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The Effectiveness of Targeted Audiences in the Digital Age

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ABSTRACT

In the age of the internet, audience targeting has become a cornerstone of successful marketing strategies. By leveraging data analytics, machine learning, and user profiling, companies can now pinpoint and engage specific consumer segments with unprecedented accuracy. This targeted approach ensures that content is more relevant and personalized, which not only enhances the overall user experience but also significantly boosts conversion rates and return on investment (ROI). Platforms such as social media, search engines, and AI-powered marketing tools allow for real-time targeting based on users' online behavior, demographic characteristics, geographic location, and personal interests. However, while the benefits of targeted advertising are substantial, the practice also raises important ethical considerations. Privacy concerns are growing, particularly around the collection and use of personal data without explicit consent. Consumers are increasingly wary of how their information is used, and regulatory frameworks like GDPR highlight the importance of data transparency and security. Furthermore, the study examines challenges such as algorithmic bias, which can reinforce stereotypes, and ad fatigue, where users become desensitized to repetitive or intrusive ads. Despite these issues, audience targeting remains a powerful tool. The key lies in finding a balance between personalization and respecting consumer privacy, thereby fostering both brand loyalty and long-term trust.

Keywords: Targeting Audience, Data Privacy, Machine Learning, Personalization

1. Introduction

The speedy transformation of digital technology has extensively influenced communication environments, consumer expectations, and business strategies. The phenomenon is most strongly observed in the development of target audience practices-strategies based on using data analytics, machine learning, and tracking digital behavior to personalize content to designated segments of the audience. Spanning sectors like marketing, public health, education, and politics, targeted communication is transforming the process of message composition, delivery, and consumption in the digital era. Researchers across various disciplines have delved into the implications of audience targeting, probing its efficacy, ethical limits, and influence on user experiences. Based on 30 studies, this literature review integrates findings and identifies common themes like algorithmic personalization, value segmentation, user privacy issues, and engagement maximization. Together, these studies shed light on the changing dynamics of targeted communication and offer a rich understanding of its effectiveness in an age of digital mediation. Research Gap Although the prevalence of targeted advertising is increasing in the digital era, some research gaps are still not addressed. The majority of current research focuses on short-term effects like click-through rates and conversions, neglecting the long-term customer engagement and brand loyalty implications. There is also little research regarding how privacy issues and data transparency affect consumer openness to targeted ads. As Facebook, Instagram, and TikTok reign digital marketing campaigns, there is limited research to compare the performance of audience targeting on different platforms with unique user behaviors. The psychological impact of hyper-targeted messaging, especially on younger and more impressionable groups such as Gen Z, is largely unexplored. Additionally, the ethical considerations of algorithmic targeting, particularly against vulnerable or marginalized audiences, remain understudied. Ad wear out and consumer resistance to overtargeted campaigns are another unexamined aspect. There is also a significant research gap regarding the effectiveness of targeted advertising in emerging or underserved digital markets. While artificial intelligence and machine learning are increasingly applied to audience segmentation, their relative effectiveness compared to manual targeting approaches is unknown. Cultural variations in audience perception and reaction to targeted content are frequently neglected, as is the importance of data accuracy and the limitations of third-party data sources. Transparency features, like "Why am I seeing this ad? ", and their impact on user trust and engagement are seldom measured. In addition, small businesses are underrepresented in existing research, even though they increasingly depend on targeted advertising. Finally, longitudinal studies measuring the long-term brand effect of targeted and nontargeted campaigns are still limited. Filling these gaps can provide a more comprehensive understanding of targeted advertising's actual effectiveness in the digital environment. Problem from a Bird's Eye View On a broad level, the success of audience targeting during the digital era is confronted by a number of key challenges. The first concern is the rising issue of privacy, as heavy dependence on user information tends to create ethical dilemmas and draw regulatory attention. The precision of audience segmentation is also in question, with many campaigns based on outdated, incomplete, or wrong information. Over-targeting may lead to ad fatigue, in which users are desensitized or irritated by repetitive content, decreasing overall engagement. Small businesses also find it

difficult to compete with large corporations because they have limited access to sophisticated targeting tools and analytics. Most users complain of feeling manipulated or under constant surveillance, which erodes trust in brands. The algorithms powering these targeting platforms are usually opaque, so it is challenging for marketers to know or optimize their approaches. Because consumer behavior continues to shift quickly, it is becoming more and more difficult to keep dynamic and accurate audience profiles. Having consistency across many platforms adds to the complexity of campaign management. In addition, targeted advertisements might drive clicks but end up not producing enduring customer loyalty or brand trust. Lastly, the complexity of complying with data protection regulations such as GDPR and CCPA is another level of difficulty, particularly for small or international businesses. These high-level issues point to the necessity of more ethical, transparent, and efficient targeting practices in the digital marketing world. Beneficiary Analysis. The success of targeted audience strategies in today's digital economy translates into benefits for several stakeholders in the marketing system. Companies and advertisers have the most to gain from maximizing ad spend, maximizing conversion rates, and presenting more relevant content to consumers. Consumers, on their part, get customized experiences that can lead to improved product discovery and satisfaction if carried out in an ethical manner. Digital platforms and technology firms make money from boosted ad revenue fueled by accurate targeting programs. In addition, data analysts and marketing experts gain from the need for sophisticated audience segmentation and performance monitoring abilities.. In light of the aforementioned, the study's goal revolves around the following objectives.

- To analyze how targeted digital strategies influence audience engagement and conversion in the digital age.
- To evaluate how value-based targeting affects long-term customer loyalty.
- To explore how micro-targeted influencer campaigns enhance perceived brand authenticity and trust among segmented audiences.

2 Literature Review

This review of the literature probes recent development and debate in strategic audience segmentation, digital literacy, artificial intelligence (AI)-enabled engagement, and big data analytics. Based on a variety of recent academic articles and books from 2023 and 2024, it distills key conclusions from research across fields including communication, education, digital marketing, entertainment, and public governance. The review establishes common themes, upcoming models, and the way forward in terms of research, with the purpose of establishing a broad perspective of how digitalization is redefining engagement tactics, audience profiling, and information flow. Orton et al. (2023) offer an important piece of research on audience segmentation in climate change communication. Applying a K-means clustering method, they divide U.S. state citizens into five clusters based on values: Skeptical Traditionalists, Slightly Skeptical Traditional Moderates, Neutral Adaptive Conservatives, Slightly Trusting Adaptive Moderates, and Trusting Helpful Adaptives. These clusters were distinguished by political ideology, media trust, and attitudes toward science with distinct demarcations in terms of Schwartz's Theory of Basic Human Values. The authors contend that effective climate communication should take into account values and trust considerations, aligning with previous research (Hine et al., 2014; Corner et al., 2014) that recommended personalized, non-alienating messages to alleviate cognitive resistance and polarization.Manoharan (2024) presents a two-perspective examination of the position of AI in digital marketing. These investigations investigate how tools such as natural language processing (NLP), machine learning (ML), and deep learning are capable of automating social media content creation, segmentation of audience, and engagement. The research reveals that content generated by AI surpasses content written by human beings in every metric of engagement. Case studies within e-commerce and brand communication contexts reveal increased responsiveness, customer satisfaction, and clickthrough rate. The ethical implications of AI, however, are not disregarded. The writer cautions against algorithmic bias, data privacy risks, and the risk of diminishing human creativity-concerns that require the instituting of clear governance and transparency procedures.

Ahmed and Abdulkareem (2024) demonstrate the ways in which big data is changing the entertainment sector by making it possible to gain real-time insights into user behavior, location-based consumption trends, and content consumption. The research underscores the function of content recommendation systems based on collaborative filtering and hybrid approaches in maximizing user satisfaction. Further, strategic monetization via dynamic pricing and targeted advertising illuminates how data-driven methods optimize revenue. However, this revolution needs to balance efficiency with ethical obligation, especially data usage and privacy guarding.

Ahmadi et al. (2024) present a new model for measuring ad targeting efficiency on platforms such as Facebook and Spotify. Their research shows that most targeted, narrow audience groups need greater than a 100% improvement in click-throughs to be economical—a level never achieved. A takeaway is that larger or combination audience groups typically yield better cost-effectiveness. The model also indicates privacy changes (e.g., Apple's ATT) creating vulnerabilities that detract from targeting data accuracy. This implies an urgent requirement for updated targeting approaches that address both segment width and data accuracy. A number of research studies explore digital literacy across educational, healthcare, and socioeconomic scenarios. Nguyen and Habók (2024) survey digital literacy assessment tools for educators and find them to heavily depend on self-assessment tools and lack localized, performance-based tools. Likewise, Campanozzi et al. (2023) contend that digital literacy has become a social determinant of health, particularly with telemedicine and e-health platforms increasing in numbers. Reddy et al. (2023) suggest the South Pacific Digital Literacy Framework (SPDLF) and a digital tool (digilitFJ) for closing digital skill gaps among underserved populations. Marín and Castañeda (2023) uphold a multi-dimensional perspective of digital literacy through the integration of media, technological, and critical literacies across varying educational contexts. Chen and Zhao (2023) discuss the use of AI in adaptive learning. Their work presents AI's advantages in bolstering adaptive assessment and learning but cautions regarding risks of dependence, monitoring, and fairness problems. Bennet et al. (2024) discuss the possibilities of blockchain to revolutionize digital transactions through safe, distributed networks. Nonetheless, energy efficiency, scalability, and legal uncertainty continue to act as hindrances. Yang et al. (2024) examine government digital transformation in China through a production network model.

is necessary for constructing resonant communication. Second, AI and big data are refining engagement strategies, yet ethical management is essential. Third, digital literacy—going beyond mere skills—must incorporate evaluative, critical, and ethical aspects to facilitate digital citizenship. The evolution of industries such as healthcare, entertainment, education, and governance signals a systemic move toward digitization that calls for responsive policy, inclusive technology design, and ongoing research. This review has emphasized the interdisciplinarity of digital transformation, from AI and data analytics to climate communication and education. Future research needs to go deeper into longitudinal effects, accountability of algorithms, and inclusive policy structures. Through the incorporation of value-based segmentation, responsible design of AI, and revised literacy models, stakeholders in all sectors can more effectively navigate the changing digital landscape with equity, engagement, and ethical integrity

3. Research Methodology

3.1 Research design

This study will utilize a quantitative research design with a structured online questionnaire to gather primary sdsdf. Digitally active consumers between 18 and 45 years from diverse regions will be the target population, stratified randomly sampled for demographic representation. The survey questionnaire will have Likert-scale items arranged as per hypothesis, measuring perceptions of proposed strategies, engagement, loyalty, and conversion intention. A pilot study involving 30 participants will provide reliability and validity of survey measures. The mediator (Perceived Brand Relevance & Authenticity) and moderator (Audience Digital Fluency) will be examined through PROCESS Macro or moderated mediation models. Ethical clearance will be sought, with participant consent and anonymity assured. Results will be utilized to evaluate the strategic influence of precision marketing and inform value-driven digital communication practices.

3.2 Sample size

The research will aim at a sample of 215 digitally engaged consumers to provide adequate power for Structural Equation Modeling. Participants will be recruited through stratified random sampling by age, gender, and platform usage. Data will be gathered through an online survey sent via social media, and forums. Respondents should have existing experience with digital advertisements or e-commerce websites. All answers will be gathered anonymously with informed consent.





Hypotheses

- H1: Precision-targeted strategies positively influence digital audience engagement.
- H2: Value-aligned messaging is positively associated with customer loyalty.
- H3: Audience-relevant influencer marketing enhances conversion intention through perceived brand authenticity.
- H4: Engagement mediates the relationship between targeting strategies and conversion intention.
- H5: Customer loyalty mediates the relationship between value-based targeting and conversion intention.
- H6: Digital fluency (Mod) moderates the relationship between targeted strategies and engagement, amplifying the effect with greater fluence

3.3 Data collection

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Demographic

Age	Frequency	Percent
13 - 16	12	5.6
17 - 20	22	10.3
21 - 24	127	59.3
25 - 28	53	24.8
Total	214	100.0

Gender	Frequency	Percent
Female	122	57.0
Male	52	24.3
Other	3	1.4
Prefer not to say	37	17.3
Total	214	100.0

Qualification	Frequency	Percent
Bachelor's	110	51.4
High School	18	8.4
Masters	76	35.5
Other	1	.5
Ph.D	9	4.2
Total	214	100.0

Employment Status	Frequency	Percent
Employed	32	15.0
Self-employed	104	48.6
Student	39	18.2
Unemployed	39	18.2
Total	214	100.0

Social Media Usage	Frequency	Percent
1-3 hours	116	54.2
² 4-6 hours	68	31.8
iLess than 1 hour	16	7.5
More than 6 hours	14	6.5
Total	214	100.0

Descriptive Statistics

	Ν	Minimum	Maximum	Mean	Std. Deviation
TSEA	214	1.6000	4.8000	3.168224	.7065885
VBA	214	1.6000	4.8000	3.300000	.6762920
ITA	214	1.4000	4.8000	3.331776	.7062562
EMA	214	1.6000	4.8000	3.394393	.6829695
LMA	214	1.4000	4.8000	3.373832	.7163203
DFMA	214	1.6000	5.0000	3.340187	.7275736
Valid	214				
N (listwise)	214				

The descriptive statistics table summarizes responses from 214 participants regarding six key constructs related to marketing attitudes and actions. Among these, the highest mean score is for EMA (Engagement with Marketing Activities) with a mean of 3.39 and a relatively low standard deviation (SD = 0.68), suggesting that most respondents report consistent engagement with marketing initiatives. LMA (Loyalty to Marketing Approaches) and ITA (Influencer Trust Alignment) also have relatively high means of 3.37 and 3.33, respectively, indicating a positive reception to influencer-driven or loyalty-based marketing tactics.DFMA (Digital Fluency in Marketing Actions) and VBA (Value-Based Advertising) have comparable mean scores (3.34 and 3.30, respectively), reflecting moderate agreement among respondents on the relevance and fluency of digital marketing strategies. The lowest mean is observed for TSEA (Targeted Strategy Effectiveness Assessment) at 3.17, though it still indicates moderate approval, with a slightly higher variation (SD = 0.71), suggesting a wider spread of opinions.Overall, the results suggest a generally favorable perception of modern marketing strategies, with engagement and loyalty being slightly stronger than targeted strategy perceptions. The relatively narrow standard deviations across variables point to consistent responses across the sample, reinforcing the reliability of the trends observed.

Correlations

Pearson Correlations								
FLA	Pearson Correlation	1	.839**	.436**	.529**	.591**		
FAA	Pearson Correlation	.839**	1	.493**	.610**	.692**		
FPA	Pearson Correlation	.436**	.493**	1	.446**	.603**		
DPA	Pearson Correlation	.529**	.610**	.446**	1	.399**		
FGA	Pearson Correlation	.591**	.692**	.603**	.399**	1		

Correlation matrix shows significant and statistically substantial associations among all the key variables. Targeted Strategy & Engagement (TSEA) is correlated positively with Value-Based Alignment (VBA) (r = .397*), Influencer Targeting & Authenticity (ITA) (r = .343*), and Loyalty as Mediator (LMA) (r = .333*) at the 0.01 level of significance. Such outcomes imply that, as audiences judge precision targeting on digital content to be present, they also likely detect value-led messaging and develop more affinity toward influencer-brand congruence, which will drive greater brand loyalty. TSEA also demonstrates weaker but nonetheless significant correlations with Engagement as Mediator (EMA) (r = .165) and Digital Fluency as Moderator (DFMA) (r = .186*), suggesting that although engagement and digital competencies are linked to targeted strategies, the associations are less direct. Value-Based Alignment (VBA) shows particularly high correlations with ITA (r = .498), EMA (r = .386), and DFMA (r = .304), underscoring the pivotal position that ethical and purpose-oriented branding takes in pushing both influencer salience and consumer activation. Similarly, ITA is highly correlated with EMA

(r = .406), LMA (r = .330), and DFMA (r = .293), indicating that influencer content aligned with audience interests not only increases trust but also increases loyalty and digital engagement. These correlations indicate that value alignment and influencer fit are the primary levers in the success of digital targeting strategies, with spillover effects to other user responses. The most powerful correlations in the dataset are between EMA and LMA (r = .493) and EMA and DFMA (r = .482), both highly significant, which mean that user interaction is a potent mediator of the creation of customer loyalty and is reinforced by digital fluency. In the same vein, LMA and DFMA (r = .477) further corroborate that digital confidence boosts long-term brand allegiance. These findings confirm the conceptual model, particularly the hypothesized mediating role of engagement and loyalty, and moderating influence of digital fluency. In general, the correlations confirm the hypothesized relationships and indicate that value-aligned, authentic influencer-supported digital strategies are most successful when partnered with a digitally fluent audience.

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Correlations

			TSEA	VBA	ITA	EMA	LMA	DFMA
	TSEA	Correlation Coefficient	1.000	.393**	.398**	.183**	.325**	.196**
	VBA	Correlation Coefficient	.393**	1.000	.526**	.379**	.298**	.311**
Spearman's the	ITA	Correlation Coefficient	.398**	.526**	1.000	.402**	.333**	.305**
Spearman's mo	EMA	Correlation Coefficient	.183**	.379**	.402**	1.000	.519**	.489**
	LMA	Correlation Coefficient	.325**	.298**	.333**	.519**	1.000	.479**
	DFMA	Correlation Coefficient	.196**	.311**	.305**	.489**	.479**	1.000

The Spearman's Rho test indicates statistically significant positive correlations between all of the most important variables, supporting the strength of relationships in a non-parametric setting. TSEA (Targeted Strategy & Engagement) indicates moderate correlations with VBA (ρ =.393), ITA (ρ =.398), and LMA (ρ =.325), suggesting that consumers who see strategic targeting are also likely to appreciate ethical messaging, believe in influencer endorsements, and demonstrate brand loyalty. TSEA also shows weaker but considerable correlations with EMA (ρ =.183) and DFMA (ρ =.196), indicating that although engagement and digital fluency are associated with targeted strategies, their impact is slightly less intense. The highest correlations seem to be between EMA and LMA (ρ =.519) and EMA and DFMA (ρ =.489), confirming the observation that user involvement is a most significant

link between brand strategies and loyalty, particularly for digitally literate audiences. VBA and ITA are also highly correlated (ρ =.526), demonstrating that ethical branding and influencer alignment complement each other in generating user trust. Overall, the matrix confirms the hypothesized model: engagement and loyalty mediate, and digital fluency enhances the impacts of targeting strategies. These findings confirm the internal validity of the model and imply significant interdependencies between psychological and behavioral digital marketing drivers

Regression

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.574ª	.330	.314	.5850346

a. Predictors: (Constant), DFMA, TSEA, VBA, EMA, LMA

The model of regression reflects a positive medium relationship between predictors (TSEA, VBA, EMA, LMA, DFMA) and the dependent variable with R = .574. An R Square of .330 measures that about 33% of the variance of the dependent variable is accounted for by the model. The value of Adjusted R Square (.314) for the number of predictors ensures that the model is reliable. The estimate's standard error (.585) indicates moderate predictive accuracy. Overall, the model is statistically significant, although other factors probably affect the dependent variable.

ANOVA

Model		Sum of Squares	df	Mean Square	F	Sig.
	Regression	35.053	5	7.011	20.483	.000 ^b
1	Residual	71.191	208	.342		
	Total	106.244	213			

Dependent Variable: ITA

Predictors: (Constant), DFMA, TSEA, VBA, EMA, LMA

The ANOVA table indicates that the regression model is statistically significant with an F-value of 20.483 and a p-value of .000, suggesting a strong overall fit. This implies that the predictors (TSEA, VBA, EMA, LMA, DFMA) explain significant variation in the dependent variable, ITA (Influencer Targeting & Authenticity). The sum of squares for regression (35.053) is considerable compared to the sum of squares for residuals (71.191), affirming that a good proportion of variance is accounted for. With 213 observations in total, the model is strong. Overall, the predictors collectively have a significant effect on ITA.

Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	Т	Sig.
		В	Std. Error	Beta		
	(Constant)	.680	.277		2.452	.015
	TSEA	.153	.064	.153	2.396	.017
1	VBA	.342	.070	.328	4.927	.000
1	EMA	.217	.074	.210	2.948	.004
1	LMA	.052	.070	.052	.732	.465
	DFMA	.037	.067	.039	.563	.574

Dependent Variable: ITA

The descriptive statistics table summarizes responses from 214 participants regarding six key constructs related to marketing attitudes and actions. Among these, the highest mean score is for EMA (Engagement with Marketing Activities) with a mean of 3.39 and a relatively low standard deviation (SD = 0.68), suggesting that most respondents report consistent engagement with marketing initiatives. LMA (Loyalty to Marketing Approaches) and ITA (Influencer Trust Alignment) also have relatively high means of 3.37 and 3.33, respectively, indicating a positive reception to influencer-driven or loyalty-

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Discussions

The results of this research emphasize the critical contribution of strategic targeting, value consistency, and user involvement in advancing influencer targeting and perceived authenticity (ITA) in online marketing. The demographic snapshot presents a digitally active young adult group-predominantly between the ages of 21-24, comprising a large percentage of self-employed individuals and holders of Bachelor's or Master's degrees—implying a sample population well aware of online marketing and influencer culture. The moderate to high means for all the variables, especially in EMA (Engagement as Mediator) and DFMA (Digital Fluency as Moderator), indicate the activity of participants in the digital environment and sensitivity to content that is values-behavior specific. The setting enhances the applicability of the study to actual digital marketing contexts.Correlation analysis with both Pearson and Spearman's Rho supports significant correlations between all constructs. Of particular interest are the high correlations between Value-Based Alignment (VBA) and Influencer Targeting & Authenticity (ITA), and between Engagement (EMA) and Loyalty (LMA), further supporting the proposition that trust, common values, and two-way communication are strong drivers of consumer reaction to targeted advertising. Further, the high correlations between Digital Fluency (DFMA) and both EMA and LMA indicate that a digitally competent audience enhances the impact of engagement and loyalty-fostering approaches. These findings affirm the hypothesized model, validating both mediators' and the moderator's roles to enhance the aggregate effectiveness of campaign targeting. Regression analysis further develops the dynamics between these. At an R² of .330, the model accounts for a significant 33% of ITA variance, indicating that any combination of TSEA, VBA, and EMA may significantly affect whether users find influencer content relevant and authentic. Notably, VBA stands out as the most potent predictor ($\beta = .328$), affirming value alignment's significant influence in consumer attitude. TSEA and EMA play substantial roles, with LMA and DFMA failing to directly present effects, which suggests although loyalty and digital fluency perform vital functions, their influence will most likely be more indirect in nature-perhaps via their mediating and moderating channels. In general, the results indicate that marketers need to prioritize value-driven, high-engagement marketing strategies that resonate with digitally literate consumers in order to maximize influencer authenticity and campaign performance.

Reliability Analysis

Case Processing Summary

		Ν	%
	Valid	214	100.0
Cases	Excluded ^a	0	.0
	Total	214	100.0

a. Listwise deletion based on all variables in the procedure.

Reliability Statistics

Cronbach's Alpha	N of Items
.771	6

Scale Statistics

Mean	Variance	Std. Deviation	N of Items
19.908411	8.300	2.8808945	6

The Case Processing Summary reports that all 214 responses were valid and were included in the analysis, with 0% missing data, which enhances the reliability and completeness of the dataset. The Reliability Statistics table reports a Cronbach's Alpha of 0.771, which implies acceptable internal consistency among the 6 survey items utilized—meaning that they consistently measure the same underlying construct. This is within the widely accepted threshold (≥ 0.7), which attests that the items are well-aligned. The Scale Statistics table shows a mean score of 19.91, a standard deviation of 2.88, and a variance of 8.30, which is indicative of a moderately tight spread of responses around the mean. The standard deviation implies that although responses differ, they differ within an expected range. These statistics together show that the scale employed is both reliable and uniform for assessing the construct being measured. Implications and conclusion

Implications and conclusion

The study results have numerous significant theoretical implications for consumer behavior and digital marketing theory. Initially, the high correlations between targeted strategies, value alignment based on values, influencer authenticity, and user engagement highlight the increased relevance of interactive, ethical, and personalized marketing strategies. The results confirm theoretical propositions that highlight the mediating role of consumer engagement and loyalty as well as the moderating role of digital fluency in influencing consumer attitudes toward brands. Also, the supportive correlations between influencer-targeted content and consumer behavior indicate that the success of digital marketing campaigns depends on the authenticity and topicality of influencers relative to their audience. The research also supports the hypothesis that digital fluency is a crucial factor in maximizing consumer engagement since more digitally aware consumers are more likely to react positively to sophisticated targeting tactics. These results contradict conventional advertising models and add to the growth in literature regarding the impact of digital media and ethical brand behavior on consumer choice in a networked world.

Additionally, the low correlations seen between loyalty as a mediator and digital fluency indicate the requirement for further elaboration of theoretical models in brand loyalty. Based on this study, it is recommended that research be conducted in the future on the changing dynamic between consumer trust, engagement, and brand loyalty in the era of digital marketing. Generally speaking, these theoretical developments pave the way for more advanced, data-driven strategies to digital marketing and consumer engagement

Implications for practice

The results indicate that marketers need to emphasize the development of customized and ethically consistent content that appeals to consumers' values and strengthens influencer authenticity. Considering the major influence of engagement and digital fluency, campaigns must emphasize interactive and technologically adept elements to boost consumer engagement. Brands need to partner with influencers who share the same preferences as their target audience to achieve maximum trust and effectiveness. Furthermore, the incorporation of digital fluency in marketing efforts can assist in engaging a digitally savvy audience. Targeted strategies should not only be employed by marketers but also the ethical messaging that supports consumer loyalty and brand affinity. Lastly, investing in tools and platforms that enhance consumer digital literacy can further increase the success of digital targeting campaigns.

Limitations

One of the limitations of the research is that it is based on self-reported information, which can lead to social desirability or memory biases. The sample is also skewed towards youth and self-employment, which may not be representative of wider consumer groups. Moreover, the cross-sectional data limit causal inference, and it becomes challenging to make long-term causal effects. The research is also limited to specific digital marketing elements, which may not capture other influencing factors. The study is restricted to one region, thus limiting the generalizability. Finally, although correlations are useful, they do not control for confounding variables that might influence the outcome.

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References

- Cohen, A. S., & Depp, C. A. (2023). A new frontier: Integrating behavioral and digital approaches to advance mental health research and treatment. Psychological Medicine, 1–10. <u>https://doi.org/10.1017/S003329172300057X</u>
- Singh, D., Katoch, R., & Singh, P. (2022). Social media marketing and Gen Z: A study of brand attitude, self-brand connection and purchase intention. IUP Journal of Marketing Management, 21(1), 7–19.
- Hekler, E. B., Michie, S., Pavel, M., Rivera, D. E., Collins, L. M., Jimison, H. B., Garnett, C., Parral, S., & Spruijt-Metz, D. (2016). Advancing models and theories for digital behavior change interventions. American Journal of Preventive Medicine, 51(5), 825–832. https://doi.org/10.1016/j.amepre.2016.06.013
- Stockwell, S., Schofield, P., Fisher, A., Firth, J., Jackson, S. E., Stubbs, B., & Smith, L. (2019). Digital behavior changes interventions to promote physical activity and/or reduce sedentary behavior in older adults: A systematic review and meta- analysis. Experimental Gerontology, 120, 68–87. <u>https://doi.org/10.1016/j.exger.2019.02.020</u>
- Tolstikova, I., Ignatjeva, O., Kondratenko, K., & Pletnev, A. (2021). Digital behaviour and personality traits of Generation Z in a global digitalization environment. In D. Bylieva, A. Nordmann, O. Shipunova, & V. Volkova (Eds.), Knowledge in the Information Society (pp. 50–60). Springer. https://doi.org/10.1007/978-3-030-65857-1_6
- Lazar, M.-A., Zbuchea, A., & Pînzaru, F. (2023). The emerging Generation Z workforce in the digital world: A literature review on cooperation and transformation. Proceedings of the 17th International Conference on Business Excellence, 1991–2001. <u>https://doi.org/10.2478/picbe-2023-0175</u>

- Ahmed, N. (2019). Generation Z's smartphone and social media usage: A survey. Journalism and Mass Communication, 9(3), 101–122. https://doi.org/10.17265/2160-6579/2019.03.001
- Ninan, N., Roy, J. C., & Cheriyan, N. K. (2020). Influence of social media marketing on the purchase intention of Gen Z. International Journal of Advanced Science and Technology, 29(1), 1692–1702. <u>https://www.researchgate.net/publication/339164968</u>
- Prasanna, M., & Priyanka, A. L. (2024). Marketing to Gen Z: Understanding the preferences and behaviors of next generation. International Journal for Multidisciplinary Research, 6(4), 1–8. <u>https://doi.org/10.36948/ijfmr.2024.v06i04.26612</u>
- 10. Munsch, A. (2021). Millennial and Generation Z digital marketing communication and advertising effectiveness: A qualitative exploration. Journal of Global Scholars of Marketing Science, 31(1), 10–29. https://doi.org/10.1080/21639159.2020.1808812 for d
- Stockwell, S., Schofield, P., Fisher, A., Firth, J., Jackson, S. E., Stubbs, B., & Smith, L. (2019). Digital behavior changes interventions to promote physical activity and/or reduce sedentary behavior in older adults: A systematic review and meta- analysis. Experimental Gerontology, 120, 68–87. <u>https://doi.org/10.1016/j.exger.2019z.02.020</u>
- Tolstikova, I., Ignatjeva, O., Kondratenko, K., & Pletnev, A. (2021). Digital behaviour and personality traits of Generation Z in a global digitalization environment. In D. Bylieva, A. Nordmann, O. Shipunova, & V. Volkova (Eds.), Knowledge in the Information Society (pp. 50–60). Springer. https://doi.org/10.1007/978-3-030-65857-1_6
- Lazar, M.-A., Zbuchea, A., & Pînzaru, F. (2023). The emerging Generation Z workforce in the digital world: A literature review on cooperation and transformation. Proceedings of the 17th International Conference on Business Excellence, 1991–2001. <u>https://doi.org/10.2478/picbe-2023-0175</u>
- Ahmed, N. (2019). Generation Z's smartphone and social media usage: A survey. Journalism and Mass Communication, 9(3), 101–122. https://doi.org/10.17265/2160-6579/2019.03.001
- Ninan, N., Roy, J. C., & Cheriyan, N. K. (2020). Influence of social media marketing on the purchase intention of Gen Z. International Journal of Advanced Science and Technology, 29(1), 1692–1702. <u>https://www.researchgate.net/publication/339164968</u>
- Prasanna, M., & Priyanka, A. L. (2024). Marketing to Gen Z: Understanding the preferences and behaviors of next generation. International Journal for Multidisciplinary Research, 6(4), 1–8. <u>https://doi.org/10.36948/ijfmr.2024.v06i04.26612</u>
- Munsch, A. (2021). Millennial and Generation Z digital marketing communication and advertising effectiveness: A qualitative exploration. Journal of Global Scholars of Marketing Science, 31(1), 10–29. <u>https://doi.org/10.1080/21639159.2020.1808812</u>
- Ebrahim, R., Ghoneim, A., Irani, Z., & Fan, Y. (2016). A brand preference and repurchase intention model: The role of consumer experience. Journal of Marketing Management, 32(13–14), 1230–1259. <u>https://doi.org/10.1080/0267257X.2016.1150322</u>
- Kuncoro, H. A. D. P., & Kusumawati, N. (2021). A study of customer preference, customer perceived value, sales promotion, and social media marketing towards purchase decision of sleeping product in Generation Z. Advanced International Journal of Business, Entrepreneurship and SMEs, 3(9), 265–276. <u>https://doi.org/10.35631/AIJBES.39018</u>
- Boksem, M. A. S., & Smidts, A. (2014). Brain responses to movie-trailers predict individual preferences for movies and their population-wide commercial success. Journal of Marketing Research. <u>https://doi.org/10.1509/jmr.13.0572</u>
- Casas-Rosal, J. C., Segura, M., & Maroto, C. (2021). Food market segmentation based on consumer preferences using outranking multicriteria approaches. International Transactions in Operational Research, 1–30. <u>https://doi.org/10.1111/itor.12956</u>
- Berk, O. N., Štimac, H., & Bilandžić Tanasić, K. (2024). Influencer marketing: A cross-cultural study of Generation Z in Croatia and Türkiye. Društvena Istraživanja, 33(4), 547–567. <u>https://doi.org/10.5559/di.33.4.04</u>
- Yardley, L., Spring, B. J., Riper, H., Morrison, L. G., Crane, D. H., Curtis, K., ... & Blandford, A. (2016). Understanding and promoting effective engagement with digital behavior change interventions. American Journal of Preventive Medicine, 51(5), 833–842. https://doi.org/10.1016/j.amepre.2016.06.015
- Dunas, D. V., & Vartanov, S. A. (2020). Emerging digital media culture in Russia: Modeling the media consumption of Generation Z. Journal of Multicultural Discourses, 15(3), 319–338. <u>https://doi.org/10.1080/17447143.2020.1751648</u>
- Kahawandala, N., Peter, S., & Niwunhella, H. (2020). Profiling purchasing behavior of Generation Z. Smart Computing and Systems Engineering. IEEE. <u>https://doi.org/10.1109/SCSE49731.2020.9313038</u>
- Król, K., & Zdonek, D. (2020). Social media use and its impact on intrinsic motivation in Generation Z: A case study from Poland. Global Knowledge, Memory and Communication, ahead-of-print. <u>https://doi.org/10.1108/GKMC-08-2020-0113</u>
- Hermsen, S., Frost, J., Renes, R. J., & Kerkhof, P. (2016). Using feedback through digital technology to disrupt and change habitual behavior: A critical review of current literature. Computers in Human Behavior, 57, 61–74. <u>https://doi.org/10.1016/j.chb.2015.12.023</u>

- Gómez, M., Lopez, C., & Molina, A. (2019). An integrated model of social media brand engagement. Computers in Human Behavior, 96, 196–206. <u>https://doi.org/10.1016/j.chb.2019.01.026</u>
- Leckie, C., Nyadzayo, M. W., & Johnson, L. W. (2016). Antecedents of consumer brand engagement and brand loyalty. Journal of Marketing Management, 32(5–6), 558–578. <u>https://doi.org/10.1080/0267257X.2015.1131735</u>
- Fernandes, T., & Moreira, M. (2019). Consumer brand engagement, satisfaction and brand loyalty: A comparative study between functional and emotional brand relationships. Journal of Product & Brand Management. <u>https://doi.org/10.1108/JPBM-08-2017-1545</u>
- Obilo, O. O., Chefor, E., & Saleh, A. (2020). Revisiting the consumer brand engagement concept: Conceptualization, scale development and validation. Journal of Business Research. <u>https://doi.org/10.1016/j.jbusres.2019.12.023</u>
- Cheung, M. L., Pires, G., & Rosenberger, P. J. (2020). The influence of perceived social media marketing elements on consumer–brand engagement and brand knowledge. Asia Pacific Journal of Marketing and Logistics, 32(3), 695–720. <u>https://doi.org/10.1108/APJML-04-2019-0262</u>
- Al-Qaysi, N., Mohamad-Nordin, N., & Al-Emran, M. (2020). Employing the technology acceptance model in social media: A systematic review. Education and Information Technologies. <u>https://doi.org/10.1007/s10639-020-10197-1</u>
- Kamal, S. A., Shafiq, M., & Kakria, P. (2020). Investigating acceptance of telemedicine services through an extended technology acceptance model (TAM). Technology in Society, 60, 101212. <u>https://doi.org/10.1016/j.techsoc.2019.101212</u>
- Al-Nuaimi, M. N., & Al-Emran, M. (2021). Learning management systems and technology acceptance models: A systematic review. Education and Information Technologies. <u>https://doi.org/10.1007/s10639-021-10513-3</u>
- Marangunić, N., & Granić, A. (2015). Technology acceptance model: A literature review from 1986 to 2013. Universal Access in the Information Society, 14(1), 81–95. <u>https://doi.org/10.1007/s10209-014-0348-1</u>
- Han, J.-H., & Sa, H. J. (2022). Acceptance of and satisfaction with online educational classes through the technology acceptance model (TAM): The COVID-19 situation in Korea. Asia Pacific Education Review, 23, 403–415. <u>https://doi.org/10.1007/s12564-021-09716-7</u>

H4: Relative Advantage in integrating sustainable logistics practices mediates the relationship between Awareness and compatibility in adoption of SLPs. H5: Awareness about sustainable logistics directly influences adoption of Sustainable logistics practices.

H6: Compatibility in using sustainable logistics positively impacts adoption of Sustainable logistics practices.

3.3 Data collection

Primary data collection is best suited for this topic as it allows researchers to gather first-hand, specific, and current insights directly from stakeholders involved in third-party logistics, such as logistics managers, service providers, and clients. This approach ensures data relevance and contextual accuracy, especially when assessing sustainability practices, beneficiary perceptions, and real-time implementation challenges. Using a structured questionnaire facilitates standardized data collection, enabling easy quantification and comparison of responses (Saunders, Lewis, & Thornhill, 2019). It also supports the use of statistical tools like SPSS for deeper analysis, enhancing the validity and reliability of the findings.

Table 1 - Model Summary

Model R	R Square	Adjusted R	Square Std.	Error of the Estimate	R Square	Change F	Change	df1	df2	Sig. F Change	

1 .730a 0.533 0.526 0.56 436 0.533 75.691 3 199.0										
	1	.730a	0.533	0.526	0.56	436	0.533	75.691	3	199 0

The predictive ability of the independent factors (Compatibility, Implementation, and Relative Advantage) on the dependent variable was investigated using a multiple linear regression analysis. The model was statistically significant, according to the results (F(3,199)=75.691, p<.001), indicating that the predictors together accounted for a sizable amount of the variance in the outcome variable. The model's multiple correlation coefficient, R=.730, showed that the observed and predicted values were strongly positively correlated. According to the coefficient of determination, R2=.533, the model accounts for roughly 53.3% of the variance in the dependent variable. After adjusting for the number of predictors, the corrected R2 was.526. The standard error of the estimate was .56436, indicating the average distance between the observed and predicted values. These findings suggest that the combination of the predictors provides a robust model for predicting the dependent variable.

Table 2:	Descriptive	Statistics	(for
AD, IM,	CO, RA)		

	Mean	Std. Deviation	Ν
AD	3.2946	0.81964	203
IM	3.6741	0.90657	203
СО	3.4069	0.81578	203
RA	3.6049	0.92328	203

Descriptive statistics were computed for all variables involved in the regression analysis to understand their central tendency and dispersion. The dependent variable, Adoption (AD), had a mean score of 3.29 (SD = 0.82), indicating a moderately high average response. Among the independent variables, Implementation (IM) recorded the highest mean value of 3.67 (SD = 0.91), suggesting that respondents generally rated this variable the highest. Relative Advantage (RA) followed closely with a mean of 3.60 (SD = 0.92), while Compatibility (CO) had a mean of 3.41 (SD = 0.82). All variables were measured on the same scale and had relatively similar standard deviations, indicating a comparable level of variability in responses. The sample size for each variable was consistent at N = 203, ensuring uniformity in the dataset used for analysis.

Pearson correlation coefficients were computed to examine the strength and direction of relationships between the dependent variable (Adoption) and the independent variables (Implementation, Compatibility, and Relative Advantage). The analysis revealed that Adoption was significantly and positively correlated with all three independent variables: Relative Advantage showed the strongest correlation with Adoption (r = .708), suggesting a strong positive relationship.

Table 3: Pearson Correlations

Column 1	Adoption	Implementation	Compatibility	Relative Advantage
Pearson Correlation				
Adoption	1			
Implementation	0.408	1		
Compatibility	0.589	0.446	1	
Relative Advantage	0.708	0.551	0.637	1
Ν				
Adoption	203	203	203	203
Implementation	203	203	203	203
Compatibility	203	203	203	203
Relative Advantage	203	203	203	203

Compatibility (CO) was also positively correlated with Adoption (AD) (r = .589), indicating a moderate-to-strong association. Implementation (IM) had a moderate positive correlation with Adoption (AD) (r = .408). Additionally, intercorrelations among the independent variables were also notable: Relative Advantage (RA) correlated strongly with Compatibility (CO) (r = .637) and moderately with Implementation (IM) (r = .551). Compatibility (CO) and Implementation (IM) were moderately correlated (r = .446). All correlations were based on a consistent sample size of N = 203, ensuring reliability and comparability across variables. These findings indicate that all three predictors share a positive association with the dependent variable, supporting their inclusion in the regression analysis.

Table 4: ANOVA

		Mean Square			
Model	Sum of Squares	df		F	Sig.
1 Regression	72.323	3	24.108	75.691.0	00b
Residual	63.381	199	0.318		
Total	135.704	202			

a. Dependent Variable: Adoption

b. Predictors: (Constant), Relative Advantage, Implementation, Compatibility

To evaluate the regression model's overall significance, an analysis of variance (ANOVA) was conducted. F(3,199)=75.691, p<.001, showed that the model was statistically significant. This demonstrates that a substantial amount of volatility in the dependent variable (adoption) can be explained by the collection of independent factors (relative advantage, implementation, and compatibility). While the residual, or unexplained variance, was 63.381, the regression model explained a Sum of Squares of 72.323. The dependent variable's overall variance was 135.704. The model's explanatory power was further demonstrated by the regression's mean square, which was 24.108, which was much greater than the residual mean square of 0.318. These findings support the notion that the model's predictors have a major impact on the dependent variable's prediction.

Table 5: Coefficients

Model	Unstandardized Coefficients B	Std. Error	Standardized Coefficients Beta	t	Sig.
1 (Constant)	0.717	0.198		3.613	0
Implementation	-0.006	0.053	-0.006	-0.105	0.917
Compatibility	0.234	0.064	0.233	3.67	0
Relative Advantage	0.499	0.061	0.562	8.25	0
a. Dependent Variable: Adoption					

To determine the relative contributions of the independent factors (implementation, compatibility, and relative advantage) to the prediction of the dependent variable (adoption), a multiple regression analysis was performed. Above are the standardized and unstandardized coefficients and their statistical significance. The strongest and most significant predictor of adoption was found to be Relative Advantage (B = 0.499, β = 0.562, t = 8.250, p

<.001). This means that, when all other factors are held constant, an increase of one unit in Relative Advantage results in an increase of 0.499 units in Adoption. A positive and substantial link with the dependent variable was suggested by compatibility, which also made a significant contribution to the model (B = 0.234, β = 0.233, t = 3.670, p <.001). Implementation, however, was not a statistically significant predictor (p = .917), with a negligible coefficient (B = -0.006, β = -0.006), indicating it had little to no effect on Adoption in this model. The constant (intercept) was also significant (p < .001), with a value of 0.717.

Table 6: Descriptive Statistics (for Awareness, Adoption, Relative Advantage, Compatibility)

	Ν	Minimum	Maximum	Mean	Std. Deviation	
Awareness	203	1	5	3.5606	1.00396	
Adoption	203	1	5	3.2946	0.81964	
Relative Advantage	203	1	5	3.6049	0.92328	
Compatibility	203	1	5	3.4069	0.81578	

The study's four main variables—adoption, relative advantage, compatibility, and awareness—were subjected to descriptive statistics. The responses ranged from 1.00 to 5.00 on a five-point Likert scale, which was used to measure all variables (see Table 6). The following were the standard deviations and mean scores: Responses to the awareness survey showed moderate variability, with a mean of 3.5606 and a standard deviation of 1.00396. A mean of 3.2946 and a standard deviation of 0.81964 were reported by Adoption, indicating comparatively smaller dispersion around the mean. The greatest mean score was 3.6049 for Relative Advantage, with a standard deviation of 0.92328. Compatibility recorded a mean of 3.4069 and a standard deviation of 0.81578. The sample size for all variables was consistent at N = 203, with no missing data, confirming the robustness and completeness of the dataset.

Table 7: Pearson Correlations

Awareness	Awareness Compatibility	Relative	Advantage	Adoption
Pearson Correlation	1	.828**	.625**	.475**
Compatibility				
Pearson Correlation	.828**	1	.637**	.589**
Relative Advantage				
Pearson Correlation	.625**	.637**	1	.708**

Adoption				
Pearson Correlation	.475**	.589**	.708**	1
. Correlation is significant at the 0.01 level (2- tailed).				

To examine the relationships among the study variables, a Pearson correlation analysis was conducted. The results, presented in Table 7, indicate several statistically significant relationships. Awareness showed a strong positive correlation with Compatibility (r = .828, p < .01), a moderate positive correlation with Relative Advantage (r = .625, p < .01), and a weak to moderate correlation with Adoption (r = .475, p < .01). Compatibility was positively and significantly correlated with both Relative Advantage (r = .637, p < .01) and Adoption (r = .589, p < .01), suggesting considerable overlap among these variables. A strong positive correlation being statistically significant at the 0.01 level (2-tailed). These results point to perhaps common underlying constructs or influences, suggesting that as scores on one variable rise, the scores on the others likely to rise as well. A Spearman's rank-order correlation was performed to investigate the direction and strength of the monotonic correlations between the variables.

Table 8: Spearman's Correlations

Awareness Compatibility	Relative Advantage	Adoption	Spearman's rho	Awareness
Correlation Coefficient	1	.822**	.628**	.480**
Compatibility				
Correlation Coefficient	.822**	1	.657**	.594**
Relative Advantage				
Correlation Coefficient	.628**	.657**	1	.673**
Adoption				
Correlation Coefficient	.480**	.594**	.673**	1
. Correlation is significant at the 0.01 level (2-tailed).				

To explore the strength and direction of the monotonic relationships between the variables, a Spearman's rank-order correlation was conducted. Awareness demonstrated a strong positive correlation with Compatibility ($\rho = .822$, p < .01) and Relative Advantage ($\rho = .628$, p < .01), and a moderate positive correlation with Adoption ($\rho = .480$, p < .01). Compatibility was strongly correlated with Relative Advantage ($\rho = .627$, p < .01) and Adoption ($\rho = .594$, p < .01). A strong positive correlation was also observed between Relative Advantage and Adoption ($\rho = .673$, p < .01). At the two-tailed 0.01 level, all correlations were statistically significant, indicating regular and substantial links between the variables. These findings support the possibility of additional multivariate analysis by showing that increases in one variable are typically linked to increases in other variables.

Table 9: Case Processing Summary

	Ν	%
Cases		
Valid	203	100
Excluded	0	0
Total	203	100

A total of 203 responses were included in the analysis, all of which were deemed valid and complete, representing 100% of the dataset. No cases were excluded from the analysis, as there were no missing values among the variables used. The data was processed using listwise deletion, ensuring that only complete cases across all variables involved in the analysis were considered. This supports the robustness of the findings, as the results are based on a consistent sample without imputation or data exclusion.

Table 10: Reliability Statistics

Cronbach's Alpha N of Items

0.876 4

To assess the internal consistency of the scale used in the study, Cronbach's Alpha was calculated for the four items included. The analysis yielded a Cronbach's Alpha value of 0.876, indicating a high level of internal consistency among the items. This suggests that the scale is reliable and the items consistently measure the underlying construct intended for investigation

4. Discussion

The findings of this study provide valuable insights into the relationships between the independent variables (Implementation, Compatibility, Relative Advantage) and the dependent variable (Adoption). The regression analysis revealed that the overall model was statistically significant, explaining approximately 53.3% of the variance in the dependent variable ($R^2 = .533$, p < .001). This indicates a substantial predictive power of the model and suggests that the selected independent variables play a critical role in influencing the outcome variable. Among the predictors, Relative Advantage emerged as the most influential factor, showing the highest standardized beta coefficient ($\beta = .562$, p < .001). This highlights the strong predictive strength of Relative Advantage in shaping responses to Adoption. Compatibility also showed a significant positive relationship with Adoption ($\beta = .233$, p < .001), confirming its relevance as a contributing factor. Interestingly, Implementation was found to be statistically insignificant (p = .917), indicating that this variable does not have a meaningful individual impact on the dependent variable in the presence of the other predictors.

The correlation analyses further reinforce these findings, with Relative Advantage showing the strongest association with the dependent variable (r =

.708), followed by Compatibility (r = .589). Both Pearson and Spearman correlation coefficients were consistent, indicating strong and statistically significant associations among the variables. Additionally, the high internal consistency of the measurement scale (Cronbach's Alpha = .876) suggests that the items used were reliable for evaluating the constructs under study. The absence of missing data and the use of listwise deletion ensured the robustness of the dataset. Overall, the study confirms that Relative Advantage and Compatibility are significant contributors to predicting Adoption, while Implementation may require further investigation or refinement to enhance its predictive value.

5. Conclusion

The findings of this study carry significant implications for both academic research and logistics practice. From a research perspective, the strong predictive relationship between Relative Advantage and Adoption emphasizes the need to explore this variable further in future studies on sustainable logistics and third-party logistics (3PL) efficiency. Researchers should consider developing refined scales or models to capture the nuances of Relative Advantage and its underlying constructs. The insignificance of Implementation suggests that this variable may be context-dependent or inadequately measured, warranting further refinement or re-evaluation in future investigations.

In terms of practical implications, the results underscore the importance of Relative Advantage and Compatibility as key drivers influencing outcomes related to 3PL sustainability initiatives. Practitioners in logistics and supply chain management should prioritize strategies aligned with these predictors— particularly those represented by Relative Advantage, given its strong impact. This could involve enhancing operational practices, stakeholder engagement, or technology integration that align with the identified variables. Moreover, the high reliability of the measurement tool supports its continued use for organizational assessments. Overall, the findings provide a data-driven basis for decision-makers to enhance sustainability performance in logistics by focusing on the most impactful factors, thereby improving strategic alignment and operational effectiveness in 3PL environments.

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References

Anderson, E., Coltman, T., Devinney, T. M., & Keating, B. W. (2010). What drives the choice of third party logistics provider? Munich Personal RePEc Archive. <u>https://mpra.ub.uni-muenchen.de/40508/</u>

Ahimbisibwe, A., Omudang, S., Tusiime, W., & Tumuhairwe, R. (2016). Information technology capability, adoption, logistics service quality, and the performance of third-party logistics providers. International Journal of Operations and Logistics Management, 5(1), 16–41. Benmamoun, Z., Hachimi, H., & Amine, A. (2018). Green logistics practices. ResearchGate. Björklund, M., & Forslund, H. (2018). Exploring the sustainable logistics innovation process. Industrial Management & Data Systems, 118(1), 204–217. https://doi.org/10.1108/IMDS-02-2017-0058

Björklund, M., & Forslund, H. (2018). A framework for classifying sustainable logistics innovations. Logistics Research, 11(1), 1–12. https://doi.org/10.23773/2018_1

Boichuk, N., & Kauf, S. (2019). Sustainable logistics: A framework for green city logistics – examples of Polish cities. In 9th Carpathian Logistics Congress – CLC 2019 Conference Proceedings (pp. 339–346).

Chandra, P., & Jain, N. (2007). The logistics sector in India: Overview and challenges (Working Paper No. 2007-03-07). Indian Institute of Management Ahmedabad.

Das, R. (2013). A review of the Indian logistics industry and policy. SSRN. https://ssrn.com/abstract=2285871

Fitria, I. (2011). Sustainable logistics in practice (Master's thesis). Norwegian University of Science and Technology.

Gossler, T., Sigala, I. F., Wakolbinger, T., & Buber, R. (2019). Applying the Delphi method to determine best practices for outsourcing logistics in disaster relief. Journal of Humanitarian Logistics and Supply Chain Management, 9(3), 438–474. <u>https://doi.org/10.1108/JHLSCM-06-2018-0044</u>

Grant, D. B., Trautrims, A., & Wong, C. Y. (2017). Sustainable logistics and supply chain management: Principles and practices for sustainable operations and management (2nd ed.). Kogan Page.

Jayaram, J., & Tan, K. C. (2010). Supply chain integration with third-party logistics providers. International Journal of Production Economics, 125(2), 262–271. <u>https://doi.org/10.1016/j.ijpe.2010.02.014</u>

Jayarathna, C. P., Agdas, D., & Dawes, L. (2022). Exploring sustainable logistics practices toward a circular economy: A value creation perspective. Business Strategy and the Environment, 32(1), 704–720. <u>https://doi.org/10.1002/bse.3170</u>

Jung, H. (2017). Evaluation of third-party logistics providers considering social sustainability. Sustainability, 9(777), 1–18. https://doi.org/10.3390/su9050777

Lu, M., & De Bock, J. (Eds.). (2016). Sustainable logistics and supply chains: Innovations and integral approaches. Springer.

Malhotra, G., & Mishra, S. (2019). Effect of economic growth on the logistics sector in India. Theoretical Economics Letters, 9(1), 210-222. https://doi.org/10.4236/tel.2019.91016

Martinsen, U., & Huge-Brodin, M. (2014). Environmental practices as offerings and requirements on the logistics market. Logistics Research, 7(1), 115. https://doi.org/10.1007/s12159-014-0115-y

Mays, R. E., Racadio, R., & Gugerty, M. K. (2012). Competing constraints: The operational mismatch between business logistics and humanitarian effectiveness. University of Washington.

Pascucci, E. (2021). More logistics, less aid: Humanitarian-business partnerships and sustainability in the refugee camp. World Development, 142, 105424. <u>https://doi.org/10.1016/j.worlddev.2021.105424</u>

Qaiser, F. H., Ahmed, K., Sykora, M., Choudhary, A., & Simpson, M. (2017). Decision support systems for sustainable logistics: A review and bibliometric analysis. Industrial Management & Data Systems, 117(7), 1376–1388. https://doi.org/10.1108/IMDS-09-2016-0410

Quariguasi Frota Neto, J., Bloemhof-Ruwaard, J. M., van Nunen, J. A. E. E., & van Heck, H. W. G. M. (2006). Designing and evaluating sustainable logistics networks. ERIM Report Series Research in Management. Erasmus University.

Schiffling, S., & Piecyk, M. (2014). Performance measurement in humanitarian logistics: A customer-oriented approach. Journal of Humanitarian Logistics and Supply Chain Management, 4(2), 198–221. <u>https://doi.org/10.1108/JHLSCM-08-2013-0027</u>

Singh, L. P., Singh, S., & Bhardwaj, A. (2011). Role of logistics and transportation in green supply chain management: An exploratory study of the courier service industry in India. International Journal of Advanced Engineering Technology, 2(1), 260–269.

Twenhöven, T., & Petersen, M. (2019). Impact and beneficiaries of blockchain in logistics. In W. Kersten, T. Blecker, & C. M. Ringle (Eds.), Artificial Intelligence and Digital Transformation in Supply Chain Management: Innovative Approaches for Supply Chains (pp. 443–468). epubli GmbH. https://doi.org/10.15480/882.2479

Viswanadham, N., & Gaonkar, R. (2003). Leveraging logistics to enhance Indian economic competitiveness. The Logistics Institute – Asia Pacific. Viswanadham, N., & Puvaneswari, M. (2004). India logistics industry (Technical Report). Indian School of Business.

Yeung, K., Zhou, H., Yeung, A. C. L., & Cheng, T. C. E. (2012). The impact of third-party logistics providers' capabilities on exporters' performance. International Journal of Production Economics, 135(2), 741–753.

Zacharia, Z. G., Sanders, N. R., & Nix, N. W. (2011). The emerging role of the third-party logistics provider (3PL) as an orchestrator. Journal of Business Logistics, 32(1), 40–54.

Abbasi, S., Damavandi, S., & RadmanKian, A. (2025). Designing a green forward and reverse logistics network with an IoT approach considering backup suppliers and special disposal for epidemics management. Results in Control and Optimization. https://www.sciencedirect.com/science/article/pii/S2590123025008473

Bamia, A., & Bamia, F. (2025). SCRGD: Supply Chain Resilience in the Face of Global Disruptions. International Business Research. https://ideas.repec.org/a/ibn/ibrjnl/v18y2025i2p80.html

Basile, G., Tani, M., & Nevi, G. (2025). Firm socialisation: Ambidexterity or new business paradigm? Sinergie. https://www.unimercatorum.iris.cineca.it/handle/20.500.12606/23208

Chowdhury, A. R. (2025). A systematic review of risk-based procurement strategies in retail supply chains. American Journal of Advanced Technology and Engineering Studies. <u>https://ajates-scholarly.com/index.php/ajates/article/view/23</u>

FICCI. (2024). Indian Logistics Industry Report. Federation of Indian Chambers of Commerce & Industry. https://ficci.in/

Gideon, E. N. (2025). Evaluation of Semiconductor Risk Mitigation Strategies in the Electric Vehicle Supply Chain. ResearchGate. https://www.researchgate.net/publication/391011954

Islam, N., Tanchangya, T., Naher, K., Tafsirun, U., & Mia, M. R. (2025). Revolutionizing supply chains: The role of emerging technologies. Financial Risk and Management Reviews. <u>https://www.researchgate.net/publication/390329024</u>

Matos-Jiménez, K., & Alamo-Rodriguez, N. (2025). Navigating Research Challenges: Collaborative Insights from Puerto Rico. International Journal of Environmental Research and Public Health. <u>https://www.mdpi.com/1660-4601/22/4/623</u>

Meunier, L. (2025). Local Actors and Environmental Challenges in Paris Post-COVID. AESOP Annual Congress. <u>https://congress.aesop-planning.eu/event/1/contributions/321/</u>

Mendis, S. (2025). Determinants of SME Internationalisation in Developing Economies. Plymouth University Thesis. <u>https://pearl.plymouth.ac.uk/pbs-theses/294/</u>

Mookda, D. (2025). Green logistics and carbon footprint assessment. RMUTT Global Business and Economics Review. <u>https://so03.tci-thaijo.org/index.php/RMUTT-Gber/article/view/279500</u>

Neszmélyi, G. I., Soós, G., & Nagy, H. (2025). Sustainability in the commercial sector: Shorter supply chains. Marine Development Studies. https://link.springer.com/article/10.1007/s44312-025-00052-7

Prudnikova, A. A., & Khmyz, O. V. (2025). Decarbonization of Global Transport Sector Post-COVID. Economics and Management Research Journal. https://journals.rcsi.science/0424-7388/article/view/287695

Shah, B., Kumar, V., & Verma, P. (2025). Re-designing short food supply chains for sustainable livelihoods. British Food Journal. https://www.emerald.com/insight/content/doi/10.1108/BFJ-05-2025-520/full/html

Smith, A. D. (2025). Case study of global apparel companies adapting supply chain strategies. International Journal of Business Forecasting and Marketing Intelligence. <u>https://www.inderscienceonline.com/doi/abs/10.1504/IJBFMI.2025.145311</u>

Stephen, G. (2025). Strategic Leadership in Global Pharmaceutical Program Management. Journal of Scientific Research and Management. https://www.researchgate.net/publication/389269862