Online touchpoints and customer effort: A comparative study of government and local authorities, businesses, and domestic customers

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ABSTRACT

Purpose: This study aims to investigate if the online touchpoints (e-mail and mobile app) of the leading energy provider in Malaysia and customer effort were significantly different by customer types, name, government and local authorities, businesses, and domestic users.
Design/Methodology/Approach: The study uses a primary data set of 281 and 1156 respondents with experience of using e-mail and mobile apps. A stratified sampling technique was used in the current study, and data were analyzed using IBM Statistical Package of Social Science (SPSS) 27.0 for Windows. Frequency, descriptive, reliability tests, and one-way analysis of variance tests was applied to the data.
Findings: The findings showed significant differences between one of the variables of e-mail (service quality) and three dimensions of the mobile app (informational, functional, and design quality) with three types of customers. The results also revealed no significant differences between customer types and effort for both online touchpoints.
Conclusion: The findings from this study will benefit the managers or practitioners of a leading energy firm and other firms in the energy sector to strategize and utilize the online touchpoints (e-mail and mobile app) functions to serve their numerous types of customers better.
Research Limitations/Implications: The current study only focuses on a leading energy firm with two types of online touchpoints.
Practical Implications: The Practitioners will be able to enhance the capabilities of online touchpoints and use these tools to efficiently engage consumers and support customer experience, happiness, and loyalty.
Contribution to Literature: The current study contributes to the body of knowledge on online touchpoints and customer effort because past literature revealed a limited study on these areas, particularly in the energy sector.

Keywords: *Customer effort, Customer experience, E-mail touchpoint, Energy firm, Mobile apps, Online touchpoints.*

1. INTRODUCTION

The energy sector has always been critical to national economics' growth worldwide because it significantly contributes to the current and future country's gross domestic production. In Malaysia, this sector is considered a major enabler for various industries. Even though the contribution is slightly reduced because of COVID-19, it remains a driving factor of production for numerous major industries in Malaysia. For instance, National Energy Policy-2022-2040 (2022) revealed that this sector has contributed to MYR400 billion of GDP and employed 4

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million workforces in 2021. Apart from that, this sector also generated RM72,000 average annual income of employees and served over 10 million customers daily. With a huge number of customers, companies must prepare numerous touchpoints to serve their customers better and increase the user experience using the touchpoints. Nowadays, in the digital age, many companies, including energy firms, have deployed various online touchpoints to engage with customers.

Online touchpoints refer to the various digital channels through which customers interact with the firm. These touchpoints include the company's website, social media pages, online chat systems, email, and mobile apps (Tax, McCutcheon, & Wilkinson, 2013). Due to the rise of e-commerce and digital marketing, online touchpoints have become critical for all companies, including service firms, to build and maintain customer relationships. Customers can easily address their problems with the help of efficient online touchpoints, which enhances the customer experience, increases customer loyalty, and spurs revenue development for many businesses in the energy industry (Wiedmann, Labenz, Haase, & Hennigs, 2018; Yin, Chiu, Hsieh, & Kuo, 2022). Conversely, customers who had spent more effort tackling their concerns have greater intention to spread negative word of mouth (Clark & Bryan, 2013).

Since the firms have offered various digital interaction channels, they must ensure that their online touchpoints are user-friendly, informative, and interactive to engage customers. For instance, a well-designed website with clear navigation, relevant content, and attractive visuals can help customers easily find the information they need and build a positive impression of the firm (Orehovački, Granić, & Kermek, 2012). On another note, social media pages allow firms to engage with customers in real time, respond to queries, and gather feedback. Additionally, online chat systems and e-mail can provide personalized customer support and promptly address their concerns, leading to customer satisfaction and improving customer effort scores (Adawiyah, Nova, & Nurfitriana, 2023). On top of that, all firms must ensure that their online touchpoints are secure and protect customer data because cybersecurity threats such as phishing attacks, identity theft, and data breaches can undermine customer trust and damage the firm's reputation (Rajaobelina, Brun, Prom Tep, & Arcand, 2018). Thus, firms must implement robust security measures such as encryption, firewalls, and two-factor authentication to safeguard customer data and prevent cyber-attacks. By leveraging online touchpoints effectively and securely, firms can enhance customer experiences, satisfaction, loyalty, trust, and thus it reduces customer effort (Pascucci, Savelli, & Gistri, 2023).

The earlier literature reveals that there is quite a substantial number of past studies of an online touchpoint in many sectors, but similar study is less found in the energy sectors (Caccavale, 2019; Chaparro-Peláez, Acquila-Natale, Hernández-García, & Iglesias-Pradas, 2020; Sihotang & Hudrasyah, 2023). Moreover, a specific study on online touchpoints with a different group of customers was inconclusive and needed more attention among scholars (Hallikainen, Ari, & Laukkanen, 2019; Ieva & Ziliani, 2017; Nakano & Kondo, 2018). Therefore, the current study aims to examine the differences between groups (types of customers-government and local authorities, business, and domestic) with the two online touchpoints provided by the largest energy provider in Malaysia, namely e-mail and mobile app constructs. In addition, the comparative study between the types of customers with customer effort is also being tested in this study.

The history of online touchpoints can be traced back to the early days of the internet when companies began to establish a presence online. Many companies created websites in the late 1990s and early 2000s to provide information about their products and services. These websites were often basic and static, offering little interactivity beyond simple navigation. However, they provided an important touchpoint for customers to learn about a brand and its services (Stein & Ramaseshan, 2016). As the internet became more sophisticated, companies began to explore new ways to engage with customers online via social media platforms, such as Facebook and Twitter, which provided a new way for brands to connect with customers and build relationships. Social media also enables customers to share their experiences with others, which could help to increase brand awareness and loyalty (Rahman, Carlson, Gudergan, Wetzels, & Grewal, 2022).

In the early 2010s, mobile devices became more prevalent, leading to the rise of mobile touchpoints. Businesses started developing mobile-friendly websites and applications so that consumers could access information and interact with brands while on the way. This helped to create a more seamless system and convenient customer experience, as customers could engage with the firms whenever and wherever they wanted with smooth transitions (Sicilia & Palazón, 2023; Tax et al., 2013). Recently, the emergence of new technologies, such as chatbots and artificial intelligence, has led instant customer service and support. As technology has advanced,

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companies have created more sophisticated and engaging touchpoints, providing even more opportunities for companies to engage with their customers online and manage customer relationships (Wu & Ho, 2022).

According to Adawiyah et al. (2023) the companies that leveraged online touchpoints led to broader customer reach, improved customer engagement in real-time and provided personalized support, enhanced customer convenience, generated cost-effective marketing, and gathered data on customer behavior, preferences, and feedback. These can provide valuable insights that service firms can use to improve their services, enhance customer experience, drive revenue growth, and value co-creation (Ardelet & Benavent, 2023; Lei, Wang, & Law, 2022). Online touchpoints not only provide businesses with numerous advantages; they also raise a few concerns, such as data security, online reputation worries due to unfavourable customer reviews and comments, and inconsistent and unfriendly touchpoints that will harm user experiences (Stein & Ramaseshan, 2016). For example, poor website design, slow loading times, and complicated navigation can lead to customer frustration and dissatisfaction. Therefore, companies must ensure that their online touchpoints are designed with the customer in mind and provide an easy and intuitive user experience to enhance customer satisfaction and loyalty.

Customers' physical, mental, time, financial, and other resources are all included in in making comfortable purchase or they convey their issues to businesses in a better way (Cardozo, 1965; Clark & Bryan, 2013). Customer effort can also be referred as the degree of effort that customers exert to integrate resources through various activities of varying levels of perceived difficulty (Sweeney, Danaher, & McColl-Kennedy, 2015). Even though the study of customer effort was established in the 1940s but was less debatable until 2010 and upwards (Clark & Bryan, 2013). Now, many recent studies have discussed the impact of customer effort, particularly using online touchpoints with customer loyalty, satisfaction, and retention (Hensher & Xi, 2022; Lütjens, Eisenbeiss, Fiedler, & Bijmolt, 2022; Rahman et al., 2022). A recent study by Ardelet and Benavent (2023), stressed that knowledge about customer effort is crucial for organizations because it has a curvilinear effect on customer satisfaction. The intention of consumers to continue doing business with a firm, increase their spending, or promote positive (and not negative) word of mouth is characterized as the customer effort score (Dixon, Freeman, & Toman, 2010).

Evidence from past literature shows inconclusive findings about online touchpoints and customer effort with types of customers (Calza, Sorrentino, & Tutore, 2023). Most past studies on online touchpoints have been conducted in the retailing sector more than in other industries (Bonfanti, Rossato, Vigolo, & Vargas-Sánchez, 2023; Yin et al., 2022). To overcome this constraint, the current study compares the effects of various customer categories with online touchpoints and customer effort from the energy provider is an effort to bridge the gap. In view of online touchpoints, many companies adopted e-mail and mobile apps as major tools to engage with their customers. Due to this, most of the companies have adopted the best technology to support the role of e-mail and mobile apps as the main communication channel with their clients. As a result of this evolution, several academics have researched the superior features of email and mobile applications that improved consumer engagement and experience across multiple sectors (Halb & Seebacher, 2021; Tax et al., 2013; Wu & Ho, 2022). For instance, Halb and Seebacher (2021) agreed that e-mail touchpoint components like system and service quality, performance, and effort are essential and impacted differently by the types of customers. They also stressed that the digital touchpoint (e.g., e-mail) must be leveraged for business-to-business customers.

Additionally, Ieva and Ziliani (2018) stated that the role of online touchpoints, including e-mail, significantly contributes to customer effort and has a different impact on several customer segments. A recent study by Pascucci et al. (2023) proved that various categories of clients are affected quite differently by digital technology, including email. Furthermore, Weiger (2023) reported that business customers in various cultures had shown significant differences with online touchpoints variables. Also, Ieva and Ziliani (2017); Nakano and Kondo (2018) and Hallikainen et al. (2019) demonstrated a significant difference between digital touchpoints (e-mail) and four customer segments. A meta-analysis study by Lütjens et al. (2022) proved that e-mail variables like system and service quality have significant differences with numerous types of clients. However, Kemppainen and Frank (2019) found a negative impact of e-mail on customer experience. Orehovački et al. (2012) also mentioned that factors affecting email, such as system and service quality, performance, and effort, had no bearing on the different customer types.

Moreover, Wu and Ho (2022) highlighted most of the quality variables of mobile touchpoints, like information, design, and functions, have significant differences with the types of customers in Taiwan. They added that mobile apps enable customers to access services anytime, anywhere, and enhance their convenience in engaging with the companies. On another note, Bahtar (2018) revealed that information quality and security have helped to reduce

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customer effort and led to customer loyalty. Similarly, Parise, Guinan, and Kafka (2016) also claimed that mobile app design and functional quality helped improve customer effort scores and customer experience. Besides, Rajaobelina et al. (2018) also mentioned that trust is an important factor of mobile apps and has a significant difference with customer types. Previous studies by Hallikainen et al. (2019) exposed the insignificant difference between the mobile touchpoint variables and types of customers. Similarly, the findings recorded in the past work of Sands, Ferraro, Campbell, and Pallant (2016) also demonstrated no significant difference in customer types and factors in the mobile app.

In their study, Ardelet and Benavent (2023), revealed that poor customer effort in various consumer categories could not be linked to customer happiness. In comparison, Sweeney et al. (2015) found a significant difference in customer effort with types of customers. Moreover, Harrington and Bryan (2013) mentioned the significant difference between customer efforts in the business-to-business segment. Finally, Hensher and Xi (2022) highlighted that firms must continue simplifying the process and reducing customer effort for loyalty. They also claimed that numerous customers have significant differences in customer effort. In light of the above arguments, this study compares the roles of online touchpoints (e-mail and mobile app) and customer effort with the three types of customers: Government and local authorities, businesses, and domestics. Figures 1 and 2 illustrate the conceptual framework used in this study to measure the difference between online touchpoints (e-mail and mobile app) and customer effort with the types of customers.

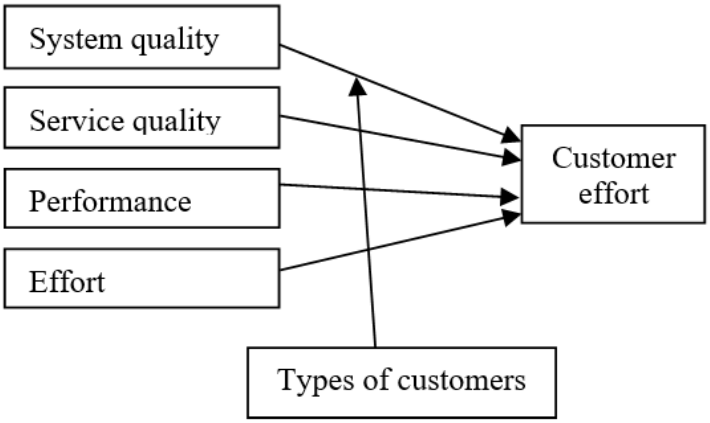

Figure 1. Conceptual framework (E-mail).

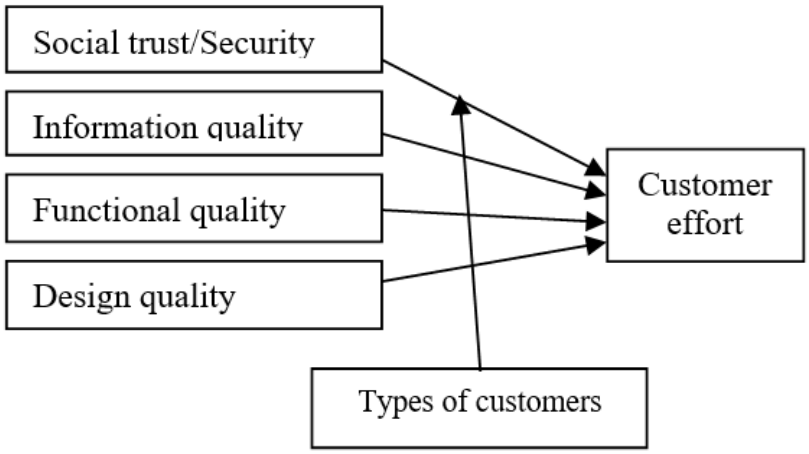

Figure 2. Conceptual framework (Mobile Apps).

Since the results are inconclusive, the current study aims to investigate the difference between online touchpoints provided by a leading energy firm in Malaysia with customer types. Thus, this study proposes the following hypotheses:

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H1: There is a significant difference between government and local authorities, businesses, and domestic customers in e-mail system quality.
H2: There is a significant difference between government and local authorities, businesses, and domestic customers in e-mail service quality.
H3: There is a significant difference between government and local authorities, businesses, and domestic customers in e-mail performance.
H4: There is a significant difference between government and local authorities, businesses, and domestic customers in client's effort.
H5: There is a significant difference between government and local authorities, businesses, and domestic customers in e-mail's customer effort score.
H6: Social trust/security in mobile apps differ according to the types of customers.
H7: Information quality in mobile apps differ according to the types of customers.
H8: Functional quality in mobile apps differ according to the types of customers.
H9: Design quality in mobile apps differ according to the types of customers.
H10: Customer effort in mobile apps differ according to the types of customers.

2. METHOD

2.1. Participants

A total of 281 (e-mail users) and 1156 (mobile app users) government and local authorities, businesses, and domestic customers of a leading energy firm in Malaysia were involved in this study. All of them are selected using a stratified sampling technique from the sampling frame (companies' owners or managers or officers and domestic customers) shared by the energy company with the researchers. The respondents answered the online survey question (using the survey sparrow platform) about real experiences using e-mail and mobile apps from June to August 2022. The survey was e-mailed to respondents' e-mail addresses, and to improve the response rate, the researchers sent several e-mail reminders to respondents. The respondents had to answer a screening question to ensure their experience of using the e-mail and mobile app of a leading energy firm before they could proceed with the survey question.

Table 1 presents the respondent's profile. Male users of email made up 40.60% of the sample, while female users made up 59.40%. While 48.30% of mobile app users were male and 51.70% were female. The age groupings were spread out quite equally, with 27.80% and 28.50% being 30 or less, 44.50% being between 31 and 40, with the remaining percentages being split between 41 and 50, 51 to 60, and above 60. The majority of respondents identified as Malay (76.90%;79.40%), followed by Chinese (16.40%;15.20%) and Indian (6.80%;5.40%). Moreover, nearly 50% of respondents held a Bachelor's degree, followed by 15.30% with a Diploma and 20.30% with a Master's or Ph.D. On another note, respondents were distributed across various job positions, with the highest percentage being in middle management (24.90%) and professional roles (21.40%). In addition, the majority (34.50%; 31.10%) earned between RM 3,000 and RM 6,000, with 23.10% and 29.20% earning less than RM 3,000 coming in between. Businesses (45.60%; 49.00%;) and private families (31.30%; 33.30%) accounted for the bulk of responses, with the balance coming from municipal and state governments.

2.2. Measures

The questionnaire used in this study was designed in two sections. The first section is about the customer's experiences using the e-mail and mobile app, which consists of 10 items (e-mail) and 15 items (mobile app). All questions were measured with a 5-point Likert scale (1=Strongly Disagree; 5=Strongly Agree). This study adapted all 15 items of mobile apps from Pour, Delavar, Taheri, and Kargaran (2021). Similarly, all items used to assess respondents' experience on e-mail touchpoints were adapted from Orehovački et al. (2012). In addition, one question is designed for each touchpoint to measure the customer effort. The item is adapted from Dixon et al. (2010) and assessed using a 5-point Likert scale (1=Very Difficult; 5=Very Easy). The second section, which consists of 7 elements (gender, age, race, education level, work position, monthly income, and categories of clients), identifies the respondents' characteristics. The questions were validated by four expert opinions from academics and industry managers. The questionnaire was pre-tested by 20 respondents, and the researchers incorporated the input they received as well as the advice of specialists to make it better. Data obtained from the personally administered questionnaire was analyzed using IBM Statistical Package of Social Science (SPSS) 27.0 for Windows.

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Analysis of variance (ANOVA) was employed in this work in addition to frequency, descriptive, and reliability analysis to assess the putative hypotheses.

Table 1. Respondents' profiles.

Profiles	Sub-profiles	E-mail (n=281)		Mobile app (n=1156)	
		Frequency	Percent	Frequency	Percent
Gender	Male	114	40.60	558	48.30
	Female	167	59.40	598	51.70
Age	30-Year-old and below	78	27.80	330	28.50
	31-40 Year-old	125	44.50	470	40.70
	41-50 Year-old	51	18.10	269	23.30
	51-60 Year-old	23	8.20	75	6.50
	More than 60 year-old	4	1.40	12	1.00
Race	Malay	216	76.90	918	79.40
	Chinese	46	16.40	176	15.20
	Indian	19	6.80	62	5.40
Education	Malaysian higher school certificate/Malaysian certificate of education and below	40	14.20	143	12.40
	Diploma	43	15.30	219	18.90
	Bachelor's degree	139	49.50	621	53.70
	Master's or PhD	57	20.30	168	14.50
	Other	2	0.70	5	0.40
Job position	Professional	60	21.40	289	25.00
	Top management	33	11.70	114	9.90
	Middle management	70	24.90	232	20.10
	Supervisory	27	9.60	82	7.10
	Administrative or clerical	44	15.70	183	15.80
	Technical	20	7.10	107	9.30
	Housewife	1	0.40	15	1.30
	Retiree	2	0.70	7	0.60
	Entrepreneur	21	7.50	104	9.00
	Other	3	1.10	23	2.00
Income	Less than RM 3,000	65	23.10	337	29.20
	RM 3,000 - RM 6,000	97	34.50	360	31.10
	RM 6,001 - RM 9,000	31	11.00	138	11.90
	RM 9,001 - RM 12,000	21	7.50	92	8.00
	RM 12,001 - RM 15,000	45	16.00	147	12.70
	More than RM 15,000	22	7.80	82	7.10
Type of customers	Domestic	88	31.30	385	33.30
	Business	128	45.60	566	49.00
	Government and local authorities	65	23.10	205	17.70

3. RESULTS AND DISCUSSION

Table 2 displays the descriptive analysis for each individual and factor items of e-mail and mobile app together with customer effort scores. The mean scores for individual and factor items of e-mail touchpoint and customer effort ranged from 3.680 [Careline (E-mail) delivers its promises on time]to 3.860 [Careline (E-mail) provides users freedom (i.e., give comments, report, etc.] and 3.730 (performance) to 3.815 (effort), respectively. Moreover, the standard deviation values of e-mail are from 0.823 to 0.906 for individual items. Subsequently, the mean scores for individual and factor items of mobile app and customer effort are from 3.900 [Mobile app provides information based on the users' interest] to 4.180 [Mobile app is easy to access and easy to use] and 3.990 (functional quality)

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to 4.200 (customer effort). Table 2 also depicts the standard deviation for mobile app variables from 0.693 to 0.739. Moreover, the Cronbach alpha value for each e-mail variable ranges from 0.822 to 0.895, and the mobile app variable is recorded at 0.872 to 0.932. Pavot, Diener, Colvin, and Sandvik (1991) mentioned that all variables have good internal consistency because the Cronbach alpha coefficient values were above 0.800.

Table 2. Descriptive and reliability results (e-mail and mobile app).

Constructs/Items (e-mail)	**Mean**	**SD**	**CA**
System quality	3.736	0.803	0.895
Careline (E-mail) is easy to use and navigate	3.790	0.906	
Careline (E-mail) is personalized and customized to meet everyone's needs	3.690	0.887	
Careline (E-mail) secures personal data and files from unauthorized access	3.730	0.858	
Service quality	3.779	0.791	0.887
Careline (E-mail) is reliable without errors or interruptions	3.800	0.850	
Careline (E-mail) responds to users' requests and actions	3.830	0.902	
Careline (E-mail) provides prompt responses to my queries	3.700	0.875	
Performance	3.730	0.827	0.863
Careline (E-mail) provides an effective solution with accurate and useful information	3.780	0.883	
Careline (E-mail) delivers its promises on time	3.680	0.881	
Effort	3.815	0.769	0.822
Careline (E-mail) provides appropriate information for the users who submit feedback	3.770	0.823	
Careline (E-mail) provides users freedom (i.e., give comments, report, etc.)	3.860	0.846	
Customer effort	3.780	0.817	*
Overall, how easy was it to solve your problem with Careline (E-mail)?	3.780	0.817	
Constructs/Items (Mobile app)	Mean	SD	CA
Social trust/security	4.084	0.729	0.872
Mobile app protects the customers' information and privacy	4.090	0.788	
Mobile app provides a risk-free transaction process	4.080	0.759	
Information quality	4.088	0.693	0.929
Mobile app provides helpful and important information for my energy usage	4.160	0.772	
Mobile app provides accurate and reliable information about energy usage	4.090	0.778	
Mobile app provides up-to-date information	4.130	0.772	
Mobile app provides meaningful, detailed, and understandable information	4.110	0.777	
Mobile app provides information in different formats like video, photo, text, etc.	3.950	0.828	
Functional quality	3.990	0.725	0.881
Mobile app provides the customers with personalized information	4.010	0.787	
Mobile app provides information based on the users' interest	3.900	0.844	
Mobile app helps navigate the users to utilize app functions	4.060	0.789	
Design quality	4.089	0.717	0.932
Mobile app is easy to access and easy to use	4.180	0.788	
Mobile app has ease of learning	4.120	0.788	
Mobile app has a responsive design and is compatible with mobile devices	4.090	0.792	
Mobile app has an attractive design	4.020	0.853	
Mobile app has an acceptable response time	4.030	0.821	
Customer effort	4.200	0.739	*
Overall, how easy was it to solve your problem with mobile app?	4.200	0.739	

Note: SD = Standard deviation, CA = Cronbach alpha, * = No values for CA because customer effort is measured by a single item.

To measure the differences between groups with the variables, two series of ANOVA were conducted to compare the differences between e-mail, mobile app, and customer effort constructs with the types of customers (government and local authorities, business, and domestic). The results are shown in Table 3 and Table 5. Table 3

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indicates no statistically significant difference between the types of customers with most of the e-mail and customer effort variables. Thus, four hypotheses, namely, Hypothesis 1 (H1), H3, H4, and H5, are unsupported. However, there was statistically significant differences at the $p < 0.05$ level in the service quality for the types of customers: $F(2, 278) = 4.733$, $p = 0.010$. Hence, H2 is supported. However, the actual difference in mean scores between the groups was medium. The effect size, calculated using eta squared, was 0.033, indicating a moderate effect size (Cohen, 1988). In addition, Table 4 displays the post hoc comparisons using the Tukey (Honest Significant Difference (HSD) test, which revealed that the mean scores for service quality of domestic customers (M = 3.779, SD = 0.791) was significantly different from the government and local authorities (M = 3.538, SD = 0.872). Also, the mean scores for service quality of business customers (M = 3.818, SD = 0.795) was significantly different from the government and local authorities (M = 3.538, SD = 0.872).

Table 3. Summary of means, standard deviations, and ANOVA results (e-mail).

Measure	Government and local authorities		Business customers		Domestics customers		Sig.	η2*	H	Decision
	Mean	SD	Mean	SD	Mean	SD				
System quality	3.533	0.929	3.771	0.786	3.833	0.706	0.058	0.020	H1	Not supported
Service quality	3.538	0.872	3.818	0.795	3.909	0.683	0.010*	0.033	H2	Supported
Performance	3.669	0.862	3.738	0.862	3.761	0.750	0.784	0.002	H3	Not supported
Effort	3.639	0.859	3.836	0.753	3.914	0.704	0.081	0.018	H4	Not supported
Customer effort	3.620	0.842	3.800	0.817	3.860	0.790	0.165	0.013	H5	Not supported

Note: SD = Standard deviation; F(2,278); *p<0.05; N = 281; η2* = Sum of squares between-groups/Total sum of squares, H = Hypothesis.

Table 4. Post Hoc tests-types of customers and service quality.

Variable	Types of customers (A)	Types of customers (B)	Mean	SD	MD (A-B)	Std. error	Sig.
Service quality	Domestic	Business	3.909	0.683	0.091	0.108	0.675
		GLA	3.538	0.872	0.381*	0.128	0.009
	Business	Domestic	3.818	0.795	-0.091	0.108	0.675
		GLA	3.538	0.872	0.289*	0.119	0.041
	GLA	Domestic	3.538	0.872	-0.381*	0.128	0.009
		Business	3.818	0.795	-0.289*	0.119	0.041

Note: GLA = Government and local authorities; SD = Standard Deviation; MD = Mean Difference; *. The mean difference is significant at the 0.05 level.

Table 5 shows that there were statistically significant differences at the $p < 0.05$ level in the three variables of mobile touchpoint (information quality, functional quality, and design quality) with types of customers: $F(2, 1152) = 6.056$, $p = .002$, $F(2, 1152) = 3.704$, $p = 0.025$, and $F(2, 1152) = 4.224$, $p = .015$ respectively. Thus, H7, H8 and H9 are supported. However, the difference in mean scores reported between the groups is small. Hence, the effect size, calculated using eta squared, was 0.010 (information quality), 0.006 (functional quality), and 0.007 (design quality). According to Cohen (1988), these figures have small effect sizes. Conversely, two hypotheses, such as, H6 and H10, are not supported due to insignificant differences between the constructs (social trust/security and customer effort) with the types of customers. Table 6 parades the post hoc comparisons using the Tukey HSD test, which revealed that the mean scores for domestic and business customers (M = 4.129, SD = 0.639; M = 4.115, SD = 0.641) were significantly different from government and local authorities (M = 3.937, SD = 0.884) for the construct of information quality. Similarly, the mean scores of functional quality for domestic and business customers (M = 4.012, SD = 0.667; M = 4.019, SD = 0.685) were significantly different from government and local authorities (M = 3.865, SD = 0.905). Furthermore, the results also demonstrated that the mean scores for domestic and business customers (M = 4.118, SD = 0.670; M = 4.116, SD = 0.666) were significantly different from government and local authorities (M = 3.957, SD = 0.904) for the construct of design quality.

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Table 5. Summary of means, standard deviations, and ANOVA results (mobile app).

Measure	Government and local authorities		Business customers		Domestics customers		Sig.	η2*	H	Decision
	Mean	SD	Mean	SD	Mean	SD				
Social trust/Security	3.995	0.891	4.090	0.699	4.121	0.671	0.131	0.004	H6	Not supported
Information quality	3.937	0.884	4.115	0.641	4.129	0.639	0.002*	0.010	H7	Supported
Functional quality	3.865	0.905	4.019	0.685	4.012	0.667	0.025*	0.006	H8	Supported
Design quality	3.957	0.904	4.116	0.666	4.118	0.670	0.015*	0.007	H9	Supported
Customer effort	4.110	0.742	4.220	0.739	4.210	0.737	0.161	0.003	H10	Not supported

Note: SD = Standard deviation; F(2,1152); *p<0.05; N = 1156; η2* = Sum of squares between-groups/Total sum of squares; H = Hypothesis.

Table 6. Post Hoc tests-types of customers, information quality, functional quality and design quality.

Variable	Types of customers (A)	Types of customers (B)	Mean	SD	MD (A-B)	Std. error	Sig.
Information quality	Domestic	Business	4.129	0.639	0.015	0.046	0.946
		GLA	3.937	0.884	0.193*	0.060	0.004
	Business	Domestic	4.115	0.641	-0.015	0.046	0.946
		GLA	3.937	0.884	0.178*	0.056	0.004
	GLA	Domestic	3.937	0.884	-0.193*	0.060	0.004
		Business	4.115	0.641	-0.178*	0.056	0.004
Functional quality	Domestic	Business	4.012	0.667	-0.007	0.048	0.987
		GLA	3.865	0.905	0.147*	0.063	0.049
	Business	Domestic	4.019	0.685	0.007	0.048	0.987
		GLA	3.865	0.905	0.154*	0.059	0.024
	GLA	Domestic	3.865	0.905	-0.147*	0.063	0.049
		Business	4.019	0.685	-0.154*	0.059	0.024
Design quality	Domestic	Business	4.118	0.670	0.002	0.047	0.999
		GLA	3.957	0.904	0.161*	0.062	0.025
	Business	Domestic	4.118	0.670	-0.002	0.047	0.999
		GLA	3.957	0.904	0.159*	0.058	0.018
	GLA	Domestic	3.957	0.904	-0.161*	0.062	0.025
		Business	4.116	0.666	-0.159*	0.058	0.018

Note: GLA = Government and local authorities; SD = Standard Deviation; MD = Mean Difference; *. The mean difference is significant at the 0.05 level.

Findings from this study revealed that only four hypotheses are supported (H2, H7, H8, and H9). The results are in line with past studies (Ieva & Ziliani, 2018; Pascucci et al., 2023; Weiger, 2023) that demonstrated the significant difference of variables in the e-mail (service quality) and mobile app (information, functional, and design quality) with customer types (government and local authorities, business, and domestic customers) from a leading energy firm located in Malaysia. While other hypotheses, such as H1, H3, H4, and H6, are not supported and shows insignificant differences between the group of customers with constructs associated e-mail and mobile app. The results differ from past studies of Parise et al. (2016) and Rajaobelina et al. (2018) but recorded a similar finding to Hallikainen et al. (2019). Moreover, the finding from this current study is also unable to find the significant difference between types of customers and customer effort for both tested online touchpoints. Thus, Hypotheses H5 and H10 are rejected and similar to the past work of Ardelet and Benavent (2023). The findings are not in line with Harrington and Bryan (2013); Hensher and Xi (2022) and Sweeney et al. (2015). On top of that, most of the variables that show significant differences with the types of customers have small effect sizes. Depending on the findings, the top energy company may decide to enhance the value of email touchpoints and mobile applications

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for their numerous clients. The company may opt to improve and redesign its online touchpoints if they decide to enhance its customer's experiences by integrating customer effort score and customer experience management.

4. CONCLUSION AND RECOMMENDATIONS

The objective of this study is to compare the role of customer types with online touchpoints and customer efforts of a leading energy firm in Malaysia. The results indicate that four hypotheses (H2, H7, H8, and H9) have been supported and other hypotheses (H1, H3, H4, H5, H6, and H10) are not supported. According to the ANOVA test, the current study confirmed that e-mail service quality and mobile app information, functional, and design quality have significant differences with customer categories. On another note, even though the other elements of e-mail (system quality, performance, and effort) and mobile app (social trust/security) have no significant difference with types of customers, these variables are indeed very critical. They must be improved and redesigned to equip a better customer experience. Further research is required to verify that the results will result in customer satisfaction and loyalty because the study was unable to detect any variations between customer effort and customer category. The energy firm may use the findings from this study to strategize its online touchpoint to maximize customer satisfaction by lowering customer effort.

This study only focuses on one of the energy firms in Malaysia. Therefore, in the future, the researcher can expand to compare the effects of customer types with other energy or services firms. The practitioners or managers may have benefitted from the comparison research that will be undertaken in the future with larger sample sizes from other organisations. Furthermore, rather than picking a small number of online touchpoints, future efforts might concentrate on developing additional digital touchpoint technologies. Finally, the comprehensive study of omnichannel (offline and online) provided by the firms could also be added for future research.

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CONFLICT OF INTEREST

The authors declare that they have no competing interests.

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AUTHORS' CONTRIBUTIONS

All authors contributed equally to the conception and design of the study.

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