Factors of Indian Online Food Delivery (OFD) Services and Assessing their Performance

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Abstract-**Online food delivery (OFD) in India has taken a step towards empowering the hyperlocal food delivery with the technology. It has shown a dynamical change in the way Indian eating habits whenever hungry by a single tap using a smartphone; they get food onhand. A predict says by 2026, India's e-commerce business would reach US$200 billion. This research analyzes the factors of Indian OFD e-business performance and implement strategies to increasing their efficiency and revenue. Data from 353 respondents collected who are a user of OFD via websites/mobile applications. The results show that application quality has an influence on trust and thus, brand loyalty of online food delivery application. Inferring from this research that if the usability to the customer on the application quality enhance the business cycle and loyal customer trust the food ordered and allows efficiency building and profiteering space.**

Index Terms—**Online food delivery, trust, brand loyalty, application quality, Usability.**

I. INTRODUCTION

With the rise in the e-commerce industry in India, online food ordering, and delivery services have had tremendous growth. It has changed the dynamics of the food industry from brick-and-mortar restaurants to delivery of food to the customers' doorsteps. The shift of attention towards online food delivery (OFD) services is associated with the rise in the income, consumption levels, favorable lifestyle changes, cheap, widespread access to the internet, the convenience of online ordering, and aggressive marketing strategies adopted by online food startups [3]. With the increasing number of working women in India, they tend to focus on productivity and spend their time either commuting and working, as they have very little time for cooking food at home. The customers enjoy the array of benefits, but the restaurants have scope for a lot of growth potential, especially in terms of orders and the amount of revenue generated that has helped many businesses to expand their geographical locations. The commercial food ventures were able to simplify tasks and conserve on investments in non-core affairs. In the meantime, for these brands, the increased use of the services by an ever-growing number of consumers has caused higher influx of accesses, an element that serves as an indexing factor to attract new restaurants to its website/application and also to attract investors to aid in the expansion of the business to other regions. The rate of increase of these OFD services into smaller towns and areas has surged significantly in 2019 [4]. The business model used by OFD services that were once seen as a 'metro phenomenon,' limited to the metro cities of India, is now rapidly accounting several record numbers of hits in tier two cities. The goal of these platforms is to act as an intermediary service linking final consumers and commercial establishments. Hence, transparency in communication and adaptation to the selected audience's needs are indispensable for sustaining the business [4]. In recent statistical reports by RedSeer research and consulting group, the food-tech market of India indicates that the increasing order frequency by the consumers is the critical leveraging factor in the food-tech sector's growth in the past few years [4]. The current top market players, Swiggy, and Zomato are recording approximately 30-35 million orders each month. Hence, the keynote is that the customers have shown increasing interest and support towards the online food delivery applications. For the food-tech market of India to maintain a steady presence, it needs to focus on improving both customer brand loyalty as well as customer acquisition rate by ensuring customer trust. Both the parameters significantly influence the OFD supply chain and the value chain.

Being a relatively new service industry in India, the growth of OFD companies are complemented by a stable sector intermixing and by the conception of large industry players and aided by foreign investments. With the exponential growth of this relatively new market segment in India, it has become pivotal in determining the characteristics of the market competitors and in analyzing their performance. In principle, this sector has brought benefits along with formidable challenges. The arrival of specialized companies in providing OFD services has enabled the users to pick the product/service (restaurants, food choices on the menu, and payment methods) pronto and effortlessly compare between an array of listed options. The challenges for the OFD

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companies are customer retention and to increase their customer order frequency through an active and engaging website alongside an apt mobile application. Also, the inception of innovative business models has enabled these companies to infiltrate into the most remote markets within the country. Tracking these novelties and their impact on the ever-changing consumer market is essential to determine the future of these services. Thus, to address these problems, few research objectives are formulated in the following section.

The objectives of this paper are to characterize the performance of OFD companies present in India and to analyze the content of the websites/applications of these companies with a view to its utilization as a site for conducting business transactions. Also, to analyze the OFD platforms from the selected sample list, based on three critical dimensions are content, functionality, and usability.

II. LITERATURE REVIEW

In the present scenario, the non-core market constituting more than 100 cities experiences 30% of the order traffic as compared to the top seven core cities that amass the major split of the order traffic [4]. It is vouched since December 2018; the OFD services are striving to expand their geographic presence in multi-cities, making their presence known in 100 cities and above. Though there is a significant metro cities hub that retains most of the order traffic are from New Delhi, Chennai, Mumbai, Kolkata, and Bangalore. The shift towards the non-core market is taking place with an awareness of e-commerce. There are pockets of experimentation with multiple online-offline models to more effectively tap into the next growth opportunities. Many such marketing campaigns are positively impacting the profit-margins and ensuring sustained progress [5]. With so many innovations being brought about on these platforms, many cross-platform business models are emerging to change the market dynamics. To name a few noteworthy innovative programmes, infrastructure set-up availed by restaurants through Swiggy Access, restaurant raw-material supply chain offered by Zomato's HyperPure, collaborations with NGOs to fight food wastage by Zomato [Akshaya Patra in 2018, Feeding India in 2019], privileged customer programs like Swiggy Super and Zomato Gold and others. A groundbreaking and innovative business model, HyperPure by Zomato aids to deliver transparency and accountability over the food supply value chain. HyperPure has tie-ups with several vendors and farmers who provide high-quality raw materials to their warehouses, which in-turn supplies to about 2500 restaurants within Bangalore, who are listed on their website/application. This provision of clean and high-quality ingredients to restaurants reinforces the efficiency of the food supply chain by involving the minimal number of certified parties in the process. The Swiggy Access provision offered by Swiggy to their restaurant partners is another noteworthy business model that is observed to have gained much traction. Swiggy makes use of the data extracted from their extensive databases and generates reports, highlighting the gaps in the supply-chain on a highly localized level. Once these gaps are identified, they move on to invite their partner restaurants to reckon the demand of the local residents. The model can be interpreted as a highly mutually benefitting one that enhances the operations of the existing restaurant partners by enabling them to initiate expansion and simultaneously satisfies the accessible cuisine needs of the local population. The aggregator fetches themselves a gradually growing revenue model by levying 3-8 % per order value. Reports suggest that Swiggy is already recording increased confidence in the model from their restaurant partners, and almost 70% of the partners are discussing the setting up at a second location [4]. Keeping the end-users always engaged with valuable offers and schemes is key to building strong customer bases. The customer trust is being captured by rolling out value-added services like Zomato Gold and Swiggy Super that grants the customers freebies and incentives with the additive use of their services. The establishment of such varied business models balances the gap between the heavy cash burnouts and the gradual increase in revenues of the OFD competitors. The Indian food-tech sector is yet to enter the Stage 2/Turbulent Stage and is predicted to experience one smaller than the other areas [4]. It is undoubtedly going to be extremely exciting to see how the Indian food-tech market pans out and takes shape, as it is already one of the fastest-growing markets among other global industries.

III. METHODOLOGY

The conceptual model chosen primarily was a flowchart that bridged the multiple secondary factors regarding application quality and service quality with customer loyalty [9]. For this project, the exploratory and qualitative research approaches were followed through the collection and analysis of data on OFD companies registered in India. Reviews of their websites/applications were also conducted by investigating parameters proposed [6], involving aspects such as content, usability, and functionality. The parameters used to represent the criteria, as mentioned in [6] as adopted by [7], later refined by [8][9] is taken for the conduct of the analysis of OFD services of Brazil [8]. The analysis procedure is replicated in this project to form a better understanding of the Indian food-tech market.

For the definition, web searches were conducted using keywords such as online food delivery, fastest food delivery, local food delivery, order food online, and order from the mobile phone. A list of companies is devised, using reliable information observed in newspaper articles, magazines, blog-spots, and websites of companies offering OFD services in India [9]. The sample from the list of 25 companies, in correspondence with the survey summer period of three months. The analysis of the websites/applications of the competitors was surveyed by focusing on the observation of the subsistence of the parameters that make up the dimensions content, usability, and functionality. Thus, when the evaluation of criteria for a projected parameter was observed, yes was filled, and when its absence was noted. The sample data gathered in our survey is used to analyze the online food delivery applications in India. Also, a set of statistical reports on the performance of these competitors are extracted. The

validation and analysis of the result data from the survey were done utilizing SPSS and SmartPLS software.

The operational definition of the constructs and the variables renders a clear understanding and aids in avoiding the susceptibility to interpersonal influences. The criteria and parameters, as explained [8], are listed in the following sections.

A. Content

The construct content accommodates three unique parameters that define the quality, compatibility, reliability, and reach of the content of the website/application. The first parameter scope, coverage, and purpose checks for links to other information sources and the social media presence of these websites/applications. The second parameter objectivity studies the relevance of content is displayed clearly and consistently on the website/application. The third parameter authority goes over the legitimacy of the website/application offering services.

B. Usability

Much of the web content is usable and used frequently. In respect to the dimension usability, the parameter operability is probed by looking at the layout adjustment capabilities of the website/application to fit into varying resolutions on multiple devices. Device-optimized websites/applications are preferred by the end-users as it is easier to navigate. The second parameter learnability works towards identifying a broad set of features of the website/application, including the availability and findability of navigation/search tools, added information indicators, and human interface for assistance. The third parameter intelligibility verifies that each link carries out a unique function and that it is adequately named.

C. Functionality

Subsequently, for the construct functionality, the security parameter was audited based on the information available in the form of the privacy policies in portals, such as cookie encryption capabilities and the use of secure/well-established protocols for their websites. The parameters interoperability and accuracy were analyzed either by placing simulated food delivery orders online or by extracting genuine user experience reviews to identify information on payment methods offered, delivery fee values, time of execution of the request, and evaluation of the quality of service, provided by the end-users. Finally, through the adequacy parameters, the extent of reciprocating dialogue taking place between the companies and customers was analyzed through comments, general query sections, compliments/suggestions received by companies through social networks such as Facebook, Twitter, Instagram, and blogs.

The percentage distribution of the dimensions and parameters was obtained using descriptive statistics among the 25 websites/applications analyzed. Assigning precise weights to the parameters is an arduous task as the above-described analysis of the websites/applications is not adequately refined, and the objectives may deviate. One of

the explanations is that the results of the averages for the three dimensions might result in the distortions between some parameters. When there is a distortion in the results, it is indicated in the descriptive analysis. A survey conducted by a questionnaire that skimmed the customer's point of view on the criteria and parameters. Questions were devised such that the answer to each question validated particular parameters. The data gathered in our pilot survey was used to gain better insight into the chosen criteria. Variance-based structural equation modeling (SEM) that uses the partial least squares path modeling method was used to get the results. Smart-PLS is a freeware/proprietary software that was used to conduct the variance-based SEM on the gathered data. Validation of the results procured was done by using SPSS software. The result and discussion of the analysis are covered in the next section. For a better understanding of the conceptual framework, a model is depicted in the next section to specify the specific direction of the relationship between the constructs and the parameters.

The secondary data for the pilot study was gathered through a survey. It provided insights into the customer perception of the OFD brands in terms of the criteria and parameters chosen for the study. A strong correlation was observed between the primary and secondary data collected. The total sample size of the data gathered is 353 respondents, out of which the majority of them belong to the Gen Z, i.e., the people who belong to the age group of 20-25 years. The Gen Z population are the power users of the OFD services; therefore, the demographic distribution of the sample population is justified. Table I gives the demographics of the sample population.

According to the data obtained from the survey, Swiggy

TABLE I
DEMOGRAPHIC PROFILE OF RESPONDENT

Field	Category	Respondent (%)
Gender	Male	253(71.70%)
	Female	100(28.30%)
Age	15-20	43(12.18%)
	21-25	284(80.45%)
	26-30	14(3.97%)
	31-35	3(0.85%)
	36 and above	9(2.55%)
Profession	Full-time employed	80(22.70%)
	Part-time employed	26(7.40%)
	Unemployed	10(2.80%)
	Full-time student	219(62.00%)
	Part-time student	10(2.80%)
	Others	8(2.30%)

and Zomato are the most popular OFD brands among the sample population, followed by Dominos, UberEats, and McDonald's, respectively. Because most of the sample population resides in the Udupi/Mangalore region of India, the regional OFD services, Foodzoned.com and Foodzozo.com, are also among the popular services listed [10-13]. Such a discrepancy in the demographics of the sample population will not affect the result analysis, when viewing the issue from a holistic approach, citing the problem applies to the India companies.

IV. RESULTS AND DISCUSSION

The analysis of the study is obtained through both descriptive and inferential statistics. The factor analysis is done to examine the pattern of correlation between the observed measures. The data gathered is analyzed using the SPSS followed by the Structural Equation Modelling (SEM). The conceptual model developed with SmartPLS (v.2.3.8). The research model is analyzed and interpreted in two stages. The first stage consists of the assessment and refinement of the adequacy of the measurement model, and the second stage consists of the assessment and evaluation of the structural model.

In the descriptive analysis, to understand the various characteristics of the data and helps in understanding the procedures in hypothesis testing. The study looks at the reliability of the scale used. It helps us determine whether the scale used is reliable and can support in explaining the data. The study employs Cronbach's alpha coefficient to track the internal consistency of the scale. Author like Pallant [14] advocates above 0.7 construct factor value is a valid measurement. The Cronbach's alpha value calculated for the conducted survey sample data and the function of the number of test items and the correlation among the items are also listed in the following section [18] , and the formula used for Cronbach's alpha α is

$$\alpha = \frac{N \text{x} \underline{c}}{\underline{v} + (N - 1)\text{xc}}$$

Where, N → number of items,
c → average inter-item covariance among the items and,
v → average variance.

Cronbach's Alpha test is used to understand and calculate the reliability of the survey questionnaire. It was obtained as 0.899 that ensures that the items measured are consistent [18] [. This is followed by factor analysis helps to understand independent variable has the most substantial influence over the others. The Cronbach's Alpha will generally increase the correlations between the items. The maximum value is 1, and minimum value is 0. The reading is expected to be in the range between 0.70–1.00.

The PLS model in Figure 1 is interpreted in two stages. In the first stage, the assessment and refinement of the measurement model are carried out, followed by the formation of the structural model. The coefficient of determination R^2 is 0.675 for the application quality endogenous latent variable. The coefficient of determination, R^2 is 0.555 for the endogenous latent variable, trust. The coefficient of determination R^2 is 0.521 for the brand loyalty endogenous latent variable. The optimum value range for the coefficient of determination, any value above a minimum of 0.25 [16]. This leads to the conclusion that the latent variables (content, usability, and functionality) have the following path coefficients as shown in Figure 2.
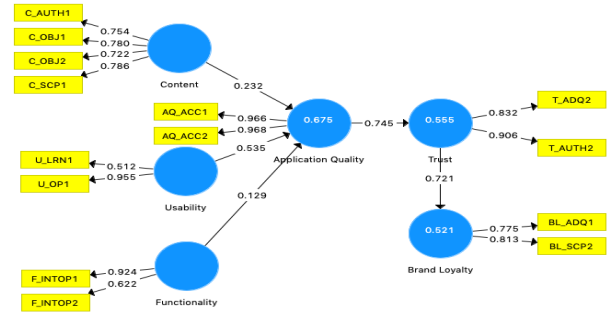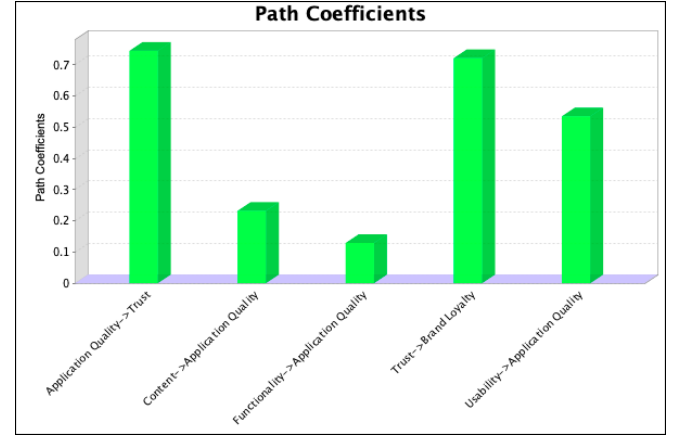

Figure 1. The PLS algorithm results.

Figure 2. Path coefficients of the Latent Variables

The chart of path coefficients of the latent variables in indicates the Application Quality relates to Trust has the highest path coefficient, which suggests that the application quality has the highest affinity towards the trust of the user. The Usability relates to Application Quality has a path coefficient of 0.535 that is much higher than Content ->Application Quality and Functionality relates to Application Quality. This indicates that the usability of the website/application contributes more to the application quality than what, content or functionality adds to the application quality of the website/application. The lowest path coefficient noted is Functionality relates to Application Quality, a value of 0.129 which indicates that the users have given the functionality factor of the OFD website/application the least consideration/importance.

The test for validity and reliability of the constructs, the Rossiter [2002] procedure for the development of the scale. The indicator reliability test, and then the convergent validity tests and discriminant validity test is conducted if the given scale is evaluated.

Similar to other marketing research procedures, it is vital to declare the reliability of the latent variables to fulfill the examination of the structural model. The indicator reliability value of the latent variable is calculated by taking the squared value of all the indicator loading values. For research purposes, it is requisite to have an indicator reliability value higher than 0.70. In the case of exploratory research, an indicator reliability value higher than 0.40 is preferred according to Tabachnick and Fidell (1996), [16].

TABLE II
INDICATOR RELIABILITY

Item	Indicator	Loading	Reliability
1.	C_OBJ1	0.780	0.6084
2.	C_AUTH1	0.754	0.568
3.	C_SCP1	0.786	0.617
4.	BL_ADQ1	0.793	0.628
5.	T_ADQ2	0.832	0.692
6.	F_INTOP1	0.924	0.853
7.	U_OP1	0.955	0.912
8.	AQ_ACC1	0.966	0.933
9.	AQ_ACC2	0.968	0.937
10.	F_INTOP2	0.924	0.853
11.	~~T_AS1~~	~~0.224~~	~~0.050~~
12.	BL_SCP2	0.796	0.633
13.	T_AUTH2	0.983	0.966
14.	~~T_ADQ4~~	~~0.343~~	~~0.117~~
15.	C_OBJ2	0.722	0.521

A. Convergent Validity

Convergent validity specifies that items that are indicators of a construct should share a high proportion of variance [Hair et al 2006] [17]. The convergent validity of the scale items was assessed using the given criteria. First, the factor loadings should be higher than 0.50 as proposed by Hair et al. (2007). Secondly, the composite reliability for each construct should exceed 0.70. Lastly, the average variance extracted (AVE) for each construct should be above the cut-off 0.50 proposed by [16].

B. Discriminant Validity

Fornell and Larcker [19] Criterion Analysis (CA) that is opted for checking discriminant validity tells that the square root of AVE in each latent variable is used to establish discriminant validity, only if this value is larger than the other correlation values among the latent variables [16] and Table III gives the square root of AVE was manually calculated from the and written in bold on the diagonal of the Table III. The correlations between the latent variables

TABLE III
DISCRIMINANT VALIDITY

	A Q	BL	CONT	FUNCT	TRUST	USAB
AQ[a]	**0.967**					
B L	0.594	**0.794**				
CONT	0.688	0.536	**0.761**			
FUNCT	0.707	0.562	0.721	**0.788**		
TRUST	0.745	0.721	0.711	0.718	**0.870**	
USAB	0.819	0.617	0.732	0.770	0.778	**0.742**

[a]AQ= Application Quality; BL= Brand Loyalty; CONT= Content; FUNCT= Functionality; USAB=Usability

were transferred from the Latent Variable Correlation. For example, the latent variable, functionality has the AVE found to be 0.621 (from Table III). Hence its square root becomes 0.788. This number is larger than the correlation values in the row of functionality (0.707, 0.562, 0.721 and 0.650) and more significant than those in the column of functionality (0.718 and 0.770). Similar observations are noted for the latent variables, application quality, brand loyalty, content, functionality, trust, and usability. The result obtained indicates that the discriminant validity is well established as all the values calculated along the principal diagonal of the LCA matrix confirms to the required criteria.

C. Structural path significance

The path coefficient for the model is carried out. The review aids in exploring the outer model by checking the T-statistic in the Outer Loadings (Means, STDEV, T-Values). As presented in Table IV, all the t-statistics are more significant than 1.96 that the outer model loadings are highly significant.

A hypothesis testing is conducted to predict and evaluate the result criteria by forming a hypothesis and using the t-statistics value for each of the path loadings. The higher the t-statistics value indicates that the higher significance support to the path, median, standard deviation, and mean. The cut-off criteria used was value greater or equal to 1.645 for an alpha level of 0.05 (Hair et al. 2006) [16].

Hypothesis H1 states that there is a positive relation

TABLE IV
PATH COEFFICIENT AND SIGNIFICANCE (T- STAT)

Application Quality to Trust	23.918***
Trust to Brand Loyalty	26.211***
Content to Application Quality	4.832***
Functionality to Application Quality	2.378**
Usability to Application Quality	10.922***

*** $p \leq 0.001$, ** $p \leq 0.01$, * $p \leq 0.5$

between application quality and trust. The hypothesized path for H1 was positive (t >1.645 and p <0.01) and is supported. Thus, it can be said can say that the null hypothesis is accepted, and an alternate hypothesis is rejected.

Hypothesis H2 states that there is a positive relationship between content and application quality. The hypothesized path for H2 was positive (t >1.645 and p <0.01) and is supported. Thus, the null hypothesis is accepted, and an alternate hypothesis is rejected.

Hypothesis H3 states that there is a positive relation between functionality and application quality. The hypothesized path for H1 was positive (t >1.645 and p <0.01) and is supported. Thus, the null hypothesis is accepted, and the alternate hypothesis is rejected.

Hypothesis H4 states that there is a positive relationship between trust and brand loyalty. The hypothesized path for H1 was positive (t >1.645 and p <0.01) and is supported. Thus, the null hypothesis is accepted, and the alternate hypothesis is rejected.

Hypothesis H5 states that there is a positive relation between usability and application quality. The hypothesized path for H1 was positive (t >1.645 and p <0.01) and is supported. Thus, the null hypothesis is accepted, and an alternate hypothesis is rejected.

The model helps in understanding the intricacies of the OFD structure, study on how it benefits the application quality when it's compared with the path coefficients and how it affects each other differently. The model was assessed using three criteria: 1) path coefficients(β), 2) path significant(p-value) and, 3) variance explained R^2. The model was designed in PLS as per the guidelines are given in the SmartPLS Guide [16]. The criterion put forth by Rossiter [2002] states that for the structural model all paths should result in a t-statistic value greater than two and the latent variable' R-Square values are higher than 50%. The result for the full model indicates that 62.7 percent of the variance

in application quality and 52.1 percent of the variance in brand loyalty. 55.5 percent of the variance in trust. According to the structural model, all the predicted paths are hypothesized and validated. The model indicates that trust is having a positive impact on brand loyalty.

V. CONCLUSION

The dimensions presented, the usability dimension has the highest occurrence, followed by content and functionality. In the analysis of the path coefficient model, the application quality dimension leading to trust has the highest path coefficient and indicates that with an application which consists of appropriate content, functionality and usability ensures that the consumers display a higher trust towards the brand. Through several tests conducted on the data gathered, it was possible to verify the reliability and credibility of the data collected. The OFD industry is still in its infancy and yet to enter the next stage. With time, the consequences and/or fruits of the services rendered may be assessed. In the current scenario of the Indian OFD services' market, it is very evident from the analysis conducted that the data suggests that there is a shift in the lifestyle of the population. Prolonged brand loyalty may lead to the consumers' fixating on a brand, and this leads to changes in the way the consumer perceives his/her intent to purchase products or services. Erecting a seamless experience for the consumers with stringent marketing efforts and creating innovations in the lifestyles of the general population should be the prime objectives of the OFD companies to be able to sustain for an elongated period. In the proceeding text the future scope of the project is discussed.

The insights from this study may help the OFD companies in India to take note of the impacts their strategies are making, especially when it comes to interactions with the customers to enhance brand loyalty. The brands will have to scrutinize the application quality of their existing services primarily and also give high regard to the use of social media to boost their returns [19] [20]. Few limitations in this study since it is an exploratory form of research and the limited availability of similar works from the literature. The data reliability has given confidence in transforming the little data into meaningful analysis and interpretation. Future works allow probing on the Online food sector. The dynamic nature of this booming market segment may intrigue [21] [22]. The upcoming generations and encourage them to devise more innovative marketing campaigns, and to produce changing ideas in the field of interest.

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