Customer Adoption of Chat GPT for Web Development and Programming in the Zimbabwe Tech Industry

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Abstract

In Zimbabwe, 60% of programmers in the IT sector express concerns about the user interface (UI) and user experience (UX) design of the web development systems they use. Additionally, 70% of the country's IT sector faces challenges that affect service quality due to software bugs and inadequate web development protocols. According to the Zimbabwe Investment and Development Agency (ZIDA), developers introduce approximately 70 bugs per 1,000 lines of code, with bug fixes taking significantly longer than initial coding efforts, leading to substantial costs for companies. This research aims to analyze the factors influencing customer adoption of ChatGPT in web development by utilizing the DeLone and McLean Success Model as a theoretical framework.

Using IBM SPSS software for data analysis, 30 tech individuals who use ChatGPT for web development were surveyed. The pilot test confirmed the validity and reliability of the tool, which comprises 7 variables and 30 items, making it suitable for further research.

Keywords: ChatGPT adoption, DeLone and McLean Success Model, Web development

1. Introduction

ChatGPT, a groundbreaking language model developed by OpenAI, represents a significant advancement in conversational AI. As a sibling model to InstructGPT (AI C. O., 2023), which excels at following instructions in prompts, ChatGPT is specifically designed for dialogue. This specialization is achieved through Reinforcement Learning with Human Feedback (RLHF), a sophisticated technique that uses preference comparisons and human demonstrations to fine-tune the model's behavior (AI C. O., 2023).

The Zimbabwe Information Technology Authority (ZIDA) conducted an in-depth examination of reviews from prominent software systems widely utilized by developers in the field of web programming. According to ZIDA's findings, a significant 60% of programmers in the Zimbabwean IT sector expressed concerns related to the user interface (UI) and user experience (UX) design of the software systems they use. The analyses underscored that ineffective UI/UX design can precipitate confusion, frustration, and a notable reduction in overall user satisfaction. The impact of a suboptimal interface extends beyond mere

*Proceedings of The 3ⁿᵈ Adpebi International Conference on Management, Education, Social Science, Economics and Technology (**AICMEST**), Indonesia, 10 August 2024*

ISBN 9798 88722 1274 *ISSN 2829 8438*

aesthetics; it affects the users' ability to interact seamlessly with the system, hindering their efficiency and impeding the overall success of web development and programming tasks.

According to the ICT Policy Framework of 2023 in Zimbabwe, the information technology (IT) industry is grappling with significant challenges related to service quality within its systems. A staggering 70% of the country's IT sector is reported to be encountering issues that adversely affect the quality of services provided. The primary contributors to this problem are varied and complex, reflecting the intricate nature of the IT landscape. Two major factors that stand out prominently are software-related challenges and insufficient testing protocols.

According to the Zimbabwe Investment and Development Agency (ZIDA), software developers typically introduce approximately 70 bugs for every 1,000 lines of code they write. This high incidence of bugs can be attributed to the complexity of modern software development, where even minor errors can lead to significant issues. These bugs are not merely nuisances; they can lead to critical failures, security vulnerabilities, and performance problems. The process of fixing these bugs is often more time-consuming and resource-intensive than the initial coding effort. This extended debugging period is due to several factors, including the need to thoroughly understand the root cause of the issue, identify all affected areas of the code, implement a fix, and then rigorously test to ensure the bug has been resolved without introducing new issues. The primary goal of this research challenge is to comprehensively understand the variables influencing ChatGPT's client acceptance within the unique framework of the Zimbabwean IT sector and how these variables affect organizational performance.

2. Literature Review
2.1 Marketing
Marketing is the process of promoting, selling, and distributing a product or service, involving market research, product development, advertising, sales, and customer service (Kotler & Keller, 2016). Market research gathers and analyzes information about the target audience, competitors, and the industry to understand consumer needs (Crawford & Di Benedetto, 2015). Product development creates or improves products based on consumer feedback (Jobber & Lancaster, 2019). Advertising and promotion inform and persuade consumers through various channels, including digital marketing (Belch & Belch, 2018; Chaffey & Ellis-Chadwick, 2019). Sales involve direct interaction to build relationships and meet customer needs (Zeithaml, Bitner, & Gremler, 2017).

2.2 Consumer Behaviour Theory
Consumer behavior theory explores how individuals and groups make purchasing decisions, influenced by factors such as motivation, perception, learning, and social influences. Maslow's Hierarchy of Needs suggests that consumers prioritize basic needs before higher-level ones (Maslow, 1943). Perception involves interpreting information to form impressions about products, influenced by selective exposure and attention (Solomon, 2018). Learning theories, like classical conditioning, explain how past experiences shape future behaviors (Pavlov, 1927). Attitudes and beliefs, guided by the theory of planned behavior, impact purchase intentions (Ajzen, 1991). Social factors, including reference groups, affect consumer choices (Bearden & Etzel, 1982). Personality and lifestyle, segmented by psychographics, provide deeper insights into consumer preferences (Plummer, 1974).

2.3 System Quality
System quality reflects the reliability, ease of use, response time, and availability of ChatGPT systems. (Wixom & Todd, 2005)

2.4 Service Quality

The overall excellence and effectiveness of the services provided by an organization to its customers. It involves the delivery of desirable attributes that meet or exceed customer expectations, resulting in positive customer experiences and satisfaction. (Roca et al, 2006)

2.5 Information Quality

Information quality refers to the accuracy, timeliness, completeness, and relevance of data provided by systems like ChatGPT. (Teo et al ., 2008)

2.6 User Benefits

User benefits are the advantages or positive outcomes that users experience as a result of interacting with Chat GPT. The benefits can be access to information, convenience, and efficiency, reduced costs, and enhanced customer service. (Al-Emran et al,. 2020)

2.7 User Satisfaction

User satisfaction is the degree to which users' needs, expectations, and preferences are met by Chat GPT. This means users are satisfied with Chat Gpt if it's easy to use, meets their needs, and exceeds expectations because of ease of use, accuracy, responsiveness, and helpfulness. (Teo et al ., 2008)

2.8 Organisational Performance

Organizational performance refers to the comprehensive evaluation and measurement of how effectively and efficiently an organization operates to attain its predetermined goals and objectives. This multifaceted concept encompasses various dimensions, including the organization's strategic planning, operational execution, and resource utilization, (Choi et al ., 2023)

2.9 Flexible-Oriented Culture

Flexible oriented culture is a forward-thinking organization that embraces flexibility, possessing the agility to swiftly alter course and diverge from predetermined trajectories, as outlined by Eardly et al. (1997) and cited in Ionescu, Cornescu, and Druica (2012).

2.10   Research Framework

Figure 1: Research Framework
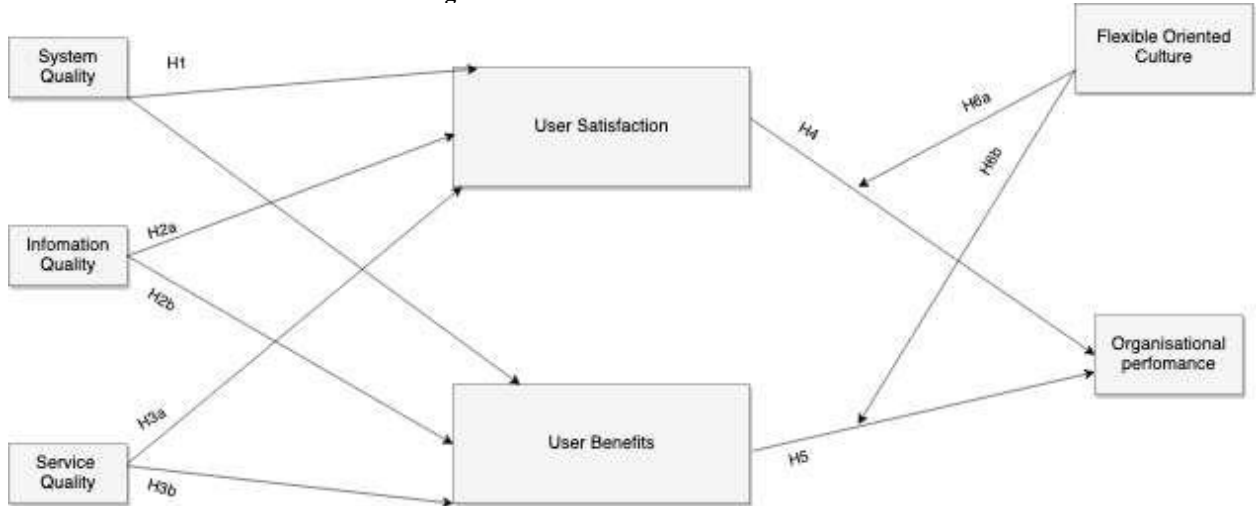
The research framework introduced by W. H. Delone and E. R. McLean (2020) examines the impacts of system quality, information quality, and service quality on user satisfaction and benefits. This study seeks to extend this framework by exploring how these factors influence organizational performance for users utilizing Chat GPT in web development and programming.

3. Methods

This research adopts a quantitative methodology, utilizing questionnaires distributed via Google Forms. The survey collected data from Zimbabwean tech professionals who utilized ChatGPT for web development or programming assistance. Recruitment efforts leveraged LinkedIn and WhatsApp to access participants (H. Hassan et al., 2017), employing snowball sampling to extend reach beyond immediate networks (Cohen et al., 2014). A non-probability purposive sampling method, as defined by Indrawati (2015), selectively chose sample members based on predefined criteria rather than random selection from the population. The study prioritized data validity and reliability. Content validity checks ensured that survey tools accurately measured their intended constructs, while reliability assessments aimed to minimize measurement errors and ensure dependable results (Indrawati, 2015).

Survey questions were reviewed based on previous research by Wixom & Todd (2005), Teo et al. (2008), Roca et al. (2006), Al-Emran et al. (2020), Choi et al. (2023), Eardly et al. (1997), and Cornescu and Druica (2018). This review aimed to solicit expert feedback to refine the questionnaire in alignment with the study's objectives. Table details outlining the items for each factor are provided below.

Variable	Item
System Quality	SYQ1:"In terms of system quality , I highly rate ChatGPT system"
	SYQ2: "Overall, the ChatGPT system is of high quality."
	SYQ3 "Overall , I would like to give high marks to quality of the chat gpt system "
	SYQ4: "In terms of system quality , I rate the ChatGPT system very highly "
Information Quality	INQ1:"Chat Gpt provides enough information for Web development ."
	INQ2:Chat Gpt provides enough information for Programming
	INQ3: "The information for Web Development provided by Chat gpt is up to date."
	INQ4: "The information for programming provided by Chat gpt is up to date."
	INQ5:"The information provided for Web Development by Chat GPT is reliable "
	INQ6:"The information provided for Programming by Chat GPT is reliable "
Service Quality	SEQ1: "Chat GPT provides a solution that is accurate."
	SEQ2: "Chat GPT provides a solution that is suitable for my needs
	SEQ3: "Chat gpt provides instant response ."
	SEQ4 "Chat gpt has a great interface to convey my needs "
User Benefits	BNT1: "It has helped me increase my knowledge in programming to successfully use ChatGPT."
	BNT2: "It has helped me increase my knowledge in Web Development to successfully use ChatGPT."
	BNT3: "Chat GPT is very effective training tool
	BNT4: "Chat GPT has helped me improve my work skills
	BNT5 "Chat Gpt helps me achieve my goals
User Satisfaction	SAT1: "Chat GPT lived up to my expectations "
	SAT2: "Chat GPT efficiently met my needs of retrieving information
	SAT3: "Chat GPT efficiently met my needs of seamless communication"
	SAT4" "I am happy with Chat GPT support "
	SAT5: " Overall I am happy with Chat GPT "
Organisational Performance	OGP1: "Since I started using Chat GPT, I have noticed increased success for our organization"
	OGP2 " With the integration of Chat GPT, our organization is experiencing accelerated growth"
	OGP3 :" With the adoption of Chat GPT, our organization has significantly increased its innovation
Flexible-Oriented Culture	FCU1: "The organization integrates Chat GPT technology to enhance adaptability in responding to changing circumstances
	FCU2 " The organization utilizes Chat GPT technology to encourage innovative thinking"
	FCU3 :" The organizational has a culture to support the integration of Chat GPT technology for experimentation"

Table 1: Questionnaire Items

4.   Results and Discussion

The researchers conducted a pilot study to assess the questionnaire's validity for future research. This pilot involved 30 respondents who were tech professionals using Chat GPT for web development and programming. Data collected were analyzed using SPSS software to conduct reliability and validity tests. The results are summarized below:

Table 2: Validity Test

Variable	Item Code	CITC	Test
System Quality	SQ1	0.884	Valid
	SQ2	0.908	
	SQ3	0.933	
Information Quality	INQ1	0.558	Valid
	INQ2	0.579	
	INQ3	0.623	
	INQ4	0.689	
	INQ5	0.783	
	INQ5	0.669	
System Quality	SEQ1	0.364	Valid
	SEQ2	0.401	
	SEQ3	0.657	
	SEQ4	0.598	
User Benefits	BNT1	0.730	Valid
	BNT2	0.822	
	BNT3	0.804	
	BNT4	0.740	
	BNT5	0.596	
User Satisfaction	SAT1	0.606	Valid
	SAT2	0.664	
	SAT3	0.678	
	SAT4	0.646	
	SAT5	0.605	
Organisational Performance	OGP1	0.755	Valid
	OGP2	0.882	
	OGP3	0.632	

Table 3: Reliability Test

Variable	Cronbach's Alpha	Test
Flexible oriented culture	0.860	Reliable
Information Quality	0.920	Reliable
Organisation Performance	0.881	Reliable
Service Quality	0.854	Reliable
System Quality	0.933	Reliable
User Benefits	0.879	Reliable
User Satisfaction	0.871	Reliable

Reliability in questionnaires with multiple items is typically evaluated using Cronbach's Alpha. A Cronbach's Alpha value above 0.70 is considered indicative of reliable results. This measure is widely accepted for assessing questionnaire reliability, ensuring that constructs are reliable when achieving a Cronbach's Alpha score exceeding 0.70

5. Conclusions

The measurement instruments underwent assessment based on data collected from 30 IT professionals specializing in web development and programming using Chat GPT. The results affirm the validity and reliability of all variables and items, signifying readiness for further research. Validity testing indicates

significant correlation values across all items, while reliability testing shows Cronbach's Alpha values exceeding 0.70, ensuring the robustness of all variables.

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