indicating the presence of an attitude–behavior gap, where awareness of sustainability and ethical issues does not always translate into responsible purchase decisions. The dominance of social influence and emotional expression in their buying behavior suggests that digital experiences and trend alignment continue to outweigh long-term brand attachment.

From a strategic perspective, the results suggest that fashion e-commerce platforms must embrace both personalization and sustainability in their business models. Rather than relying solely on promotional offers or trend cycles, companies should engage Gen Z through value-driven storytelling, micro-influencer collaborations, and platform features that reflect both speed and ethical awareness. Incorporating measurement tools like the Rasch Model may also support better consumer segmentation and service innovation.

Future research could enhance these insights by incorporating mediating variables such as moral obligation, subjective norms, or social identity. Moreover, applying multivariate techniques such as Structural Equation Modeling (SEM) or Confirmatory Factor Analysis (CFA) could strengthen the structural validity of the model and allow for broader generalization across different platforms, regions, or socioeconomic segments.

Declarations

Author contribution statement

The lead author participated in the study's conceptualization and design, analysis, interpretation of data, and initial drafting of the paper. Each author contributed to the critical revision of the content for intellectual rigor and provided final approval for the published version. All authors are responsible for every aspect of the work.

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Data availability statement

The data supporting this study's findings are available from the corresponding author upon reasonable request. However, due to privacy and ethical considerations, the data are not publicly accessible.

Declaration of Interests Statement

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