IDENTIFYING THE MOST IMPORTANT FACTOR MOTIVATING NEPALESE CUSTOMERS TO USE CHATBOTS: AN ANALYTIC HIERARCHY PROCESS APPROACH

Undergraduate Business Research Project Report (RES 450)

In partial fulfillment of the requirements of the degree of

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Submitted To:

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DECLARATION

I, Abhishek Byanjankar, declare that the research project entitled "Identifying the Most Important Factor Motivating Nepalese Customers to Use Chatbots: An Analytic Hierarchy Process Approach" submitted to Kathmandu University is my original research carried out in the year 2024. It is done in partial fulfillment of the requirements for Bachelor of Business Information Systems (BBIS) under the supervision of Dr. Prabal Sapkota, Assistant Professor of Department of Management Informatics and Communication, KUSOM. It has not been submitted to any other institutions for any degree.

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LIST OF ABBREVIATIONS

AHP: Analytic Hierarchy Process

MCDM: Multi-Criterion Decision Making

CR: Consistency Ratio

CI: Consistency Index

ABSTRACT

Digital transformation has fundamentally changed the way we do business. Many companies have adopted new technologies to streamline operations, increase profitability, maintain a competitive advantage, and enhance customer experience. In line with this, interest in chatbots is growing, as these machine agents function as natural language user interfaces for service providers. Chatbots are believed to enhance customer satisfaction and operational efficiency. However, there is no definitive factor that motivates customers to use chatbots. This uncertainty also applies to the Nepalese context, where businesses offering chatbot services are unaware of the main reasons customers use them. Companies are unsure about upgrading their chatbot services, as several factors and subfactors influence their use. This research aims to identify and rank the factors and subfactors that motivate Nepalese customers to use chatbots. These findings can help chatbot service providers address areas where their chatbots need improvement. This is a true case of multi-criteria decision-making (MCDM), and the Analytic Hierarchy Process (AHP) has been adopted in this study.

Keywords: *Chatbot, E-Commerce, Customer Service, Multi-Criterion Decision Making (MCDM), AHP; Nepal*

INTRODUCTION

Over the past 20 years, internet media, particularly Social Networking Sites (SNS), have driven innovation in e-Commerce (Evert, Brahim, & Karolien, 2019). Electronic commerce or e-commerce is defined as the telecommunication networks' usage for buying/selling or exchanging information among the organization and its external stakeholders (Chaffey, 2007).

E-commerce has transformed customer behavior by providing a wide product range with ease (Evert, Brahim, & Karolien, 2019). This has been possible due to the widespread use of websites and the internet, leading to the digital revolution. (Jahan & Martin, 2019; Lata & Kumar, 2021a).

Companies can remain competitive in this information era through electronic commerce. They can enter new markets, increase the speed of growing their business, increase the flexibility of their commercial policies, cut their expenses like provisioning, sales and advertising and also simplify their procedures (Kumar & Ayodeji., 2021). It is considered a cost-effective way for organizations to communicate with consumers, and in recent years, its role has significantly increased in the consumer goods segment, especially in specialized retail (Blazenka et al., 202l; Yang and Grice 2018).

The development of the internet and the penetration of the internet within ordinary people increased the popularity of online purchasing. E-commerce has grown significantly driven by enhancing infrastructure, growing internet penetration and moreover the increasing number of shoppers online (Kamel, 2015; El Ahmar et al., 2016; Shereen & Marwa, 2011) due to the COVID-19 pandemic, where people embraced social distancing and turned to online shopping more than earlier (Lokman et al., 2022).

The growth of internet and e-commerce can be seen in Nepal as well. Before COVID-19, there were 10.21 million internet users in Nepal which reached 11.51 million after the pandemic. At the start of 2024, there were 15.40 million internet users in Nepal while the internet penetration rate stood at 49.6 percent (Kemp, 2024).

Given the fast-growing and increasing importance of the internet in Nepal, we can see numerous e-commerce companies rising to 40,000+ registered companies (Top 5 E-Commerce Sites in Nepal - OnlineKhabar English News, 2021), which also gives rise to the need for more academic research to identify factors contributing to success and growth in this sector.

The success of e-commerce in Nepal, such as HamroBazar, Jeevee, Thulo, Dealayo, Kunyo, Meroshopping.com, Smartdoko, Muncha, etc. refer to the widespread acceptance of use of e-commerce shopping among consumers. Due to the fierce competition with international brands directly such as Daraz, Flipkart, and indirectly with Amazon, Lazada, etc. ecommerce platforms should ensure to provide a better experience for online shoppers and overall add more value proposition attraction than their competitors (Cao, 2014).

Customer satisfaction plays an important role in commerce. Customers interact with salespersons, saving time. They receive advice from them which often makes customers feel valued and also ease purchasing procedures (Holzwarth et al.,2006). This gives a requirement for salespersons and brand associates to be courteous, helpful and trustworthy. This ensures that customer interactions are positive (Dabholkar, Thorpe, & Rentz, 1996).

Technology and particularly social media can be used for casual interactions with customers to provide information and build and strengthen customer relationships (Kim & Ko, 2010). Virtual service agents have come into play due to this and interactions with virtual service

agents are similar to real world human agents in terms of saving time, gathering advice, or even gaining parasocial benefits (Holzwarth et al., 2006).

However, customer service can miss the human touch and be impersonal and irritating in the digital world. Furthermore, issues related to security, quality, assurance and right information may arise which needs to be addressed by e-commerce platforms to provide total customer satisfaction (Hwang & Kim, 2007).

Chatbots are an innovative answer to such issues. They offer instant support, personalized recommendations and also automate the transaction process. One of the most fundamental and popular examples of Artificial Intelligence (AI) systems and intelligent Human-Computer Interaction (HCI) is the chatbot (Bansal & Khan, 2018). Chatbots are widely known as smartbots, interactive agents, artificial conversation entities and digital assistants.

Chatbots are personalized, to the point, and all knowing, due to its features like customer tracking, big data and machine learning and has the capacity to do many things provide personalized support for many customers at once, recommend products and services, and assist during and after a sale; all without the need of humans (Kate & Glavas, 2017). The American Research Firm Gartner (2018) predicted that by 2020 only 25% of customer interactions will be managed by humans, the rest 85% through chatbots and virtual assistants.

Chatbots help enhance customer service as they can guide customers through their shopping journey, answer queries about products, facilitate secure transactions and optimize the checkout process (Soni & Dubey, 2024).

Facebook is a popular social networking site that is widely used for chatbots. They are used for performing transactions or services rather than communicating with the users. Facebook

Messenger chatbots perform functions such as providing statistics around a sports match, or creating a music playlist or even giving Smart Replies like informing about business hours or making a reservation without leaving the chat window. Thus, chatbots act as a secretary rather than just communicating with users (Adamopoulou & Moussiades, 2020).

***Table 1**: Attributes of an E-Commerce Chatbots*

Factors	**Sub-Factors**	**References**
Responsiveness	x	(Nordheim, 2018) (Corritore et al., 2005) (Yun J and Park J, 2022)
Technology	Ease of Use Expertise Predictability	(Nordheim, 2018) (Corritore et al., 2005)
Credibility	Honesty Trust Reputation	(Nordheim, 2018) (Corritore et al., 2005)
Risk	x	(Nordheim, 2018) (Corritore et al., 2005) (Ischen, C., Araujo, T., Voorveld, H., van Noort, G., & Smit, E. (2020)

RESEARCH METHODOLOGY

This study uses the Analytical Hierarchy Process (AHP) technique to address the complicated issue of enhancing customer service in e-commerce businesses through the implementation of chatbots. Multi Criteria Decision Making (MCDM) technique outperforms other methods due to its capacity to effectively address decision-making problems involving several dimensions (Wang et al., 2021; Li & Sun, 2020). AHP is used to discover the significant factors and sub-criteria that impact the preference of chatbots in e-commerce among Nepali customers. Analytical Hierarchy Process determines the weight of criteria and the ranking is determined through the use of the aggregated weighted scores technique.

The main objective of the research is to identify the key characteristics for evaluating chatbots by conducting a literature review. Furthermore, the process involves measuring the relative weight and relevance of each factor in order to evaluate and prioritize them. Hence, the AHP approach is employed to determine the impact of chatbots on customer service in e-commerce and to establish their ranking.

Research Design

This study has adopted three tools in addition to literature review which include a questionnaire, 1-on-1 interview and model development using AHP. The steps followed during the research work are shown in the research framework in Figure 1.

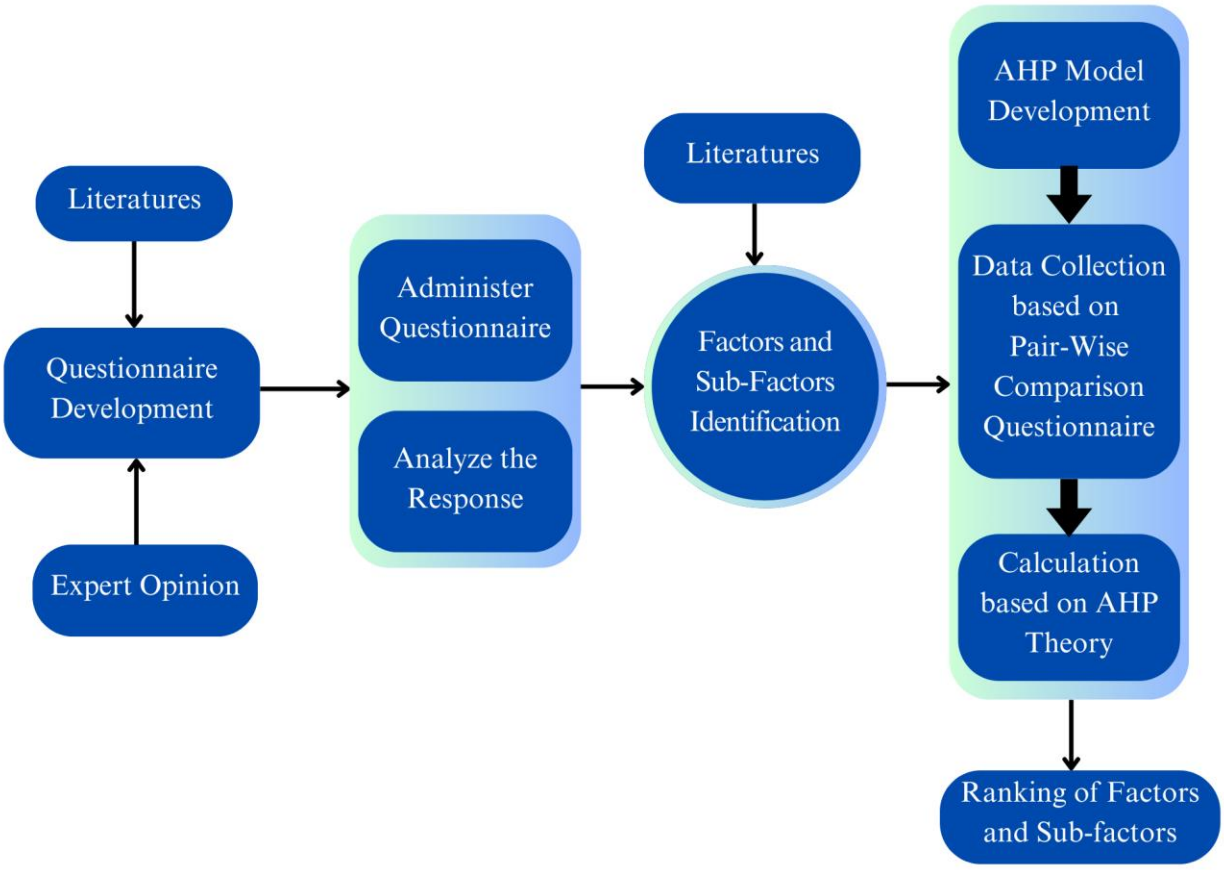

Figure 1: *Research Framework*

A group of experts from four different areas has been formed. The group consists of AI Developers (2); Software Developers (3); Game Developer (1); and with IT/Management background (2). All the group members have Graduate degrees and more than a year of work experience in the respective fields.

Analytic Hierarchy Process (AHP)

AHP method was developed by Saaty (1980). This technique is considered as one of the widely used MCDM techniques (Saaty, 2013). Where AHP is a systematic procedure to solve MCDM problems (Torfi et al., 2010), and an effective method for decision making mainly in the existence of subjectivity and it is appropriate for solving problems when the decision criteria can be structured in a hierarchical way into sub-criteria (Ishizaka & Labib, 2011). Then the prioritization mechanism is executed by giving out a number from a comparison scale as seen in Table 2 to represent the importance of the relative factor, which is used to choose among the available alternatives, based on performing pairwise comparisons for deriving the importance of the relative selected variables (Wang et al., 2021; Li & Sun, 2020). Therefore, AHP is based on three principles: the model structure, a comparative judgment of the criteria, sub-criteria, alternatives, and priorities synthesis.

Step One: Identification of the factors, and building problem' structures

The main aim of this step is to finalize a list of the criteria that are essential to understand the chatbots effect on the customer service in e-commerce in Nepal. In this step, the literature review was conducted through which the factors were chosen and the determining of the factors, and sub-factors was done. Moreover, the survey was conducted where 65 respondents were involved in gathering the factors and ranked them accordingly. Then the factors and sub-factors were identified. According to the literature review and the opinion of respondents, 4 main factors and 6 sub-factors were identified.

At that point, the problem was structured in a hierarchical manner (Gupta et al., 2017). Initially, AHP divides a complex problem with multi-criteria decision making into interrelated decision elements in a hierarchical structure (Factors, sub- factors, decision alternatives) (Albayrak

& Erensal, 2004). In the AHP, the objectives, factors, sub-factors, and alternatives are arranged in a hierarchical way like a tree. There are usually three levels in a hierarchy: the top represents the problem goal, the middle has many factors with their sub-factors (if they exist), and at the end decision alternatives ((Albayrak & Erensal, 2004). In the study, the goal is to know the Nepalese Customer Perception towards Chatbots. In the hierarchical structure, the study goal is located at level one. Level 2 consists of the main factors [Responsiveness, Technology, Credibility and Risk] and Level 3 includes the sub-criteria [Ease of Use, Expertise, Predictability, Honesty, Trust and Reputation]. The hierarchical structure is shown in Figure 2.

Step Two: Data collection from field experts:

In this step, the data of factor and sub-factor pertaining to pairwise comparisons are collected from field experts. Seven Field experts were contacted to get their opinion on all the factors and sub-factors that influence customer satisfaction with use of Chatbots in E-commerce in Nepal. The nine-point scale (Saaty, 1988) was used to give relative scores to pairwise comparisons among different criteria from Table 4.

Step Three: The determination of the normalized priority weights,

In this step each criterion and sub-criterion is calculated as follows:

1) Pairwise comparison matrices' construction. The pairwise comparisons are done to determine which factor predominates the others. These judgements are presented as integers. In AHP, it is possible to assume a set of criteria as

$$A = \{A_{ij} / j = 1,2,3, \ldots\ldots, n\}.$$

Following pairwise comparison among "n" (n= number of factors being compared) factors, a (n x n) dimension matrix A is formed in which each component, A= [a_{ij}], represents the factors' weight given by the experts.

2) Aggregate comparison matrix' construction: All data collected from experts for pairwise comparisons for all criteria and sub-criteria are aggregated by applying the geometric mean method to get the aggregated judgment for each entry (Gupta et al., 2017). The aggregated matrix A is constructed as follows:

$$A = \begin{bmatrix} a11 & a12 & \dots & a1n \\ a21 & a22 & \dots & a2n \\ . & . & . & . \\ an1 & an2 & \dots & ann \end{bmatrix}, \; a_{ij} = 1, \; a_{ji} = 1/\, a_{ij}, \; a_{ij \neq 0.}$$

(1)

3) Relative weights' calculation, A normalized matrix N is constructed (by equation 2) for calculating the priorities of each factor and sub-factor. Equation 2.

$$N = [n_i], \text{ where } n_{ij} = \frac{aij}{\sum_{i=1}^{n} aij}$$

(2)

Then, the corresponding weights to all factors and sub-factor are calculated by averaging the elements of each row of N.

- Calculating the Priority Vector

$$W_i = \frac{\sum_{j=1}^{n} nij}{n}$$

(3)

4) Checking the consistencies. Given that it is well-known that people are sometimes inconsistent when answering questions, it is crucial to determine the consistency levels for the comparison matrices (Gupta et al., 2017). In order to calculate the accuracy level, the Consistency Ratio (CR) is used for measuring pair-wise comparison consistency (Gupta et al., 2017). The acceptance limit for CR is less than or equal to 0.1. If the final consistency ratio exceeds 0.1, the evaluation process has to be reviewed again by the decision maker to improve consistency (Saaty, 1988). Matrix A can be considered consistent if:

$$AW = nW$$

(4)

The Eigenvalue problem exists in equation 3, which is supposed that the biggest Eigenvalue is >= to n (Saaty, 1988; Gupta et al., 2017). The closer max is to n, matrix A is more consistent. And the next step represents the calculation of CR corresponding to a comparison matrix A for consistency checking:

$$AW = \lambda_{max} W$$

(5)

5) The calculation of CR as follows:

$$\mathrm{CR} = \frac{CI}{RI} \tag{6}$$

Matrix A has rank 1 and λ_{max} = n, if the pairwise comparisons are entirely consistent. In this case, normalizing any of the matrix's rows or columns can be done for obtaining the weights (Liu, 2017; Li & Sun 2020). It should be emphasized that the AHP output quality is rigidly related to pairwise comparison consistency judgements (Gupta et al., 2017). The relationship between the entries of matrix A is the definition of consistency which can be calculated by (the consistency index (CI)):

$$\mathrm{CI} = \frac{\lambda\mathrm{max} - n}{n-1} \tag{7}$$

The final consistency ratio (CR), applied for determining if the assessments are sufficiently consistent, can be computed by the (CI) ratio and the random index (RI), as shown in equation (6).

The global weights calculation. From equation 3, local weights for the main factor and sub-factor are obtained. Then, the overall or global weights for sub-factors are computed by equation 8, while the global weights for the main criteria are the same as their local weights.

Global weight of sub-factor = Local weight of the sub-factor x Global weight of the corresponding main factor **(8)**

Table 2: *Random Consistency Index Table (Saaty, 1980)*

n	1	2	3	4	5	6	7	8	9	10	11	12	13
RI	**0**	**0**	**0.58**	**0.90**	**1.12**	**1.24**	**1.32**	**1.41**	**1.45**	**1.49**	**1.51**	**1.58**	**1.56**

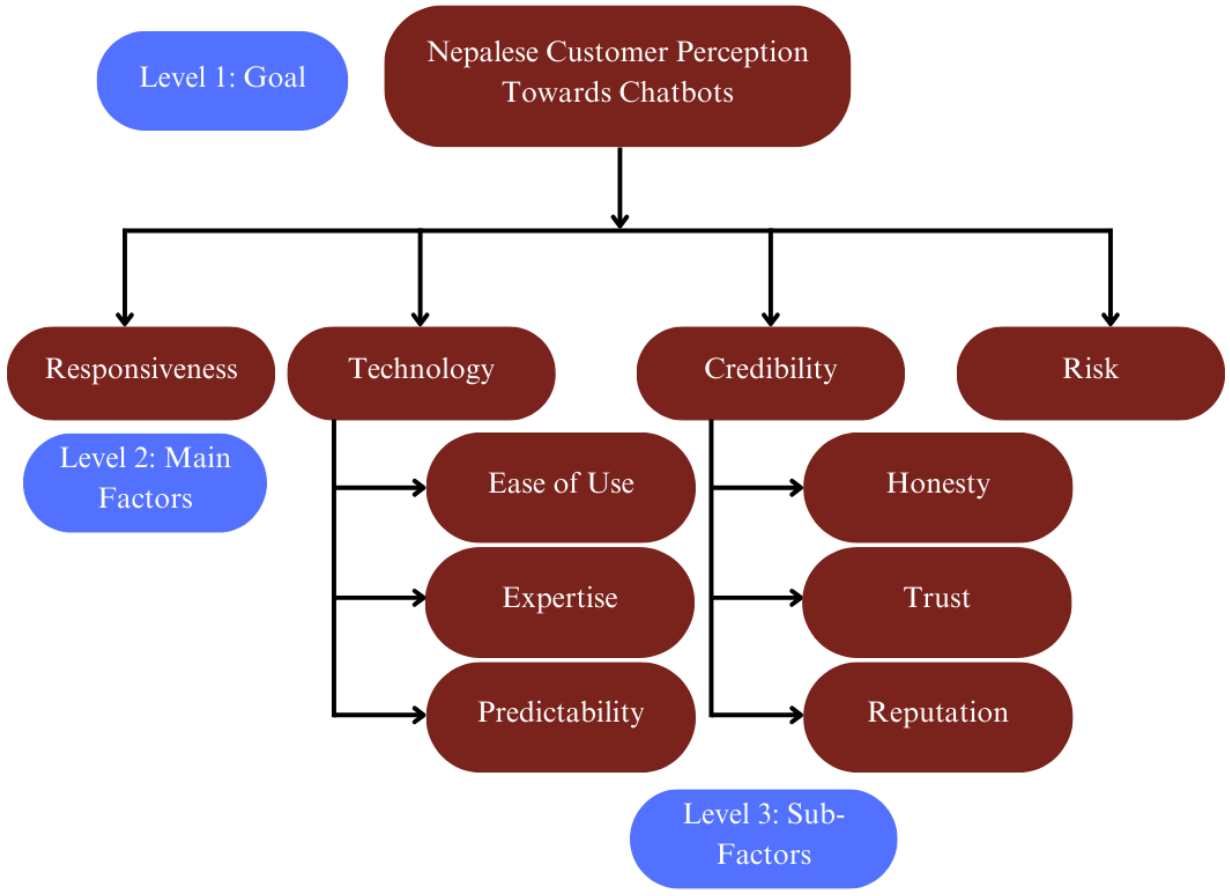

Figure 2: *Factors and Sub-factors in Tree Structure*

DATA COLLECTION AND ANALYSIS

For this study, a AHP questionnaire was prepared with four factors affecting the customer decision making process regarding the use of Chatbots in e-commerce sites.

Table 3: *The Nine-point Intensity of Importance Scale and its Explanation*

Intensity if Importance	Definition	Explanation
1	Equal Importance	Two Objectives contribute equally to the Objective
2	Weak or slight	
3	Moderate Importance	Experience and judgement slightly favor one Objective over another
4	Moderate Plus	
5	Strong Importance	Experience and judgement strongly favor one Objective over another
6	Strong Plus	
7	Very Strong Importance	An Objective is favored very strongly over another
8	Very, Very Strong	
9	Extreme Importance	Favoring one Objective over another is of the highest possible order of affirmation

The questionnaire was filled out by respondents under the pairwise comparison scale. The respondent provides his/her response at only one side of the diagonal as the value on the other side depicts the inverse of the former.

The data analysis is done through Microsoft Office Excel 365. The inconsistency that might arise out of the subjective preferences in dealing with customer choices should not exceed 0.10.

AHP Results

All the data gathered was evaluated by the Microsoft Excel Office 365. The experts' responses were collected in the pairwise comparisons for numerous criteria and sub-criteria were consolidated by applying the method of the geometric mean. The calculated geometric mean values were organized into a matrix. A sample matrix was developed during the calculations, as shown in Table 4. The entire calculation of comparison matrices, weights, and consistency tests for each of the hierarchical model's main criteria and sub-criteria are represented in Appendix A. The findings indicated that all the consistency ratio (CR) values smaller than 0.10, indicate toward the consistency of the comparison matrices, and as an outcome, the computed weights can be accepted.

Table 4: *Pair wise comparison of factors with respect to the goal*

	Responsiveness	Technology	Credibility	Risk
Responsiveness	1	1.01	0.75	1.21
Technology	0.98	1	0.74	1.19
Credibility	1.33	1.34	1	1.61
Risk	0.82	0.83	0.62	1

Main-Factors Weights

Following the transformation of the problem into a hierarchical structure, the weight of the four main factors (Responsiveness, Technology, Credibility and Risk) was selected. By computing the pairwise matrix, the key factors weights have been determined as shown in Figure 3. It can be identified that among the four main factors, the credibility criterion (Weight = 32%) occupies the most crucial success aspect in strengthening the customer's point of view while implementing chatbots in Nepalese E-commerce sites.

The second highest weight is responsiveness (Weight = 24%) with less than 8% of the weight of the credibility criteria. The third factor in the sequence is technology, which earned 24% weight, followed in accordance by the Risk (Weight = 19%).

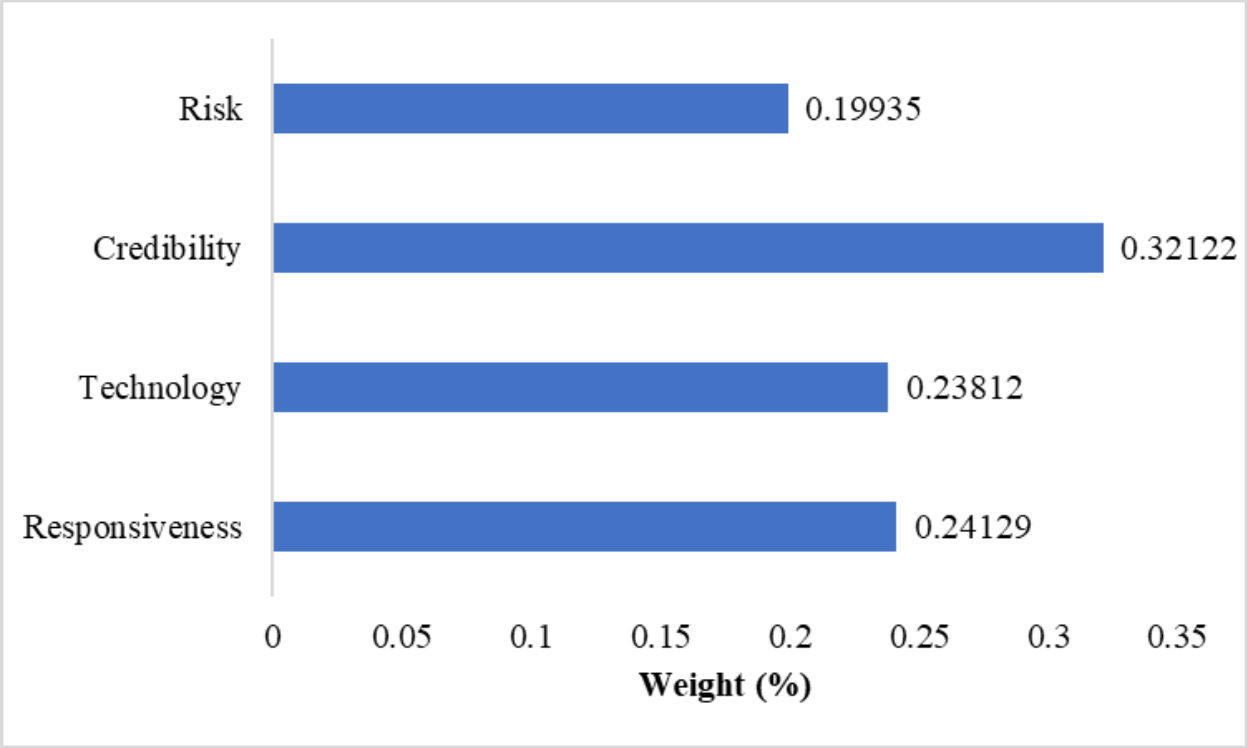

Figure 3: *The result of e-commerce chatbots factor with respect to the goal*

Technology Weights

Also, following computation of the main factor weights, the sub-factor weights were also computed through the comparable methods as used in the main factor weights' calculation. Construction of five paired matrices was done for each main factor. By these matrices' an approach solving the weights of sub-factor with regard to their respective main factors was reached. The comparison of pairwise for each sub-factor associated with the "Technology" factor indicates that the sub-factor Ease of use has the highest weight of 10.9%. This conclusion is consistent with (Hasan, 2016; Luo et al., 2012; Mithas et al., 2007; Chang & Chen, 2009) that the customers address their initial experience with the via the web interface of the e-store. Accordingly, the ease

of use and design aspects have influence on consumers' opinions and perspectives (Hasan, 2016). The second sub-factor predictability has the weight of 7.2% while expertise has 5.59%.

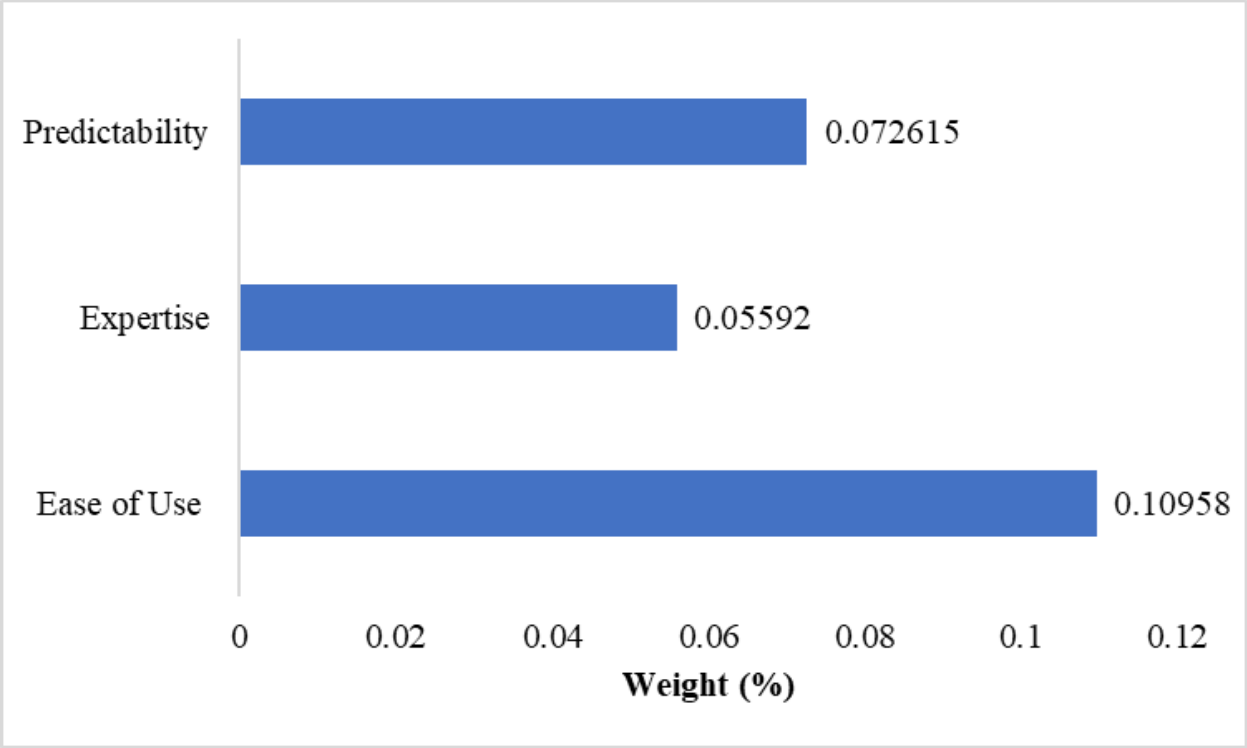

Figure 4: *The sub-factor results with the respect to the Technology*

Credibility Weights

The top three sub-factors for the major factor "credibility" as evaluated by the AHP approach, are Honesty, Trust and Reputation. The weights of the sub-factor with regard to the credibility can be seen in Figure 5. The Honesty sub-factor obtained 11.97% of the weight, which is the highest one achieved under the credibility factor. The Trust sub-factor obtained 11.96%, while Reputation had the lowest weight of 8.18%.

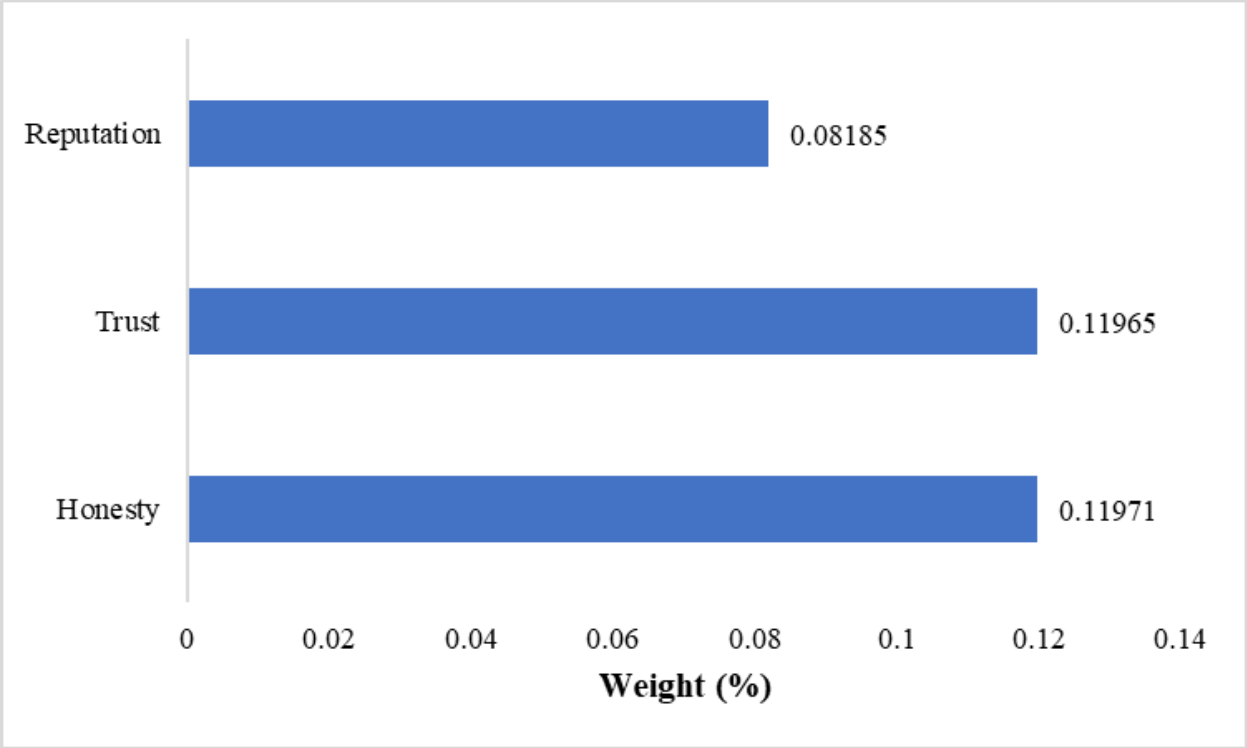

Figure 5: *The sub-factor results with the respect to the Credibility*

Final Ranking of Overall Factors

During the last stage, we computed the final weights of the sub-factor after determining the weights of the major factor and sub-factors in relation to the main factor. The computations were done by multiplying the original sub-factor weights with their corresponding weights of the main factor. Table 5 displays the ultimate weights of the sub-factor and their overall order. The honesty sub-factor scored as the most essential among 6 sub-factors. In contrast, the Expertise sub-factor had the least impact. The sensible reason behind the low ranking of the sub-factor may be that the customers want to have chatbots that are simple to use, truthful integrity, reputed among the chatbots, and due to this many e-commerce sites have really started to utilize chatbots.

Table 5: *Final weights of overall chatbots factors*

Main Factor	Main Factor Weight	Sub-Factor	Sub-Factor Initial Weights	Sub-Factor Global Weights
Responsiveness	0.2412			
Technology	0.2381	Ease of Use	0.4601	0.1095
		Expertise	0.2348	0.0559
		Predictability	0.3049	0.0726
Credibility	0.3212	Honesty	0.3726	0.1197
		Trust	0.3724	0.1196
		Reputation	0.2548	0.0818
Risk	0.1993			

CONCLUSION

The main objective of the paper is to analyze the impact of chatbots on customers in the growing e-commerce landscape of Nepal.

The findings state that credibility is the most important factor for respondents among the four important factors identified for the chatbot's impact on customers.

Though the findings of the research are subjective as it is based on the judgment of a selected few people, the developed model is applicable and useful in most cases. Additionally, this model will be useful in conducting stakeholder analysis and risk analysis during project development and implementation.

LIMITATIONS

This paper has some limitations. The sample size used is small, and the method relies on subjective judgements from the respondents. Since only a select few people were respondents, the weights assigned to the decision-makers may reflect the opinions of a limited group. Inconsistent input from a single respondent can affect the overall rankings of factors and subfactors. Additionally, the same model may not be applicable to all e-commerce sectors in Nepal and may not be suitable for other organizations dealing with different aspects.

REFERENCES

Adamopoulou, E., & Moussiades, L. (2020, December 15). chatbots: History, technology, and applications. Machine Learning with Applications, Volume 2. https://doi.org/10.1016/j.mlwa.2020.100006

Albayrak E, Erensal YC, (2004), Using analytic hierarchy process (AHP) to improve human performance: An application of multiple criteria decision-making problem, Journal of intelligent manufacturing. 15(4), 491-503

Bansal, H., & Khan, R. (2018). A Review Paper on Human Computer Interaction. International Journals of Advanced Research in Computer Science and Software Engineering, 8(4), 56. doi:10.23956/ijarcsse.v8i4.630

Blazenka K., Petra S., & Eva P. (2021), Differentiation of E-commerce Consumer Approach by Product Categories, Journal of Logistics, Informatic and Service Science, 8(1), 1-19

Cao, L. (2014). business model transformation in moving to a cross-channel retail strategy: a case study. International Journal of Electronic Commerce, 18(4), 69-96

Chaffey D. (2007), E-business and E-commerce Management: Strategy, Implementation and Practice. *Pearson Education*

Chang, H. H., & Chen, S. W. (2009), Consumer perception of interface quality, security, and loyalty in electronic commerce. Information & Management, 46(7)411-417

Dabholkar, P. A., Thorpe, D. I., & Rentz, J. O. (1996). A measure of service quality for retail stores: Scale development and validation. Journal of the Academy of Marketing Science, 24(1), 3.

Dubey, S. and Soni, A. (2024) *Study of security in privacy and Intelligent Library Service by IOT based on Cloud Computing Smart Libraries.*, *NATURALISTA CAMPANO*.

El Ahmar P, Oatley G, Tantawi P. (2016), government regulations and online shopping behavior: An exploratory study on Egyptian online consumers. The Business and Management review, 7(2):134-44.

Evert, V. d., Brahim, Z., & Karolien, P. (2019). Chatbot Advertising Effectiveness: when does the message get through? doi:10.1016/j.chb.2019.04.009

Gupta KP, Bhaskar P, Singh S. (2017), Prioritization of factors influencing employee adoption of e-government using the analytic hierarchy process. *Journal of Systems and Information Technology*.

Holzwarth, M., Janiszewski, C., & Neumann, M. M. (2006). The influence of avatars on online consumer shopping behavior. Journal of Marketing, 70(4), 19–36.

Hwang, Y., & Kim, D. J. (2007). Customer self-service systems: The effects of perceived web quality with service contents on enjoyment, anxiety, and e-trust. Decision Support Systems, 43(3), 746–760.

Ischen, C., Araujo, T., Voorveld, H., van Noort, G., & Smit, E. (2020). Privacy concerns in chatbot interactions. In A. Følstad, T. Araujo, S. Papadopoulos, EL-C. Law, O-C. Granmo, E. Luger, & P. B. Brandtzaeg (Eds.), Chatbot Research and Design: Third International Workshop, CONVERSATIONS 2019, Amsterdam, The Netherlands, November 19–20, 2019 : revised selected papers (pp. 34-48). (Lecture Notes in Computer Science; Vol. 11970). Springer. https://doi.org/10.1007/978-3-030-39540-7_3

Ishizaka A, Labib A. (2011), Review of the main developments in the analytic hierarchy process. Expert systems with applications, 38(11), 14336-45

Jahan, M. S., & Martin, M. P. (2019). Exploring the Value of Your Website Analytics. EPRA International Journal of Economic and Business Review, 4(2), 66-69.

Kamel, S. (2015), Electronic Commerce Challenges and Opportunities for emerging Economies: Case of egypt. CONF-IRM 2015 Proceedings. 37. Retrieved from: https://aisel.aisnet.org/confirm2015/37

Kate, L., & Glavas, C. (2017, March 17). Embracing the bots: how direct to consumer advertising is about to change forever. Retrieved from the conversation: https://theconversation.com/embracing-the-bots-how-direct-to-consumer-advertising-is-about-to-change-forever-70592

Kemp, S. (2024). *Digital 2024: Nepal*. Kepios. https://datareportal.com/reports/digital-2024-nepal

Kim, A. J., & Ko, E. (2010). Impacts of luxury fashion brand's social media marketing on customer relationship and purchase intention. Journal of Global Fashion Marketing, 1(3), 164–171.

Kumar, V., & Ayodeji, O. G. (2021). E-retail factors for customer activation and retention: An empirical study from Indian e-commerce customers. Journal of Retailing and Consumer Services, Volume 59, March 2021, P.102399.

Li R, Sun T. (2020), Assessing factors for designing a successful B2C E-Commerce website using fuzzy AHP and TOPSIS-Grey methodology, Symmetry, 12(3)

Liu, W., Batra, R., Wang, H., (2017). Product touch and consumers' online and offline buying: the role of mental representation. J. Retail, 93(3), 369-381.

Lokman H., Amy H., Hui-Ngo G. (2022), Click Analysis: How E-commerce Companies Benefit from Exploratory and Association Rule Mining, Journal of System and Management Sciences, 12(5), 36-56

Luo, J., Ba, S., Zhang, H. (2012), Evaluation of E-Commerce Websites: An Integrated Approach under a Single-Valued Trapezoidal Neutrosophic Environment. Knowledge Based Systems, 44-59

Mithas, S., Ramasubbu, N., Krishnan, M. S., & Fornell, C. (2007), Designing web sites for Customer loyalty across business domains: a multilevel analysis, Journal of Management Information Systems, 23(3), 97-127

Morsi, Journal of System and Management Sciences, Vol. 13 (2023) No. 1, pp. 218-240

Nordheim, C. B. (2018). Trust in chatbots for customer service – findings from a questionnaire study .

Saaty, T. L. (2008). Decision making with the Analytic Hierarchy Process. International Journal of Services Sciences, 1(1), 83-98, doi: http://dx.doi.org/10.1504/IJSSSCI.2008.017590

Saaty, T. L., (2013), Analytic hierarchy process. In: Encyclopedia of Operations Research and Management Science. Springer, Boston, MA, 52-64

Saaty, T.L., (1988), What is the analytic hierarchy process? In: Mathematical Models for Decision Support. Springer, *Berlin, Heidelberg*, 109–121

Shereen M., Marwa T. (2011), Using System Dynamics Approach to Analyze Factors restraining E-Commerce Growth in Egyptian firms, Journal of Business Studies & Statista, (2022) Fashion - Egypt, Statista: The Statistics Portal

Top 5 e-commerce sites in Nepal - OnlineKhabar English News. (2021, January 23). Onlinekhabar English. Retrieved November 5, 2024, from https://english.onlinekhabar.com/top-e-commerce-sites-in-nepal.html

Torfi F, Farahani RZ, Rezapour S. (2010), Fuzzy AHP to determine the relative weights of evaluation criteria and Fuzzy TOPSIS to rank the alternatives. Applied soft computing, 10(2)

Wang CN, Nguyen NA, Dang TT, Lu CM. (2021), A compromised decision-making approach to third-party logistics selection in sustainable supply chain using fuzzy AHP and fuzzy VIKOR methods. Mathematics. Vol. Apr 16, (9)

Yang, D. & Grice, S. (2018). Research on the Design of E-commerce Recommendation System. International Journal of Smart Business and Technology, 6(1), 15-30. 10.21742/IJSBT.2018.6.1.02.

Yun J and Park J (2022) The Effects of Chatbot Service Recovery With Emotion Words on Customer Satisfaction, Repurchase Intention, and Positive Word-Of-Mouth. Front. Psychol. 13:922503. doi: 10.3389/fpsyg.2022.922503