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RESEARCH PAPER

Role of Artificial Intelligences in Shaping Customer Demand in E-commerce: A Case Study of Pakistan

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ABSTRACT

This study examines the impact of artificial Intelligence on customer demand in the e-commerce industry. This study has diagnosed the demand into basic perspective named them demand forecast, demand plan and demand management. Data was gathered from e-commerce users across Pakistan. Data was gathered from the 460 respondents by convenience sampling. The gathered data was analyzed via SmartPLS. This study found that artificial intelligence plays a vital role in the demand management of Pakistan's e-commerce industry. It enhances the diverse sections of the demand, like demand forecasting, planning, and management. This study further suggests that the e-commerce industry across Pakistan and globally should use artificial intelligence applications to better manage their e-commerce demand.

Keywords: Artificial Intelligence, Demand Forecast, Demand, E-commerce

Introduction

In recent years, the global commerce landscape has been transformed by the integration of artificial intelligence (AI) technologies (Nawaz & Naheed, 2020; Chen et al., 2022). As one of the fastest-growing sectors, e-commerce has embraced AI to enhance various aspects of the customer journey. This paper aims to explore the pivotal role played by AI in shaping customer demand within the context of the burgeoning e-commerce market in Pakistan (Luo, 2022). By delving into specific case studies and examples, researcher will unravel how AI technologies influence consumer behaviour and preferences in this South Asian nation. E-commerce Landscape in Pakistan Before delving into the impact of AI, it is essential to understand the current state of e-commerce in Pakistan. The country has witnessed a rapid increase in internet penetration and smartphone usage, paving the way for a burgeoning e-commerce market (Hasan & Rizvi, 2022). Online shopping platforms have become increasingly popular among the tech-savvy population, offering various products and services (Ali et al., 2021). As the e-commerce industry expands, businesses are exploring innovative ways to meet customer expectations and stay competitive. AI encompasses a range of technologies, including machine learning, natural language processing, and computer vision, among others. In the e-commerce realm, these technologies are employed to analyze vast amounts of data, personalize user experiences, and optimize various processes. Understanding customer behaviour and predicting trends are critical aspects of AI applications in e-commerce, and they play a crucial role in shaping customer demand (Pallathadka et al., 2023). One of the primary ways AI shapes customer demands in e-commerce is through personalized recommendations. Machine learning algorithms analyze customer browsing and purchase history to understand individual preferences (Rashid et al., 2022). By leveraging this data, e-commerce platforms can provide personalized product recommendations, creating a more tailored and engaging shopping experience. In the Pakistani e-commerce landscape, companies like Daraz and OLX have implemented AI-driven recommendation systems (Thandekkattu & Kalaiarasi, 2022). These systems analyze user behaviour, considering search history, past purchases, and the

time of day. The result is a personalized homepage for each user, showcasing products that align with their preferences. This level of personalization enhances the customer experience and influences purchasing decisions. Customer support is a critical component of any e-commerce platform, and AI has revolutionized this aspect by introducing chatbots and virtual assistants (Sajid et al., 2022). These AI-driven systems provide real-time assistance to users, addressing queries, offering product information, and even facilitating the purchase process. AI-driven chatbots have been particularly beneficial in Pakistan, where a diverse population speaks multiple languages (Sadiq et al., 2023). These virtual assistants can communicate in multiple languages, ensuring that users from different linguistic backgrounds feel comfortable and understood (Acharya et al., 2023). This not only enhances the accessibility of e-commerce platforms but also contributes to building customer trust and loyalty. The impact of AI on customer demand in e-commerce extends beyond the front-end user experience. AI technologies are increasingly utilized to optimize supply chain management, ensuring that products are available when and where customers need them (Demir et al., 2021). In the Pakistani context, where logistics and supply chain challenges are prevalent, AI plays a crucial role in predicting demand, managing inventory, and streamlining the delivery process. AI systems can accurately predict product demand by analyzing historical data and external factors such as weather and holidays, preventing stockouts and minimizing overstock situations. This, in turn, contributes to a smoother shopping experience for customers who can find the products they want when they want them (Fonseka et al., 2022). Ensuring the security of online transactions is paramount in building and maintaining customer trust. AI-powered fraud detection systems play a crucial role in identifying and preventing fraudulent activities, safeguarding the interests of both e-commerce platforms and customers. In Pakistan, where online payment systems are gaining traction, implementing AI-driven fraud detection has become imperative. By continuously learning from patterns and anomalies in transaction data, AI algorithms can detect suspicious activities in real-time, preventing unauthorized access and ensuring the integrity of online transactions. This proactive approach to security enhances customers' confidence in the safety of e-commerce platforms, positively influencing their purchasing behaviour (Malapane & Ndlovu, 2022). Dynamic pricing, facilitated by AI algorithms, is another aspect influencing customer demand in e-commerce. These algorithms analyze market demand, competitor pricing, and customer behaviour to adjust real-time prices. This dynamic pricing strategy allows e-commerce platforms to remain competitive and responsive to market fluctuations. In Pakistan, where price sensitivity is a significant factor in consumer decision-making, dynamic pricing can impact purchasing behaviour. For example, during festive seasons or sales events, AI-driven pricing adjustments can attract customers by offering competitive deals. Conversely, during periods of high demand, prices may be adjusted to maximize profits. This flexibility in pricing strategies contributes to the overall adaptability of e-commerce platforms in responding to customer expectations (Fedorko et al., 2022). While the integration of AI in shaping customer demand in Pakistani e-commerce is promising, it is not without challenges and ethical considerations. Privacy concerns, data security, and the potential for algorithmic biases are issues that demand careful consideration. In Pakistan, where data protection laws are still evolving, ensuring the responsible and ethical use of customer data is essential. E-commerce platforms must prioritize transparency and communicate clearly with users about how their data is collected, used, and protected. Additionally, efforts should be made to address biases in AI algorithms to avoid perpetuating societal inequalities (Rosário & Raimundo, 2021). The role of AI in shaping customer demand in Pakistani e-commerce is dynamic and multifaceted. From personalized recommendations and efficient customer support to supply chain optimization and dynamic pricing, AI technologies drive innovation and transform how businesses interact with consumers (Marjerison et al., 2022). As the e-commerce landscape continues to evolve in Pakistan, businesses must balance leveraging AI's benefits and addressing ethical considerations. By doing so, the industry can foster sustainable growth, build consumer trust, and contribute to the broader digital transformation of the Pakistani economy.

Literature Review

Artificial Intelligence (AI) has emerged as a transformative force in the e-commerce industry, significantly influencing various facets of operations. One of the critical areas where AI has demonstrated its prowess is demand factors, including demand forecasting, demand planning, and demand management (Bawack et al., 2022). This comprehensive analysis delves into the profound impact of AI on these crucial aspects of the e-commerce supply chain, exploring how advanced technologies are reshaping traditional approaches and driving efficiency in meeting consumer demands (Liu et al., 2022).

Demand Forecasting with AI

Historically, demand forecasting in the e-commerce industry has been a complex task fraught with challenges. Fluctuating market trends, seasonal variations, and unforeseen events often lead to inaccuracies in predicting customer demand (Khan et al., 2022). Traditional methods relied heavily on historical sales data, often falling short in capturing real-time changes in consumer behaviour and market dynamics. AI has revolutionized demand forecasting by introducing advanced analytics and machine learning algorithms. These technologies can process vast datasets in real time, considering many factors influencing demand (Irshad et al., 2023). AI-driven demand forecasting models generate more accurate predictions by analyzing historical sales and external variables such as social media trends, weather patterns, and economic indicators. Machine learning algorithms, particularly those employing neural networks and deep learning, excel in identifying patterns and trends that may elude traditional statistical models (Wang et al., 2023). In the e-commerce industry, companies like Amazon have pioneered AI for demand forecasting. Amazon's recommendation engine, powered by machine learning, suggests products to customers and predicts future demand based on individual user behaviour (Saeed, 2023). AI-driven demand forecasting significantly improves accuracy by continuously learning from new data and adjusting predictions accordingly. This adaptability is particularly beneficial in dynamic e-commerce environments where consumer preferences change rapidly (Peng et al., 2023). Unlike traditional methods that rely on periodic updates, AI enables real-time adjustments to demand forecasts. This agility is invaluable for e-commerce businesses dealing with flash sales, seasonal spikes, or unexpected market shifts. Accurate demand forecasting is directly linked to efficient inventory management (W. Li et al., 2023). AI-driven models help businesses optimize inventory levels, reducing the risk of overstocking or stockouts. This improves operational efficiency and enhances customer satisfaction by ensuring product availability (Ahmad et al., 2023).

Demand Planning and AI

Demand planning involves translating demand forecasts into actionable procurement, production, and distribution strategies. Traditional demand planning processes often face challenges aligning supply chain activities with dynamic market demands (Ni et al., 2023). Static planning models struggled to accommodate the variability inherent in the e-commerce landscape. AI introduces a paradigm shift in demand planning by offering dynamic and adaptive solutions (Cheng et al., 2023). By integrating AI into demand planning processes, e-commerce companies can create responsive and flexible supply chains that adapt to real-time changing market conditions. AI-driven predictive analytics plays a pivotal role in optimizing procurement processes. By analyzing historical supplier performance, market trends, and other relevant data, AI algorithms can recommend optimal procurement strategies, ensuring that businesses source the right quantities at the right time (Abou Houran et al., 2023). demand planning often relied on fixed production schedules, leading to inefficiencies during fluctuating demand. AI enables dynamic production scheduling, which adjusts production rates based on real-time demand signals. This flexibility improves resource utilization and reduces production costs. The

dynamic nature of AI-enabled demand planning allows businesses to respond swiftly to market changes (Song et al., 2023). This increased responsiveness is crucial in the e-commerce industry, where trends can shift rapidly and consumer expectations evolve continuously. By optimizing procurement, production, and distribution processes, AI-driven demand planning contributes to cost reduction (Mohiuddin Babu et al., 2022). Efficient resource allocation and reduced wastage drive cost savings in e-commerce supply chains (Li et al., 2023). AI facilitates better collaboration across the supply chain by providing real-time visibility and data-driven insights. This collaborative approach helps streamline communication between suppliers, manufacturers, and distributors, fostering a more integrated and efficient supply chain ecosystem (Lin et al., 2023).

Demand Management in the AI

Demand management involves overseeing and influencing the entire demand process, from forecasting to planning and fulfilment. Traditional approaches often faced challenges balancing supply and demand, leading to stockouts, excess inventory, and suboptimal customer experiences. AI injects Intelligence into demand management, offering a holistic view of the demand-supply ecosystem (Dong et al., 2023). By leveraging real-time data and predictive analytics, AI enhances decision-making, enabling businesses to align their resources with customer demand effectively. AI plays a crucial role in predictive order fulfilment, where algorithms anticipate customer demand and proactively initiate order processing and fulfilment. This reduces order processing times, minimizes delays, and improves customer satisfaction. AI's ability to analyze vast datasets allows e-commerce businesses to personalize marketing campaigns and promotions. By understanding individual customer preferences and behaviours, AI-driven systems can tailor promotions to specific segments, driving targeted demand and enhancing conversion rates (Peng, et al., 2023). Integrating AI into demand management provides a more seamless and personalized customer experience. Predictive order fulfilment, personalized promotions, and efficient inventory management collectively elevate customer satisfaction, fostering loyalty and repeat business. AI provides valuable insights for strategic decision-making in demand management (Alshammari et al., 2023). Businesses can make informed decisions regarding product launches, pricing strategies, and inventory investments by analyzing historical data, market trends, and customer behaviour. In the fast-paced e-commerce industry, adapting to market changes is crucial (Ahmad et al., 2021). AI-driven demand management enables businesses to respond quickly to shifts in customer preferences, competitor actions, and other external factors, ensuring sustained competitiveness.

Hypotheses

H1: Artificial Intelligence significantly impacts the demand forecast
H2: Artificial Intelligence significantly impacts the demand Plan
H3: Artificial Intelligence significantly impacts the demand Manage

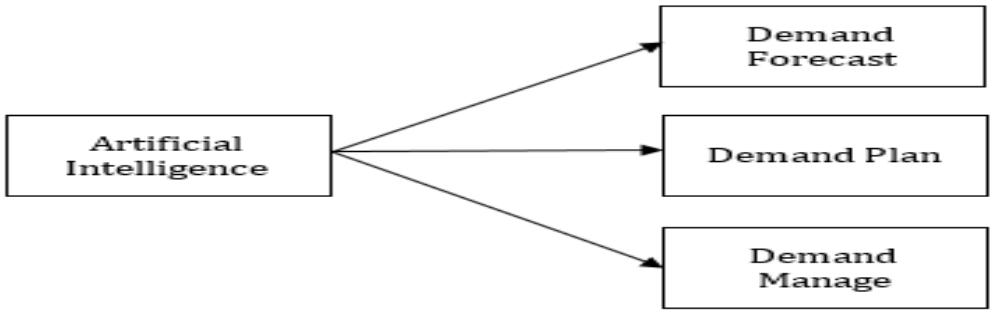

Figure 1 Conceptual Framework

Material and Methods

This study has used a quantitative approach to address the issue in question by the study. This study has collected the primary data from e-commerce users across Pakistan via a closed-ended questionnaire. The scale used in the questionnaire was Likert 5 points. The data sample comprised 460 respondents across Pakistan selected based on convenience sampling. The gathered data was analyzed via SmartPLS.

Results and Discussion

Measurement Model

The measurement model in the SEM includes the scales' reliability and validity. There are two standard tests in the SmartPLS items' reliability and construct reliability. Meanwhile, there are two standard tests for validity: convergent validity and discriminant validity. The measure used for the item's reliability is called outer loading values. The threshold value for the outer loading is 0.7 and above. The table of reliability below shows that all the items of the model are significant. The measure used for the construct reliability is called Cronbach alpha. The threshold value for the Cronbach alpha is 0.7 and above. The table below shows the reliability of all the Cronbach alpha values of all constructs is more significant than the threshold value, which shows the reliability of the items, and the scales are confirmed.

Table 1
Reliability

Constructs	Items	Outer loadings	Cronbach Alpha
Artificial Intelligence	A1	0.723	0.770
	A2	0.822	
	A3	0.771	
	A4	0.761	
	A5	0.771	
Demand Forecast	C1	0.739	0.794
	C2	0.823	
	C3	0.882	
	C4	0.733	
Demand Plan	P1	0.772	0.779
	P2	0.789	
	P3	0.776	
Demand Manage	E1	0.736	0.798
	E2	0.774	
	E3	0.883	

For the convergent validity, the measure used is called the AVE values. The threshold value for the AVE is 0.5 or above. The validity table below shows that all the constructs have AVE values more significant than the threshold value. The measure used for the discriminant validity is the HTMT values. The threshold value for the HTMT values is 0.85 or below. The validity table below shows that all the constructs have HTMT values smaller than the threshold values. This overall shows the validity of the scales is also achieved.

Table 2
Validity

Construct	AVE	HTMT
Artificial Intelligence	0.532	0.423
Demand Forecast	0.562	0.622

Demand Plan	0.551	0.411
Demand Manage	0.611	0.254

Structural Model

The structural model defines the relationships among the variables of interest based on the study. In other words, you may call it hypothesis testing. The most common measure for hypothesis testing is the regression analysis when we come to the Cause and effect relationships. The measures used in the regression for the significance of a cause-and-effect relationship are the p and t values. The threshold value for the p is 0.05 or less, while the threshold value for the t is 1.96 or above. The table of the hypothesis testing below shows that there are a total of three hypotheses with both p and t values in the significant range, which indicates that the results of this study support all three hypotheses.

Table 3
Regression Analysis

Relationships	Beta	T-Value	P-Value	Results
Artificial Intelligence >>> Demand Forecast	0.223	11.523	0.000	Supported
Artificial Intelligence >>> Demand Plan	0.143	9.234	0.000	Supported
Artificial Intelligence >>> Demand Manage	0.341	17.345	0.000	Supported

Conclusion

Globally, the world economy is moving towards digital-based technology. In this shift, Artificial Intelligence plays a broad role in e-commerce development. This study examines the impact of artificial intelligence on customer demand in the e-commerce industry. This study found that artificial intelligence plays a vital role in the demand management of Pakistan's e-commerce industry. It enhances the diverse sections of the demand, like demand forecasting, planning, and management. This study further suggests the e-commerce industry across Pakistan and globally uses artificial intelligence applications to manage their e-commerce demand better.

References

Abou Houran, M., Ahmad, S. F., Nutakki, T. U. K., Agrawal, M. K., Ghfar, A. A., Ooi, J. B., Albani, A., & Xie, S. (2023). Numerical simulation and 4E analysis of a steam methane reforming-based multi heat recovery process, producing electricity, methanol, fresh water, heating, and coolant. *Process Safety and Environmental Protection*, *180*, 511–534. https://doi.org/10.1016/j.psep.2023.10.011

Acharya, N., Sassenberg, A.-M., & Soar, J. (2023). Effects of cognitive absorption on continuous use intention of AI-driven recommender systems in e-commerce. *Foresight*, *25*(2), 194–208. https://doi.org/10.1108/FS-10-2021-0200

Ahmad, S. F., Han, H., Alam, M. M., Rehmat, Mohd. K., Irshad, M., Arraño-Muñoz, M., & Ariza-Montes, A. (2023). Impact of artificial Intelligence on human loss in decision making, laziness and safety in education. *Humanities and Social Sciences Communications*, *10*(1), 311. https://doi.org/10.1057/s41599-023-01787-8

Ahmad, S. F., Rahmat, Mohd. K., Mubarik, M. S., Alam, M. M., & Hyder, S. I. (2021). Artificial Intelligence and Its Role in Education. *Sustainability*, *13*(22), 12902. https://doi.org/10.3390/su132212902

Ali, S., Khalid, N., Javed, H. M. U., & Islam, D. Md. Z. (2021). Consumer Adoption of Online Food Delivery Ordering (OFDO) Services in Pakistan: The Impact of the COVID-19 Pandemic Situation. *Journal of Open Innovation: Technology, Market, and Complexity*, *7*(1), 10. https://doi.org/10.3390/joitmc7010010

Alshammari, T. O., Ahmad, S. F., Abou Houran, M., Agrawal, M. K., Pulla, B. P., Nutakki, T. U. K., Albani, A., & Youshanlouei, H. M. (2023). Thermal energy simulation of the building with heating tube embedded in the wall in the presence of different PCM materials. *Journal of Energy Storage*, *73*, 109134. https://doi.org/10.1016/j.est.2023.109134

Bawack, R. E., Wamba, S. F., Carillo, K. D. A., & Akter, S. (2022). Artificial Intelligence in E-Commerce: a bibliometric study and literature review. *Electronic Markets*, *32*(1), 297–338. https://doi.org/10.1007/s12525-022-00537-z

Chen, D., Esperança, J. P., & Wang, S. (2022). The Impact of Artificial Intelligence on Firm Performance: An Application of the Resource-Based View to e-Commerce Firms. *Frontiers in Psychology*, *13*. https://doi.org/10.3389/fpsyg.2022.884830

Cheng, C., Ahmad, S. F., Irshad, M., Alsanie, G., Khan, Y., Ahmad (Ayassrah), A. Y. A. B., & Aleemi, A. R. (2023). Impact of Green Process Innovation and Productivity on Sustainability: The Moderating Role of Environmental Awareness. *Sustainability*, *15*(17), 12945. https://doi.org/10.3390/su151712945

Demir, A., Maroof, L., Sabbah Khan, N. U., & Ali, B. J. (2021). The role of E-service quality in shaping online meeting platforms: a case study from higher education sector. *Journal of Applied Research in Higher Education*, *13*(5), 1436–1463. https://doi.org/10.1108/JARHE-08-2020-0253

Dong, Y., Ahmad, S. F., Irshad, M., Al-Razgan, M., Ali, Y. A., & Awwad, E. M. (2023). The Digitalization Paradigm: Impacts on Agri-Food Supply Chain Profitability and Sustainability. *Sustainability*, *15*(21), 15627. https://doi.org/10.3390/su152115627

Fedorko, R., Kráľ, Š., & Bačík, R. (2022). *Artificial Intelligence in E-commerce: A Literature Review* (pp. 677–689). https://doi.org/10.1007/978-981-16-9113-3_50

Fonseka, K., Jaharadak, A. A., & Raman, M. (2022). Impact of E-commerce adoption on business performance of SMEs in Sri Lanka; moderating role of artificial Intelligence. *International Journal of Social Economics*, *49*(10), 1518–1531. https://doi.org/10.1108/IJSE-12-2021-0752

Hasan, I., & Rizvi, S. (2022). *AI-Driven Fraud Detection and Mitigation in e-Commerce Transactions* (pp. 403–414). https://doi.org/10.1007/978-981-16-6289-8_34

Irshad, M., Qureshi, M. A., Saraih, U. N., & Ahmad, S. F. (2023). Impact of institutional climate on the student's engagement and learning outcomes in private sector universities of Karachi. *International Journal of Management in Education*, *17*(3), 297. https://doi.org/10.1504/IJMIE.2023.130674

Jaweria, Ghias, S., & Muhammad, J. (2023). Role of artificial intelligence on leadership decision making: A perspective of business sector organization. Annals of Human and Social Sciences, 4(3), 195–203. doi:10.35484/ahss.2023(4-III)18

Jaweria, Muhammad, J., & Khan, M. A. (2023). SWOT analysis of artificial intelligence: Empirical evidence from the pharmaceutical industry of Pakistan. PAKISTAN LANGUAGES AND HUMANITIES REVIEW, 7(III), 616–628. doi:10.47205/plhr.2023(7-iii)54

Khan, Y., Su'ud, M. B. M., Alam, M. M., Ahmad, S. F., Ahmad (Ayassrah), A. Y. A. B., & Khan, N. (2022). Application of Internet of Things (IoT) in Sustainable Supply Chain Management. *Sustainability*, *15*(1), 694. https://doi.org/10.3390/su15010694

Li, C., Ahmad, S. F., Ahmad Ayassrah, A. Y. A. B., Irshad, M., Telba, A. A., Mahrous Awwad, E., & Imran Majid, M. (2023). Green production and green technology for sustainability: The mediating role of waste reduction and energy use. *Heliyon*, *9*(12), e22496. https://doi.org/10.1016/j.heliyon.2023.e22496

Li, W., Zehforoosh, A., Singh Chauhan, B., Uday Kumar Nutakki, T., Fayaz Ahmad, S., Muhammad, T., Farouk Deifalla, A., & Lei, T. (2023). Entropy generation analysis on heat transfer characteristics of Twisted corrugated spiral heat exchanger utilized in solar pond. *Case Studies in Thermal Engineering*, *52*, 103650. https://doi.org/10.1016/j.csite.2023.103650

Lin, F., Wang, J., Nutakki, T. U. K., Ayadi, M., Ahmad, S. F., Muhammad, T., & Lui, C. (2023). Proposal, process development, and multi-aspect investigation of a novel environmentally friendly multigeneration process in arrangement with a sea water desalination unit. *Journal of Environmental Chemical Engineering*, *11*(6), 111392. https://doi.org/10.1016/j.jece.2023.111392

Liu, X., Ahmad, S. F., Anser, M. K., Ke, J., Irshad, M., Ul-Haq, J., & Abbas, S. (2022). Cyber security threats: A never-ending challenge for e-commerce. *Frontiers in Psychology*, *13*. https://doi.org/10.3389/fpsyg.2022.927398

Luo, N. (2022). Innovation of E-Commerce Development Model under the Background of Artificial Intelligence and Wireless Communication. *Wireless Communications and Mobile Computing*, *2022*, 1–7. https://doi.org/10.1155/2022/8572911

Malapane, T. A., & Ndlovu, N. K. (2022). The Adoption of Artificial Intelligence in the South African E-Commerce Space: A Systematic Review. *2022 Systems and Information Engineering Design Symposium (SIEDS)*, 7–12. https://doi.org/10.1109/SIEDS55548.2022.9799403

Marjerison, R. K., Zhang, Y., & Zheng, H. (2022). AI in E-Commerce: Application of the Use and Gratification Model to The Acceptance of Chatbots. *Sustainability*, *14*(21), 14270. https://doi.org/10.3390/su142114270

Mohiuddin Babu, M., Akter, S., Rahman, M., Billah, M. M., & Hack-Polay, D. (2022). The role of artificial Intelligence in shaping the future of Agile fashion industry. *Production Planning & Control*, 1–15. https://doi.org/10.1080/09537287.2022.2060858

Nawaz , M, A Naheed D . (2020). E-Commerce Ethics into Expectation-Confirmation Model: Emerging Case of Pakistan's B2B SMEs. *Pakistan Social Sciences Review*, 4(3), 610-638, doi:10.35484/pssr.2020(4-III)44

Ni, L., Ahmad, S. F., Alshammari, T. O., Liang, H., Alsanie, G., Irshad, M., Alyafi-AlZahri, R., BinSaeed, R. H., Al-Abyadh, M. H. A., Abu Bakir, S. M. M., & Ayassrah, A. Y. A. B. A. (2023). The role of environmental regulation and green human capital towards sustainable development: The mediating role of green innovation and industry upgradation. *Journal of Cleaner Production*, *421*, 138497. https://doi.org/10.1016/j.jclepro.2023.138497

Pallathadka, H., Ramirez-Asis, E. H., Loli-Poma, T. P., Kaliyaperumal, K., Ventayen, R. J. M., & Naved, M. (2023). Applications of artificial Intelligence in business management, e-commerce and finance. *Materials Today: Proceedings*, *80*, 2610–2613. https://doi.org/10.1016/j.matpr.2021.06.419

Peng, Y., Ahmad, S. F., Ahmad, A. Y. A. B., Al Shaikh, M. S., Daoud, M. K., & Alhamdi, F. M. H. (2023). Riding the Waves of Artificial Intelligence in Advancing Accounting and Its Implications for Sustainable Development Goals. *Sustainability*, *15*(19), 14165. https://doi.org/10.3390/su151914165

Peng, Y., Ahmad, S. F., Irshad, M., Al-Razgan, M., Ali, Y. A., & Awwad, E. M. (2023). Impact of Digitalization on Process Optimization and Decision-Making towards Sustainability: The Moderating Role of Environmental Regulation. *Sustainability*, *15*(20), 15156. https://doi.org/10.3390/su152015156

Rashid, R. M., Pitafi, A. H., Qureshi, M. A., & Sharma, A. (2022). Role of Social Commerce Constructs and Social Presence as Moderator on Consumers' Buying Intentions During COVID-19. *Frontiers in Psychology*, *13*. https://doi.org/10.3389/fpsyg.2022.772028

Rosário, A., & Raimundo, R. (2021). Consumer Marketing Strategy and E-Commerce in the Last Decade: A Literature Review. *Journal of Theoretical and Applied Electronic Commerce Research*, *16*(7), 3003–3024. https://doi.org/10.3390/jtaer16070164

Sadiq, M. W., Akhtar, M. W., Huo, C., & Zulfiqar, S. (2023). ChatGPT-powered chatbot as a green evangelist: an innovative path toward sustainable consumerism in E-commerce. *The Service Industries Journal*, 1–45. https://doi.org/10.1080/02642069.2023.2278463

Saeed, S. (2023). A Customer-Centric View of E-Commerce Security and Privacy. *Applied Sciences*, *13*(2), 1020. https://doi.org/10.3390/app13021020

Sajid, S., Rashid, R. M., & Haider, W. (2022). Changing Trends of Consumers' Online Buying Behavior During COVID-19 Pandemic With Moderating Role of Payment Mode and Gender. *Frontiers in Psychology*, *13*. https://doi.org/10.3389/fpsyg.2022.919334

Song, Y., Ahmad, S. F., Abou Houran, M., Agrawal, M. K., Nutakki, T. U. K., Siddiqui, M. R., Albani, A., & Su, Q. (2023). Multi-variable study of a novel multigeneration system using biogas separation unit and LNG cold energy utilization, producing electricity, cooling,

heat, fresh water, liquid CO2, biomethane, and methanol. *Process Safety and Environmental Protection*, *180*, 616–638. https://doi.org/10.1016/j.psep.2023.10.023

Thandekkattu, S. G., & Kalaiarasi, M. (2022). *Customer-Centric E-commerce Implementing Artificial Intelligence for Better Sales and Service* (pp. 141–152). https://doi.org/10.1007/978-981-16-7389-4_14

Wang, C., Ahmad, S. F., Bani Ahmad Ayassrah, A. Y. A., Awwad, E. M., Irshad, M., Ali, Y. A., Al-Razgan, M., Khan, Y., & Han, H. (2023). An empirical evaluation of technology acceptance model for Artificial Intelligence in E-commerce. *Heliyon*, *9*(8), e18349. https://doi.org/10.1016/j.heliyon.2023.e18349