IMPACT OF E-PAYMENT AND RECOMMENDATION SYSTEMS: A CASE STUDY IN E-COMMERCE PLATFORMS IN NEPAL

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ABSTRACT

The advancement in technology has helped mankind achieve innovation and improve the living standards. As the world is engulfed in mobile phones the use of internet and mobile applications have skyrocketed. E-commerce is a major application that is used by millions of people every day with their smart devices. The possibility of shopping of an item from the palm of one's hand is convenient and enjoyable as well. This has led to the growth of e-commerce throughout the world as a major business platform. This study examines the adoption and usage of e-commerce platforms in Nepal, a country where traditional brick-and-mortar retail is the dominant mode of commerce. The research uses quantitative research methodology through online surveys to assess the readiness of e-payment infrastructure, focusing on factors like security, trust, and accessibility. It also examines the role of recommendation systems in enhancing user experience and increasing engagement on e-commerce platforms. The study analyzes the effectiveness of recommendation algorithms in providing personalized product suggestions and reducing information overload for Nepali consumers. The findings provide insights into the e-commerce landscape in the Kathmandu Valley, highlighting the challenges and opportunities for e-payment providers, businesses, and e-commerce platforms in a market transitioning to digital commerce. The study emphasizes the importance of tailored recommendation systems in addressing the unique needs and preferences of Nepali consumers. The findings offer valuable insights for businesses, policymakers, and e-commerce stakeholders seeking to navigate and thrive in the evolving landscape of Nepali e-commerce.

Keywords: *E-commerce, Recommendation Systems, E-payment, Quantitative Research*

1. INTRODUCTION

Information Technology (IT) has significantly globalized the world, facilitating communication and transforming commerce. E-commerce, or electronic commerce, is a platform where people exchange goods or services over the internet. Today, it is a multi-billion-dollar industry, accounting for a significant portion of retail sales worldwide. The COVID-19 pandemic has accelerated the shift towards online shopping, with more people turning to e-commerce platforms for their purchases (Jain et al., 2021).

E-commerce originated in the 1960s through EDI transactions, but gained mainstream acceptance in the 1990s. The introduction of the WWW and web browsers made it easier for consumers to access and use the internet, leading to the emergence of online marketplaces and consumer-facing e-commerce websites. In 1994, Amazon and eBay launched the first online bookstores, paving the way for other e-commerce businesses like clothing retailers, travel websites, and financial services (Khoshnampour & Nosrati, 2011). The late 1990s saw the introduction of secure online payment systems like PayPal, enhancing consumer safety. The 2000s saw widespread smartphone adoption and mobile internet access, accelerating e-commerce growth (Fatonah et al., 2018).

Various types of e-commerce exist in the world. Based on the business module, the e-commerce can be broadly categorized into following types (Babenko et al., 2019):

a. B2C: This type of e-commerce involves the sale of goods or services from a business to an individual consumer. Examples include online retailers such as Amazon, Daraz, AliExpress, etc.
b. C2C: This type business module involves activities where individuals put an ad for selling goods or services to other individuals. It's like a second-hand market. Examples include platforms like eBay, Etsy, Hamrobazar etc.
c. B2B: This type of e-commerce involves the sale of goods or services between businesses. Examples include wholesale marketplaces like Alibaba or ThomasNet.

d. C2B: This business module involves consumers selling goods or services to businesses. Examples include online freelance platforms like Upwork or Fiverr.

Online shopping has expanded businesses' options, but it also introduces information overload. To address this, recommendation systems (RS) are used in e-commerce to personalize the shopping experience. These systems use customer behavior data, preferences, and historical purchasing patterns to suggest products based on top sellers, customer demographics, and historical purchasing patterns. This approach helps customers make informed decisions about their needs (Gil & García, 2005).

There are different types of recommendation Systems, the most common three types of recommendation systems are collaborative filtering, content-based filtering, and hybrid methods. Collaborative filtering suggests products based on similar customer purchase history, content-based filtering suggests products based on a customer's previous viewing or purchase characteristics, and hybrid methods combine these methods (Alamdari et al., 2020).

Nepal's e-commerce industry is rapidly growing, but faces challenges such as a lack of reliable delivery infrastructure and limited payment options. Companies struggle to reach remote and rural areas, and cash on delivery remains the most used payment method. Despite digital payment options like Khalti, eSewa, ImePay, and Credit Cards, many customers are not comfortable with online payments, making it difficult for e-commerce companies to scale their business (Vaidya, 2019).

Nepal's e-commerce industry is experiencing growth despite challenges, with an increase in platforms and transactions. Mobile commerce is also gaining traction, with platforms launching apps to make online shopping easier. The penetration of internet and smartphones in Nepal has further boosted this growth (Pathak, 2020).

This paper explores the use of Recommendation Systems (RS) in online shopping platforms like *Daraz Nepal* and *Hamrobazar* in Kathmandu Valley, Nepal. It aims to identify the various types and their impact on consumers.

2. OBJECTIVES

The objective of this study is to investigate how RS impact the e-commerce scenario in Nepal, how online payment facilitates the growth of e-commerce and how different types of RS can influence unplanned buying decision in consumers.

i. To investigate how perceived usefulness of RS will affect the usage of e-commerce platform.
ii. To analyze the use of e-payment in e-commerce platforms and correlate with the usage of online shopping.
iii. To determine the relationship between impact of RS and increase in unplanned purchase decision of consumer.
iv. To develop a conceptual model for suitable implementation of RS in the e-commerce platforms for Nepal.

3. PROBLEM STATEMENT

Many scholars and researchers have done research on e-commerce, use of RS on e-commerce, factors determining unplanned purchases, user experience of RS in e-commerce, effect of online payment options and how the RS can help an online business to grow and thrive in the current competition. The individual scholars have come up with their own conclusion from their experiments and surveys.

The problem statements of some of the research papers can be listed as:

i. What type of information should the RS provide to persuade the users to make unplanned purchase decisions? (Ying et al., 2018)
ii. What is the attitude of consumers towards the RS of e-commerce and how does it affect the buying decision of the consumer? (Martínez-López et al., 2015)
iii. What are the effects of micro-behaviors on the RS of e-commerce? (Zhou et al., 2018)
iv. How does the integration of e-payment affect online shopping and sales growth? (Alzoubi et al., 2022)
v. How can customer's behavior be classified for developing the RS? (Abdul Hussien et al., 2021)

4. RESEARCH QUESTIONS

Research on e-commerce in Nepal is limited to countries like China, Malaysia, Vietnam, and Spain. The study aims to explore the use cases of RS in e-commerce in Kathmandu Valley and develop a framework to determine e-commerce adoption using TAM and MTAM models. The research is particularly relevant in Nepal, where the e-commerce industry is still in its early stages due to the COVID-19 pandemic. The main research requisitions are as follows:

RQ1. Is there a significant relationship between perceived usefulness of RS with the usage of e-commerce platform?

RQ2. Is there a significant relationship between availability of e-payment with the usage of e-commerce platform?

RQ3. Is there a significant relationship between the impact of RS and increase in unplanned purchases from e-commerce platform?

RQ4. Is there a suitable framework for the implementation of RS in e-commerce industry of Nepal?

5. SIGNIFICANCE OF THE STUDY

The research is significant in exploring the current trends and status of online-shopping in the context of Nepalese people. The research also plays vital role in determining how RS affect the online business. The benefits of this dissertation can be listed below:

- It may shed light on how use of RS can affect the e-commerce business.
- It may provide a knowledge base to the government officials regarding the use of e-commerce and IT policies may be made accordingly to enhance e-commerce.
- E-commerce companies may get valuable information regarding the use of RS for the enhancement of their products.
- It may give some ideas for future research regarding use of RS in e-commerce in context of Nepal.

6. SCOPE OF THE STUDY

The scope of the research is limited to Kathmandu Valley. The dissertation tries to explore the use of e-commerce and the effect of RS in the online shopping industry among the people of Kathmandu Valley. The research is focused on people of diverse demographic

background inside the valley who use e-commerce platform to perform online shopping. The research is further extended to make a plausible framework to increase the usage of online shopping.

7. LIMITATIONS OF THE STUDY

Every research has some limitations and shortcomings. These limitations provide ideas for future researchers to work on. In addition, limitations also give a clear scope of a dissertation. Some of the limitations of this dissertation are as follows:

i. The survey size was limited to 363 people and conducted inside the Kathmandu Valley only. So, the results cannot be generalized for the whole context of Nepal.
ii. The survey will be confined to the usage of selected e-commerce platforms (Daraz Nepal, SastoDeal, Gyapu, Jeevee and Hamrobazar)
iii. The survey was more focused on young people who are working of Technical jobs. So, it cannot be generalized to overall demographics.
iv. There were very few papers regarding the effect of RS on Nepalese market, so authentic research data might be lacking.
v. All the survey was conducted online, so there might be some doubts regarding the data validity.

8. LITERATURE REVIEW

The COVID-19 pandemic has led to a surge in online shopping, causing information overload for consumers. recommendation Systems (RS) can help alleviate this by recommending items according to users' preferences. However, the effectiveness of RS varies across applications and users' views on RS. This paper aims to determine the impact of RS on user purchase decisions, considering factors like ease of use, shopping enjoyment, satisfaction, perceived usefulness, and recommendation accuracy. E-payment integration is also crucial for smooth transactions during online shopping. The Technology Acceptance Model (TAM) is used to study the adoption of these technologies by society.

E-commerce began in the 1960s with the development of EDI systems, which facilitated electronic document exchange. In the 1970s, EFT technologies enabled

online payments. The true era of e-commerce began in the 1990s with the rise of the World Wide Web. Companies like Amazon and eBay were early pioneers in online shopping, paving the way for online retail (Santos et al., 2017).

RS uses collaborative and content-based filtering methods to suggest products of interest to consumers. It enhances the online shopping experience by providing clear product classifications. However, poorly designed website interfaces may discourage adoption. Online customers feel satisfied and fulfilled, and the online environment provides psychological pleasure by temporarily disconnecting them from reality. The technology acceptance model (TAM) focuses on perceived ease of use, usefulness, and shopping enjoyment (Ying et al., 2018). E-commerce sites use recommendation systems to encourage purchases, cross-sell, provide personalized customer care, and foster loyalty. They use manual suggestion definition by system administrators and automatic rule development based on user behavior (Prassas & Pramataris, 2001).

Misbehaviors are tiny actions performed by the users during their online shopping activities. These activities include browsing for products, adding it to the cart, making an order and dwell time of customers. The data from these activities can be used to design a Recommendation Framework based on micro behavior perspective using Deep Learning. The empirical results obtained from the datasets from a real e-commerce platform shows the effectiveness of the proposed framework and the significance of micro-behaviors for generating recommendations (Zhou et al., 2018).

In E-commerce businesses, customer reviews provide a rich source of information regarding the quality of products. Hence, customer reviews can be used for generating high-quality recommendations. However, it is quite an uphill task to extract useful information from the customer feedback in text format. The useful information is filtered using Latent Dirichlet Allocation and deep neural network is implemented to generate deep features from the reviews. Finally, the recommendation is generated using collaborative filtering from the deep feature matrix generated (Shoja & Tabrizi, 2019)

Electronic payment methods have revolutionized the landscape of online shopping, wielding a profound impact and exerting substantial influence on consumer

behavior. The convenience and security of electronic payment options, such as credit cards, digital wallets, and online banking, have significantly accelerated the growth of e-commerce (Alzoubi et al., 2022). These methods have instilled trust in consumers, enabling them to make purchases confidently in a virtual marketplace. Furthermore, electronic payments have streamlined the checkout process, reducing friction and cart abandonment rates. As a result, they have become a cornerstone of the online shopping experience, reshaping how individuals engage with e-commerce platforms and ultimately fueling its expansion (Fatonah et al., 2018).

Gray sheep behavior in e-commerce refers to a unique category of online consumers who exhibit characteristics of both loyal customers and critical skeptics. These individuals are not easy to classify as they oscillate between brand loyalty and a tendency to scrutinize products, services, and recommendations rigorously. They are neither strictly black sheep (dissatisfied, non-returning customers) nor white sheep (loyal, repeat customers) but rather occupy a middle ground. Gray sheep customers may demonstrate loyalty to specific aspects of an e-commerce platform while being cautious and selective in their overall engagement. Their behavior is characterized by a balanced approach, often seeking the best value, quality, and service while occasionally trying out new options. Understanding gray sheep behavior is vital for e-commerce businesses aiming to cater to this unique segment of consumers and tailor marketing and recommendation strategies accordingly (Srivastava et al., 2020).

9. METHODOLOGY

Research methodology is the systematic and structured approach that researchers use to conduct a study or investigation. It encompasses the strategies, techniques, and procedures employed to gather and analyze data, answer research questions or test hypotheses, and draw meaningful conclusions. The choice of research methodology depends on the nature of the research, its objectives, and the available resources. Common research methodologies include qualitative methods, such as interviews and content analysis, and quantitative methods, including surveys and experiments. Methodology also involves selecting a research design, defining a research population or sample, collecting and processing data, and employing

statistical or analytical techniques to interpret the findings. A well-defined and appropriate research methodology is crucial for the validity, reliability, and credibility of research outcomes, ensuring that the study's objectives are met effectively.

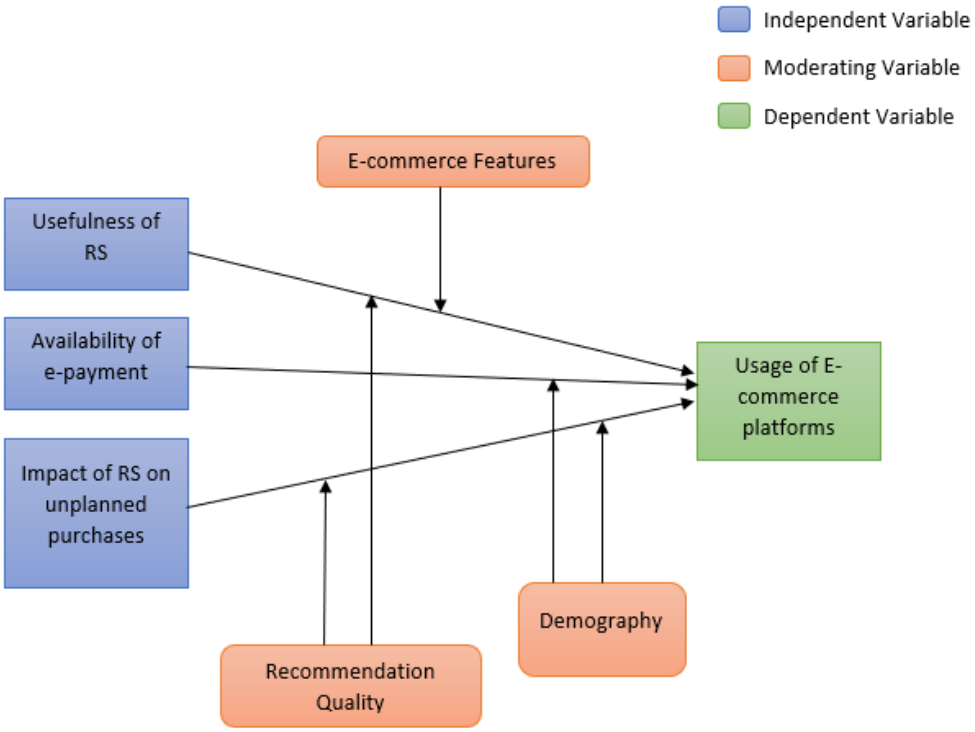

Figure 1 Research Model

This research used a mixed-methods approach, including both quantitative and qualitative data collection methods. Surveys will be administered to customers of e-commerce platforms that use recommendation systems to gather data on their satisfaction with the recommendations and the impact on their purchasing behavior. Interviews with e-commerce platform managers will also be conducted to gather qualitative data on the implementation and effectiveness of the recommendation systems.

The study examines the impact of RS on e-commerce using TAM, a theoretical framework developed by Fred Davis. TAM focuses on how individuals perceive and embrace new technologies, focusing on perceived ease of use and perceived usefulness. It has been widely applied to study e-commerce adoption, providing valuable insights for designing user-friendly and effective technological solutions

(Roudposhti et al., 2018). Mobile Technology Acceptance Model (MTAM) addresses limitations of traditional Technology Acceptance Model (TAM) by incorporating factors like mobile practicality and ease of use. MTAM addresses the limitations of TAM, which was limited to organizational contexts and lacked consideration for variables affecting technology acceptance beyond the workplace (Lah et al., 2020).

10. DATA ANALYSIS

After preparing the questionnaire, it was distributed among 15 close friends and family circle. The questionnaire was distributed to small audience to test and review the quality of the questionnaire from respondents. Among them, 12 responses were collected and some respondents provided valuable feedback on the questionnaire and survey. Some suggestions were adding likert type questions regarding the quality of online-shopping, adhering to 5-scale Likert questions, reducing the number of multiple-choice questions. These recommendations were applied in the revised questionnaire set and distributed to larger audience for the survey data.

For the study, the questionnaire were developed and distributed to the respondents via Internet. The questionnaire was circulated all over Nepal via various mediums like WhatsApp, E-mails, Viber, LinkedIn, Facebook, Instagram and Snapchat. The questionnaire was then distributed to 370 respondents in order to achieve high response rate. Out of those, 363 responses were valid and used for further analysis.

Reliability Analysis

After the collection of the responses from the people, the test was conducted and performed using Cronbach's coefficient alpha to determine how error-free the items of the study were from random mistakes and to also check the dependability of the items i.e. how strong or weak the dependability is amongst the items. Cronbach's alpha is actually the measure of the internal consistency of the items, that is, how closely related a set of items is as a group. The reliability coefficient of this measure normally ranges from 0 to 1. The closer the Cronbach alpha's value is to 1.0 the greater the internal consistency of the items in the scale. For this study, dependability findings are show below in tabular format:

Table 1: Reliability Analysis of the variables

Variables of the study	**No. of items**	**Cronbach Alpha**
Usefulness of RS	6	0.786
Electronic Payment	4	0.785
Impact of RS	5	0.705

As per the data presented in the table 1, the Cronbach Alpha value for the independent variables lies in the range of 0.6 – 0.8, so the data is reliable. The Cronbach Alpha score for the variables vary from 0.705 to 0.786.

Regression Analysis

The ANOVA resulted into low p-value ($p < 0.001$) suggesting the relationship between the predictors and the dependent variable is unlikely to be due to random chance. The constant term in the regression equation represents the predicted value of the dependent variable when all independent variables are zero. For each one-unit increase in the usefulness of RS variable, overall usage of e-commerce is expected to increase by 0.468 units. For each one-unit increase in the e-payment variable, overall usage of e-commerce is expected to increase by 0.350 units.

Correlation analysis

In correlation analysis, the correlation coefficient ranges from -1 to 1. A positive correlation coefficient indicates a positive linear relationship between the two variables, while a negative coefficient indicates a negative linear relationship. A coefficient of 0 indicates no linear relationship.

Table 2 Correlation Analysis of dependent and independent variables

		Usefulness Of RS	E-Payment	Impact Of RS	Overall Usage Of Ecommerce
Usefulness Of RS	Pearson Correlation Sig. (2-tailed)	1			
E-Payment	Pearson Correlation Sig. (2-tailed)	.376** 0.000	1		
Impact Of RS	Pearson Correlation Sig. (2-tailed)	.530** 0.000	.628** 0.000	1	
Overall Usage of Ecommerce	Pearson Correlation Sig. (2-tailed)	.500** 0.000	.489** 0.000	.521** 0.000	1

** Correlation is significant at the 0.01 level (2-tailed).

The table 2 shows the correlation between the dependent variable and the independent variables. Here, the dependent variable is the overall usage of e-commerce which is affected by three independent variables viz. usefulness of RS, e-payment and impact of RS.

From table 2, it is quite convincing that there is a significant relationship between usefulness of RS and usage of e-commerce. It is supported by the fact that it has correlation coefficient of 0.5 and the p value is $0.0<0.05$. Similar results can be seen for other two independent variables: E-payment and Impact of RS. Thus, it suggests that both of these variables have strong relationship with the dependent variable: usage of e-commerce.

11. EVALUATION

While some platforms are actively utilizing RS, others still use traditional methods. The study investigates the interplay between these technologies and their impact on consumer behavior, business operations, and the overall e-commerce landscape in the Kathmandu Valley. This dissertation investigates the impact of recommendation Systems (RS) and e-payment on e-commerce usage in the Kathmandu Valley. A survey conducted online using Google Forms revealed a positive correlation between RS implementation and enhanced user engagement. Personalized product recommendations increased average time spent on platforms,

boosting purchasing probability. Electronic Payments simplified checkout processes, reducing cart abandonment rates and increasing successful transactions.

The survey data reveals that the majority of respondents were male, with 69.7% being male and 30.3% being female. This indicates that males are more technologically literate and use more e-commerce platforms for online purchases. Out of 363 participants, 62.5% were aged 25-34, followed by 25.6% aged 35-44. 79.3% were fully-time employed, indicating a dependable income source for online shopping. The majority of respondents were in technical jobs (82.7%), with only 17.9% in non-technical jobs. Monthly income data showed that 57.6% had an income between Rs. 50,000 to Rs. 1,00,000. 1,00,000 to Rs. 2,00,000. This suggests that having a steady income supports online shopping activities and encourages periodic use of e-commerce.

The use of e-commerce platforms has become increasingly popular among residents of the Kathmandu Valley, particularly during the COVID-19 lock-down. The TAM model of technology adoption suggests that people became habituated to online shopping, leading to increased usage and trust. Daraz Nepal is the most popular e-commerce platform in the valley, followed by Hambrobazr, a C2C platform, and Jeevee, a platform for medicine and cosmetics. Other popular platforms include SastoDeal, Gyapu, Facebook, and Instagram. The frequency of online shopping is 71.6% monthly, with 12.4% once a week. The majority of respondents use e-commerce platforms for electronics (87.3%), clothing (82.6%), and medical and cosmetics (70.5%) shopping, while only a few uses it for groceries, furniture, and baby toys. The data suggests that most people are attracted to electronics, clothing, medical and cosmetics shopping while performing online shopping.

E-commerce transactions involve money transactions between buyers and sellers, with various methods available including cash on delivery, credit cards, debit cards, e-banking, and mobile wallets. A survey found that 90% of respondents preferred cash on delivery and mobile wallets for online shopping, followed by credit cards at 39.3%. E-banking and debit cards were used by 9.3% and 4.2%, respectively. This indicates a growing trend towards e-payment as people

transition from traditional cash payments due to the availability of mobile wallet services like IMEPay and Esewa Khalti. The pandemic has further increased trust in e-payments due to their high security and ease of use.

12. RESEARCH QUESTIONS AND FINDINGS

This dissertation aims to investigate the impact of RS and e-payment on e-commerce platform usage in the Kathmandu Valley, using research questions to gain a better understanding of the current situation.

RQ1. Is there a significant relationship between perceived usefulness of RS with the usage of e-commerce platform?

The statistical analysis reveals a significant relationship between the "Usefulness of RS" and "Usage of E-commerce", with a positive correlation coefficient of 0.500 indicating a moderate positive linear relationship between the perceived usefulness of the recommendation System and overall e-commerce platform usage, with a p-value of 0.000.

RQ2. Is there a significant relationship between availability of e-payment with the usage of e-commerce platform?

The statistical analysis reveals a strong correlation between the availability of E-payment and the usage of e-commerce platforms, with a r=0.489 and p-value of 0.000<0.05.

RQ3. Is there a significant relationship between the impact of RS and increase in unplanned purchases from e-commerce platform?

The study found a significant correlation between the Impact of recommendation System (RS) and unplanned purchases on an e-commerce platform, with a Pearson coefficient of 0.521 and a p-value of 0.000, indicating a moderate positive linear relationship.

RQ4. Is there a suitable framework for the implementation of RS in e-commerce industry of Nepal?

A suitable framework for the implementation of RS in e-commerce industry of Nepal is recommended as follows. The conceptual model is illustrated in figure 2. The conceptual model for e-commerce platforms in Nepal outlines various factors affecting its usage, popularity, and development, including internet availability,

delivery services, payment options, return policy, and reliability. Stakeholders like entrepreneurs, government, research and development teams, and customers play a crucial role in the development and maintenance of these platforms, highlighting the interaction among independent variables.

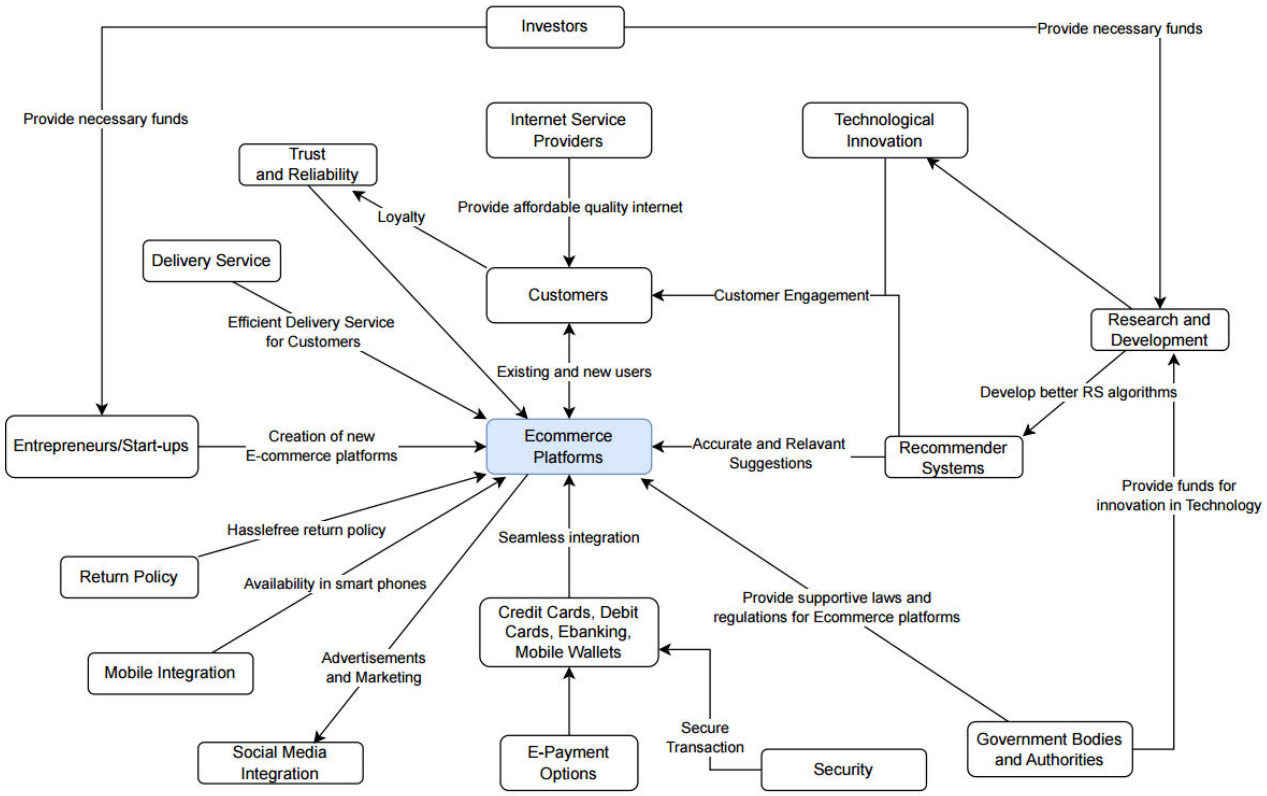

Figure 2 Conceptual Model for Ecommerce Platforms

13. CONCLUSION

E-commerce has become a global phenomenon, driven by technological innovation and human necessity. Surveys show that most people in Nepal use popular e-commerce platforms like Daraz Nepal, Hamrobazar, Jeevee, SastoDeal, and Gyapu for online shopping. E-payment and recommendation systems have a significant impact on e-commerce usage, with most people preferring e-payment for secure and reliable transactions. Recommendations systems (RS) are helpful in making purchase decisions, suggesting relevant products based on past history and search results, and reducing information overload. RS also enhances the shopping experience by tailoring product recommendations to individual preferences, leading to higher customer satisfaction and increased sales for e-commerce businesses. E-commerce can also help Nepal's market expand globally, particularly for exporting

handcrafted items like caps, clothing, and lokta paper. Entrepreneurs can also start their own businesses in the country through e-commerce businesses, such as import/export, wholesaler, retailer, or inventory management.

References

Abdul Hussien, F. T., Rahma, A. M. S., & Abdul Wahab, H. B. (2021). Recommendation Systems for E-commerce Systems An Overview. *Journal of Physics: Conference Series*, *1897*(1). https://doi.org/10.1088/1742-6596/1897/1/012024

Agrawal, D. S., & Agrawal, R. (2020). FACTORS AFFECTING THE BUYER'S ONLINE SHOPPING DECISION: AN EMPIRICAL ANALYSIS. *Prestige International Journal of Management and Research*, *11*(August 2019).

Alamdari, P. M., Navimipour, N. J., Hosseinzadeh, M., Safaei, A. A., & Darwesh, A. (2020). A Systematic Study on the recommendation Systems in the E-Commerce. *IEEE Access*, *8*, 115694–115716. https://doi.org/10.1109/ACCESS.2020.3002803

Ali Abumalloh, R., Ibrahim, O., & Nilashi, M. (2020). Loyalty of young female Arabic customers towards recommendation agents: A new model for B2C E-commerce. *Technology in Society*, *61*(August 2019), 101253. https://doi.org/10.1016/j.techsoc.2020.101253

Alzahrani, J. (2019). The impact of e-commerce adoption on business strategy in Saudi Arabian small and medium enterprises (SMEs). *Review of Economics and Political Science*, *4*(1), 73–88. https://doi.org/10.1108/reps-10-2018-013

Alzoubi, H. M., Alshurideh, M. T., Kurdi, B. Al, Alhyasat, K. M. K., & Ghazal, T. M. (2022). The effect of e-payment and online shopping on sales growth: Evidence from banking industry. *International Journal of Data and Network Science*, *6*(4), 1369–1380. https://doi.org/10.5267/j.ijdns.2022.5.014

Babenko, V., Kulczyk, Z., Perevosova, I., Syniavska, O., & Davydova, O. (2019). Factors of the development of international e-commerce under the conditions of globalization. *SHS Web of Conferences*, *65*, 04016. https://doi.org/10.1051/shsconf/20196504016

Chen, M., & Liu, P. (2017). Performance evaluation of recommendation systems. *International Journal of Performability Engineering*, *13*(8), 1246–1256. https://doi.org/10.23940/ijpe.17.08.p7.12461256

Cornell, J. (2022, October 11). *https://www.proprofssurvey.com/blog/quantitative-data/*. Retrieved from https://www.proprofssurvey.com/: https://www.proprofssurvey.com/blog/quantitative-data/

Fatonah, S., Yulandari, A., & Wibowo, F. W. (2018). A Review of E-Payment System in E-Commerce. *Journal of Physics: Conference Series*, *1140*(1). https://doi.org/10.1088/1742-6596/1140/1/012033

Gu, Y., Ding, Z., Wang, S., Zou, L., Liu, Y., & Yin, D. (2020). Deep Multifaceted Transformers for Multi-objective Ranking in Large-Scale E-commerce recommendation Systems. *International Conference on Information and Knowledge Management, Proceedings*, 2493–2500. https://doi.org/10.1145/3340531.3412697

Hayashi, T., Wang, Y., Kawai, Y., & Sumiya, K. (2018). An E-commerce recommendation system using complaint data and review data. *CEUR Workshop Proceedings*, *2068*.

Hussien, F. T. A., Rahma, A. M. S., & Abdulwahab, H. B. (2021). An e-commerce recommendation system based on dynamic analysis of customer behavior. *Sustainability (Switzerland)*, *13*(19). https://doi.org/10.3390/su131910786

IBM. (2023, January 12). *https://www.ibm.com/products/spss-statistics*. Retrieved from https://www.ibm.com/: https://www.ibm.com/products/spss-statistics

Jain, V., Malviya, B., & Arya, S. (2021). An Overview of Electronic Commerce (e-Commerce). *Journal of Contemporary Issues in Business and Government*, *27*(3). https://doi.org/10.47750/cibg.2021.27.03.090

Jawaid, M., & Karim, E. (2021). Factors Affecting Consumer Buying Behavior in E-Commerce Business during Outbreak of Covid-19: A Case Study on Top E-Commerce Websites. *Munich Personal RePEc Archive*, *110476*, 25. https://mpra.ub.uni-muenchen.de/110476/

Karimova, F. (2016). A Survey of e-Commerce recommendation Systems. *European Scientific Journal, ESJ*, *12*(34), 75. https://doi.org/10.19044/esj.2016.v12n34p75

Lah, U., Lewis, J. R., & Šumak, B. (2020). Perceived Usability and the Modified Technology Acceptance Model. *International Journal of Human-Computer Interaction*, *36*(13), 1216–1230. https://doi.org/10.1080/10447318.2020.1727262

Mao, M., Lu, J., Han, J., & Zhang, G. (2019). Multiobjective e-commerce recommendations based on hypergraph ranking. *Information Sciences*, *471*, 269–287.

https://doi.org/10.1016/j.ins.2018.07.029

Martínez-López, F. J., Esteban-Millat, I., Argila, A., & Rejón-Guardia, F. (2015). Consumers' psychological outcomes linked to the use of an online store's recommendation system. *Internet Research*, *25*(4), 562–588. https://doi.org/10.1108/IntR-01-2014-0033

Natour, W. Al. (2019). Critical Factors in the Development and Introduction of E-commerce : A Critical Factors in the Development and Introduction of E-commerce : A Global Approach Walid Al Natour Cardiff University This dissertation is submitted in partial fulfilment of the re. *Cardiff University*, *December*. https://doi.org/10.13140/RG.2.2.21983.61600

Pathak, C. (2020). *Abstract Title DIGITAL ECOMMERCE A case study of Daraz online shopping store in Nepal*.

Prassas, G., & Pramataris, K. (2001). A recommendation System for Online Shopping Based on Past Customer Behaviour. *E-Everything: E-Commerce, e-Government, e-Household, e-Democracy*, *EP 27046*, 766–782. http://ecenter.fov.uni-mb.si/proceedings.nsf/0/1ae52d3e68074686c1256e9f00326308/$file/49_prassas.pdf

Roudposhti, V. M., Nilashi, M. hrbakhsh, Mardani, A., Streimikiene, D., Samad, S., & Ibrahim, O. (2018). A new model for customer purchase intention in e-commerce recommendation agents. *Journal of International Studies*, *11*(4), 237–253. https://doi.org/10.14254/2071-8330.2018/11-4/17

Santos, V. F. dos, Sabino, L. R., Morais, G. M., & Goncalves, C. A. (2017). E-Commerce: A Short History Follow-up on Possible Trends. *International Journal of Business Administration*, *8*(7), 130. https://doi.org/10.5430/ijba.v8n7p130

Scholz, M., Dorner, V., Schryen, G., & Benlian, A. (2017). A configuration-based recommendation system for supporting e-commerce decisions. *European Journal of Operational Research*, *259*(1), 205–215. https://doi.org/10.1016/j.ejor.2016.09.057

Shoja, B. M., & Tabrizi, N. (2019). Customer Reviews Analysis With Deep Neural Networks for E-Commerce recommendation Systems. *IEEE Access*, *7*, 119121–119130. https://doi.org/10.1109/ACCESS.2019.2937518

Srivastava, A., Bala, P. K., & Kumar, B. (2020). New perspectives on gray sheep behavior in E-commerce recommendations. *Journal of Retailing and Consumer Services*,

53(February), 101764. https://doi.org/10.1016/j.jretconser.2019.02.018

SurveyMonkey. (2023, January 20). *https://www.surveymonkey.com*. Retrieved from https://www.surveymonkey.com/mp/survey-question-types/#multiple-choice: https://www.surveymonkey.com/mp/survey-question-types/#multiple-choice

Vaidya, R. (2019). Online Shopping in Nepal: Preferences and Problems. *Journal of Nepalese Business Studies*, *12*(1), 71–86. https://doi.org/10.3126/jnbs.v12i1.28184

Wang, C. D., Deng, Z. H., Lai, J. H., & Yu, P. S. (2019). Serendipitous recommendation in e-commerce using innovator-based collaborative filtering. *IEEE Transactions on Cybernetics*, *49*(7), 2678–2692. https://doi.org/10.1109/TCYB.2018.2841924

Wijaya, I. W. R., & Mudjahidin. (2021). Development of conceptual model to increase customer interest using recommendation system in e-commerce. *Procedia Computer Science*, *197*(2021), 727–733. https://doi.org/10.1016/j.procs.2021.12.194

Ying, Z., Caixia, C., Wen, G., & Xiaogang, L. (2018). Impact of recommendation systems on unplanned purchase behaviours in e-commerce. *2018 5th International Conference on Industrial Engineering and Applications, ICIEA 2018*, *1*, 21–30. https://doi.org/10.1109/IEA.2018.8387066

Zhao, X. (2019). A study on E-commerce recommendation system based on big data. *2019 IEEE 4th International Conference on Cloud Computing and Big Data Analytics, ICCCBDA 2019*, *1*, 222–226. https://doi.org/10.1109/ICCCBDA.2019.8725694

Zhou, M., Ding, Z., Tang, J., & Yin, D. (2018). *Micro Behaviors*. 727–735. https://doi.org/10.1145/3159652.3159671

TO BE REMOVED FROM HERE.

1. Abdul Hussien, F. T., Rahma, A. M. S., & Abdul Wahab, H. B. (2021). Recommendation Systems for E-commerce Systems An Overview. *Journal of Physics: Conference Series*, *1897*(1). https://doi.org/10.1088/1742-6596/1897/1/012024
2. Agrawal, D. S., & Agrawal, R. (2020). FACTORS AFFECTING THE BUYER'S ONLINE SHOPPING DECISION: AN EMPIRICAL ANALYSIS. *Prestige International Journal of Management and Research*, *11*(August 2019).
3. Alamdari, P. M., Navimipour, N. J., Hosseinzadeh, M., Safaei, A. A., & Darwesh, A. (2020). A Systematic Study on the recommendation Systems in the E-Commerce. *IEEE Access*, *8*, 115694–115716. https://doi.org/10.1109/ACCESS.2020.3002803
4. Ali Abumalloh, R., Ibrahim, O., & Nilashi, M. (2020). Loyalty of young female Arabic customers towards recommendation agents: A new model for B2C E-commerce. *Technology in Society*, *61*(August 2019), 101253. https://doi.org/10.1016/j.techsoc.2020.101253
5. Alzahrani, J. (2019). The impact of e-commerce adoption on business strategy in Saudi Arabian small and medium enterprises (SMEs). *Review of Economics and Political Science*, *4*(1), 73–88. https://doi.org/10.1108/reps-10-2018-013
6. Alzoubi, H. M., Alshurideh, M. T., Kurdi, B. Al, Alhyasat, K. M. K., & Ghazal, T. M. (2022). The effect of e-payment and online shopping on sales growth: Evidence from banking industry. *International Journal of Data and Network Science*, *6*(4), 1369–1380. https://doi.org/10.5267/j.ijdns.2022.5.014
7. Babenko, V., Kulczyk, Z., Perevosova, I., Syniavska, O., & Davydova, O. (2019). Factors of the development of international e-commerce under the conditions of globalization. *SHS Web of Conferences*, *65*, 04016. https://doi.org/10.1051/shsconf/20196504016
8. Chen, M., & Liu, P. (2017). Performance evaluation of recommendation systems. *International Journal of Performability Engineering*, *13*(8), 1246–1256. https://doi.org/10.23940/ijpe.17.08.p7.12461256

9. Cornell, J. (2022, October 11). *https://www.proprofssurvey.com/blog/quantitative-data/*. Retrieved from https://www.proprofssurvey.com/: https://www.proprofssurvey.com/blog/quantitative-data/
10. Fatonah, S., Yulandari, A., & Wibowo, F. W. (2018). A Review of E-Payment System in E-Commerce. *Journal of Physics: Conference Series*, *1140*(1). https://doi.org/10.1088/1742-6596/1140/1/012033
11. Gu, Y., Ding, Z., Wang, S., Zou, L., Liu, Y., & Yin, D. (2020). Deep Multifaceted Transformers for Multi-objective Ranking in Large-Scale E-commerce recommendation Systems. *International Conference on Information and Knowledge Management, Proceedings*, 2493–2500. https://doi.org/10.1145/3340531.3412697
12. Hayashi, T., Wang, Y., Kawai, Y., & Sumiya, K. (2018). An E-commerce recommendation system using complaint data and review data. *CEUR Workshop Proceedings*, *2068*.
13. Hussien, F. T. A., Rahma, A. M. S., & Abdulwahab, H. B. (2021). An e-commerce recommendation system based on dynamic analysis of customer behavior. *Sustainability (Switzerland)*, *13*(19). https://doi.org/10.3390/su131910786
14. IBM. (2023, January 12). *https://www.ibm.com/products/spss-statistics*. Retrieved from https://www.ibm.com/: https://www.ibm.com/products/spss-statistics
15. Jain, V., Malviya, B., & Arya, S. (2021). An Overview of Electronic Commerce (e-Commerce). *Journal of Contemporary Issues in Business and Government*, *27*(3). https://doi.org/10.47750/cibg.2021.27.03.090
16. Jawaid, M., & Karim, E. (2021). Factors Affecting Consumer Buying Behavior in E-Commerce Business during Outbreak of Covid-19: A Case Study on Top E-Commerce Websites. *Munich Personal RePEc Archive*, *110476*, 25. https://mpra.ub.uni-muenchen.de/110476/
17. Karimova, F. (2016). A Survey of e-Commerce recommendation Systems. *European Scientific Journal, ESJ*, *12*(34), 75. https://doi.org/10.19044/esj.2016.v12n34p75
18. Lah, U., Lewis, J. R., & Šumak, B. (2020). Perceived Usability and the Modified Technology Acceptance Model. *International Journal of Human-Computer Interaction*, *36*(13), 1216–1230. https://doi.org/10.1080/10447318.2020.1727262
19. Mao, M., Lu, J., Han, J., & Zhang, G. (2019). Multiobjective e-commerce

recommendations based on hypergraph ranking. *Information Sciences*, *471*, 269–287. https://doi.org/10.1016/j.ins.2018.07.029

20. Martínez-López, F. J., Esteban-Millat, I., Argila, A., & Rejón-Guardia, F. (2015). Consumers' psychological outcomes linked to the use of an online store's recommendation system. *Internet Research*, *25*(4), 562–588. https://doi.org/10.1108/IntR-01-2014-0033
21. Natour, W. Al. (2019). Critical Factors in the Development and Introduction of E-commerce : A Critical Factors in the Development and Introduction of E-commerce : A Global Approach Walid Al Natour Cardiff University This dissertation is submitted in partial fulfilment of the re. *Cardiff University*, *December*. https://doi.org/10.13140/RG.2.2.21983.61600
22. Pathak, C. (2020). *Abstract Title DIGITAL ECOMMERCE A case study of Daraz online shopping store in Nepal*.
23. Prassas, G., & Pramataris, K. (2001). A recommendation System for Online Shopping Based on Past Customer Behaviour. *E-Everything: E-Commerce, e-Government, e-Household, e-Democracy*, *EP 27046*, 766–782. http://ecenter.fov.uni-mb.si/proceedings.nsf/0/1ae52d3e68074686c1256e9f00326308/$file/49_prassas.pdf
24. Roudposhti, V. M., Nilashi, M. hrbakhsh, Mardani, A., Streimikiene, D., Samad, S., & Ibrahim, O. (2018). A new model for customer purchase intention in e-commerce recommendation agents. *Journal of International Studies*, *11*(4), 237–253. https://doi.org/10.14254/2071-8330.2018/11-4/17
25. Santos, V. F. dos, Sabino, L. R., Morais, G. M., & Goncalves, C. A. (2017). E-Commerce: A Short History Follow-up on Possible Trends. *International Journal of Business Administration*, *8*(7), 130. https://doi.org/10.5430/ijba.v8n7p130
26. Scholz, M., Dorner, V., Schryen, G., & Benlian, A. (2017). A configuration-based recommendation system for supporting e-commerce decisions. *European Journal of Operational Research*, *259*(1), 205–215. https://doi.org/10.1016/j.ejor.2016.09.057
27. Shoja, B. M., & Tabrizi, N. (2019). Customer Reviews Analysis With Deep Neural Networks for E-Commerce recommendation Systems. *IEEE Access*, *7*, 119121–119130. https://doi.org/10.1109/ACCESS.2019.2937518
28. Srivastava, A., Bala, P. K., & Kumar, B. (2020). New perspectives on gray sheep

behavior in E-commerce recommendations. *Journal of Retailing and Consumer Services*, *53*(February), 101764. https://doi.org/10.1016/j.jretconser.2019.02.018

29. SurveyMonkey. (2023, January 20). *https://www.surveymonkey.com*. Retrieved from https://www.surveymonkey.com/mp/survey-question-types/#multiple-choice: https://www.surveymonkey.com/mp/survey-question-types/#multiple-choice
30. Vaidya, R. (2019). Online Shopping in Nepal: Preferences and Problems. *Journal of Nepalese Business Studies*, *12*(1), 71–86. https://doi.org/10.3126/jnbs.v12i1.28184
31. Wang, C. D., Deng, Z. H., Lai, J. H., & Yu, P. S. (2019). Serendipitous recommendation in e-commerce using innovator-based collaborative filtering. *IEEE Transactions on Cybernetics*, *49*(7), 2678–2692. https://doi.org/10.1109/TCYB.2018.2841924
32. Wijaya, I. W. R., & Mudjahidin. (2021). Development of conceptual model to increase customer interest using recommendation system in e-commerce. *Procedia Computer Science*, *197*(2021), 727–733. https://doi.org/10.1016/j.procs.2021.12.194
33. Ying, Z., Caixia, C., Wen, G., & Xiaogang, L. (2018). Impact of recommendation systems on unplanned purchase behaviours in e-commerce. *2018 5th International Conference on Industrial Engineering and Applications, ICIEA 2018*, *1*, 21–30. https://doi.org/10.1109/IEA.2018.8387066
34. Zhao, X. (2019). A study on E-commerce recommendation system based on big data. *2019 IEEE 4th International Conference on Cloud Computing and Big Data Analytics, ICCCBDA 2019*, *1*, 222–226. https://doi.org/10.1109/ICCCBDA.2019.8725694
35. Zhou, M., Ding, Z., Tang, J., & Yin, D. (2018). *Micro Behaviors*. 727–735. https://doi.org/10.1145/3159652.3159671