

QUANTIFYING CUSTOMER EXPERIENCE FOR QUALITY ASSURANCE IN THE DIGITAL ERA

Abstract

Post the pandemic, the new normal situation demands an increased digitalization across all industry sectors. Ensuring top class customer experience became crucial for all digital customer interactions through multiple channels like web, mobile, chatbot, etc. Customer experience is an area in which neither the aesthetics nor the content can be compromised as that will lead to severe negative business impact. This paper explains various automation strategies that can enable QA teams to provide a unified experience to the end customers across multiple channels. The focus is to identify the key attributes of customer experience and suggest metrics that can be used to measure its effectiveness.

Introduction

Customer experience has always been a dynamic topic as it is becoming more personalized day by day and varies according to individual preferences. It is hard to measure customer experience which make the work even more difficult for Quality Assurance teams. The factors which amplify the customer experience not only include the functional and visual factors like front end aesthetics, user interface, user experience, etc., but also include non-functional and social aspects like omnichannel engagements, social media presence, customer sentiments, accessibility, security, performance, etc.

Why do we need to measure the Customer Experience?

Enterprises encounter various challenges in providing a unified experience to their end customers across multiple channels such as:

- Lack of information or mismatch in information
- Quality of content is not up to the standard
- Lack of usability in cross navigation to make it intuitive and self-guided
- Consistent look and feel and functional flow across various channels
- Improper content placement
- Inappropriate format and alignment
- Performance issues across local and global regions
- Violation of security guidelines
- Nonconformance to Accessibility as per the Web Content Accessibility Guidelines (WCAG) guidelines
- Lack of social media integration

Quality Assurance is required in all these areas of functional, nonfunctional, and social aspects of Customer Experience. Since, Customer Experience is hyper personalized in the digital era, a persona-based experience measurement is required. Conventional Quality Assurance practices need to be changed to evaluate all aspects of customers journey across multiple channels, comprehensively.

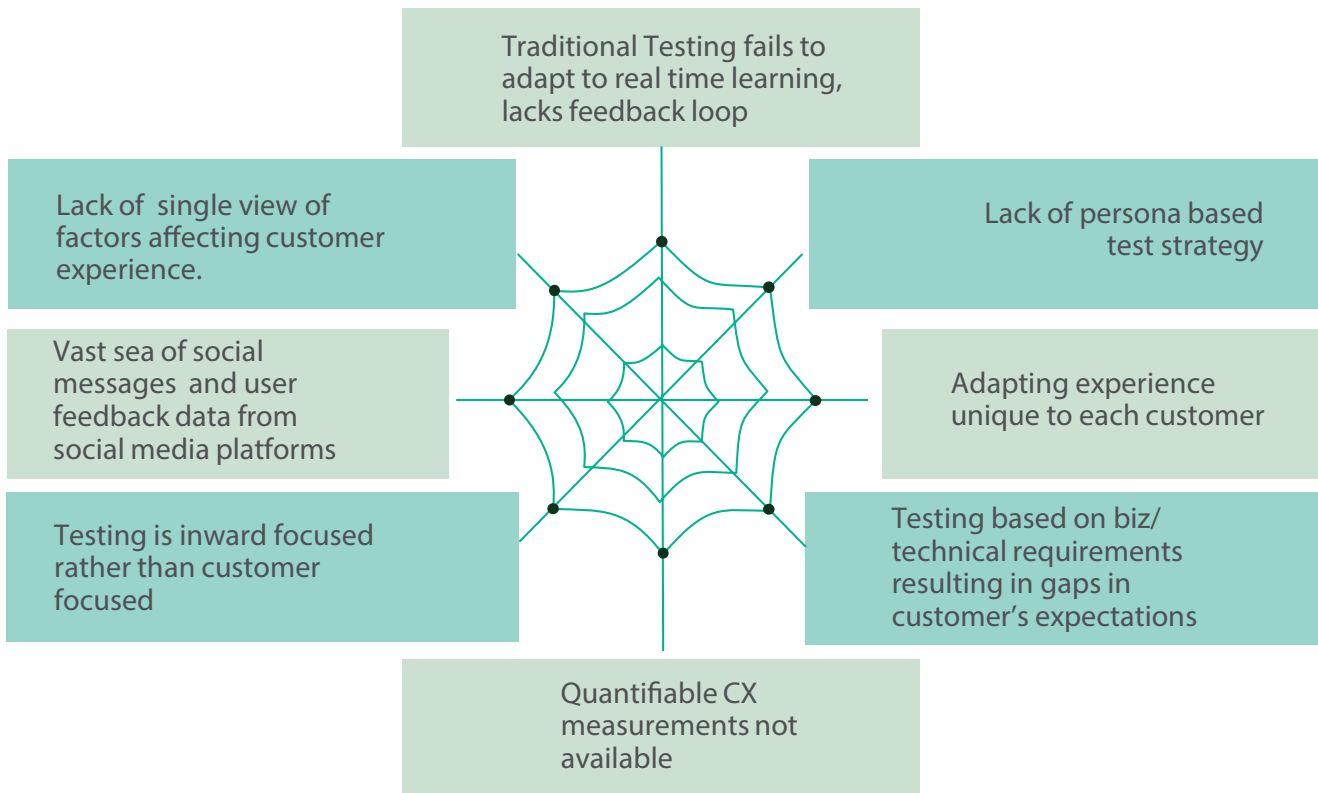


Figure 1 Challenges in Quality Assurance of Customer Experience

Experience Validation Needs to Cover Multiple Areas of a Customer Journey

While organizations try to focus on enhancing the customer experience, there are various areas need to be validated and remediated independently for functional, nonfunctional, and social aspects. The current testing trend covers the basic functional and statistical aspects, emerging testing areas will cover behavioral aspects and focus more on providing customer centric approach like using AI for enhancing the quality of digital impression with personalized customizations. Below table provides information on areas where quality assurance is required along with the popular tools for automation.

Sr No	Area	Key Aspects / Metrics	Current Testing Trend	Emerging Testing Trend	Tools
1	Visual Conformance	Webpage content alignment, font size, font color, web links, images, audio files, video files, forms, tabular content, color scheme, font scheme, navigation buttons, theme etc.	A/B testing, Style guide check, Font check, Color check, Usability testing, Readability testing	Persona based testing	Siteimprove, AppliTools, SortSite
2	Content	Checking whether the image, video, audio, text, tables, forms, links etc. are up to the standards.	A/B Testing, Voice quality testing, Streaming media testing, Compatibility testing, Internationalization/ Localization testing	Personalized UX Testing, CSS3 Animation testing, 2D Illustrations, AI powered translators	Siteimprove, SortSite
3	Performance of webpage	Loading speed, Time to Title, DNS lookup speed, Requests per second, Conversion rate, Time to First Byte, Time to Interact, Error Rate	Performance testing, Network testing, cross browser testing, multiple device testing, multiple OS testing	Performance Engineering, AI in performance testing, Chaos Engineering	GTMetrix, Pingdom Tool, Google Lighthouse, Web Page Test, etc.
4	Security	Conformance with security standards across geographies. Secured transactions, cyber security, biometric security, user account security	Application security testing, Cyber Assurance, Biometric testing, Payment Testing	Blockchain testing, Brain Computer Interface BCI testing, Penetration testing, Facial recognition	Sucuri SiteCheck, Mozilla Observatory, Acunetix, Wapiti
5	Usability	Navigation on website, visibility, readability, chatbot integrations, user interface	Usability testing, Readability testing, Eye tracking, Screen reader validation, Chatbot testing	AI led design testing, Emotion tracking, Movement tracking	Hotjar, Google Analytics, Delighted, SurveyMonkey, UserZoom
6	Web Accessibility	Conformance to web accessibility guidelines as per geography	Checking conformance to guidelines [Web Content Accessibility Guidelines (WCAG), Disability Discrimination Act (DDA) etc.]	Persona based accessibility testing	Level Access, AXE, Siteimprove, SortSite.
7	Customer Analytics	Net Promoter Score, Customer Effort Score, Customer Satisfaction, Customer Lifetime Value, Customer Turn Rate, Average Resolution Time, Conversion Rate, Percentage of new sessions, Pages per session	Sentiment Analytics, Crowd testing, Real time analytics, social media analytics, IOT testing	AR/ VR testing, Immersive testing	Sprout Social, Buffer, Google Analytics, Hootsuite.
8	Social Media Integration	Clickthrough rate, measuring engagement, influence, brand awareness	Measuring social media engagement, social media analytics	AR/VR testing, Advertising Playbook, Streaming Data Validation	Sprout Social, Buffer, Google Analytics, etc.

Table 1 Holistic Customer Experience Validation and Trends

Emerging Trends in Customer Experience Validation

Below are few of the emerging trends that can help enhance the customer experience. QA team can use quantifiable attributes to understand where exactly their focus is required.

Telemetry Analysis using AI/ML in Customer Experience

Telemetry data collected from various sources can be utilized for analyzing the customer experience and implementing the appropriate corrective action. These sources could be the social media feeds, various testing tools mentioned in Table 1, web pages, etc. Analytics is normally done through custom built accelerators using AI/ML techniques. Some of the common analytics are listed below:

- **Sentiment Analytics:** Sentiment of the message is analyzed as positive, negative, or neutral
- **Intent Analytics:** Identifies intent as marketing, query, opinion etc.
- **Contextual Semantic Search (CSS):** Intelligent Smart Search Algorithm which filters the messages into given concept. Unlike the keyword-based search, here the search is done on a dump of social media messages for a concept (e.g Price, Quality, etc.) using AI techniques.
- **Multilingual Sentiment Analytics:** Analyze sentiment based on languages
- **Text Analytics, Text Cleansing, Clustering:** Extracting meaning out of the text by language identification, sentence breaking, sentence clustering etc.
- **Response Tag Analysis:** To filter pricing, performance, support issues
- **Named entity recognition (NER):** To identify who is saying what on social media posts and classify
- **Feature Extraction from Text:** Transform text using bag of words and bag-of-n-grams
- **Classification Algorithms:** Classification algorithms assign the tags and create categories according to the content. It has broad applications such as sentiment analysis, topic labeling, spam detection, and intent detection.

- **Image analytics:** - Identifying the context of the image using image analytics, categorizes the image and sort them according to gender, age, facial expression, objects, actions, scenes, topic, and sentiment.

Computer Vision

Computer Vision helps to derive meaningful information from images, objects, and videos. With hyper personalization of customer experience, we need an intelligent and integrated customer experience which can be personalized by the people. While AI plays an important role in analyzing the data and recommend the corrective actions, Computer Vision helps to capture the objects, face expressions, etc. and the image processing technology can be leveraged to interpret the customer response.

Chatbot

A chatbot is an artificial intelligence software that can simulate a conversation (or chat) with a user. Chatbot has become a very important mode of communication and most of the enterprises use chatbots for their customer interactions, especially in the new normal scenario.

Some of the metrics to measure customer experience using a chatbot are:

1. **Customer Satisfaction:** This metrics will determine the efficiency and effectiveness of chatbot. Questions which can be included in this can be:
 - Whether chatbot was able to understand the query of the customer?
 - Was the response provided to the specific query?

- Whether the query was transferred to the specific agent in case on non-resolution of the query

2. **Activity Volume:** How frequently is the chatbot used? Is the usage of chatbot increasing or decreasing?
3. **Completion Rates:** This metric measures the amount of time the customer took. Also, the levels of question asked by the customer. It will measure the instance when the customer opted to get resolution from an agent and left the chatbot. This will help identify the opportunities to improve the chatbot further, improving the comprehension, scripts and adding other functionalities to the chatbot.
4. **Reuse Rates:** This metric will provide the insight on the reuse of chatbot by the same customer. This will also enable to dive deep into the results of customer satisfaction metric, help us understand new user v/s old user usage ratio and allow us to conclude on re-usability and adaptability of chatbot by customers.
5. **Speech Analytics Feedback:** In this speech analytics can be used to examine customer interactions with service agents. Some of the specific elements to be noted include tone of the call, frustration level of customer, knowledge level of customer, ease of use etc.

Measuring Tools

Even though there are various tools available from startups like BotAnalytics, BotCore, CharBase, Dashbot, etc., most of the QA teams are measuring the Chatbot performance parameters through AI/ ML utilities.

Alternative Reality

Alternative Reality includes augmented reality (AR), virtual reality (VR) and mixed reality. AR is in many ways adding value to the customer experience of an enterprise by providing an interactive environment and helps them to stay ahead of their competitors. The data points used to measure it overlap with those of website and app metrics, with addition of a few new points to be measured.

Some of the additional metrics to measure customer experience in Alternate Reality:

1. **Dwell time:** Total time spent on the platform. More time spent on platform being the positive outcome
2. **Engagement:** Interaction with the platform. More the engagement better is the outcome.
3. **Recall:** Ability to remember. Higher recall rate indicates proper attention and guides us on the effectiveness of the platform
4. **Sentiment:** Reaction. Positive, Negative and Neutral. This will assist in understanding the sentiment.
5. **Hardware used:** Desktop, laptop, tablet, mobile etc.

Measuring Tools

There is not much automation done in AR/ VR experience validation. Custom built utilities using Unity framework can be explored to measure the AR/ VR experience.

Brain computer interface

A brain computer interface (BCI) is a system that measures activity of the central nervous system (CNS) and converts it into artificial output that replaces, restores, enhances, supplements, or improves natural CNS output, and thereby changes the ongoing interactions between the CNS and its external or internal environment. BCI will help in personalizing the user experience by understanding the brain signals from a user.

Metrics to measure customer experience in BCI:

1. **Speed** - Speed of the user's reaction. Higher the speed, more is the user interest on digital print.
2. **Intensity** - Intensity of user's reaction towards a digital presence will help understanding the likes and dislikes of user.

3. **Reaction** - This will help understand the different reactions on digital interaction.

Measuring Tools

Open-source tools like OpenEXP, Psychtoolbox, etc. can be leveraged to build custom built utilities for measurement of the above metrics



Automation in Customer Experience Assurance

With multiple channels to interact with the end customers, companies really looking at ensuring the digital quality assurance in a faster and in a continuous way. To reduce time to market, customer experience assurance should be automated with more and more infusion of AI and ML. Further, quality assurance should be in an end-to-end manner, where the developer can ensure the quality even before the application is passed to QA. With the adoption of DevSecOps, customer

experience assurance should be an ongoing process which goes beyond the conventional QA phase

Some of the technical challenges in automation are:

- Services offered by company should have a seamless experience with all distribution channels (Web, mobile, Doc, etc.).
- Early assurance during development
- Ensure regulatory compliance
- Collaboration environment for

developers, testers, and auditors with proper governance

- On demand service availability
- Automating the remediation and Continuous Integration
- Actionable insights
- Scoring mechanism to benchmark
- Integration with Test and Development tools

The above challenges will call for a fully automated customer experience platform as depicted below:

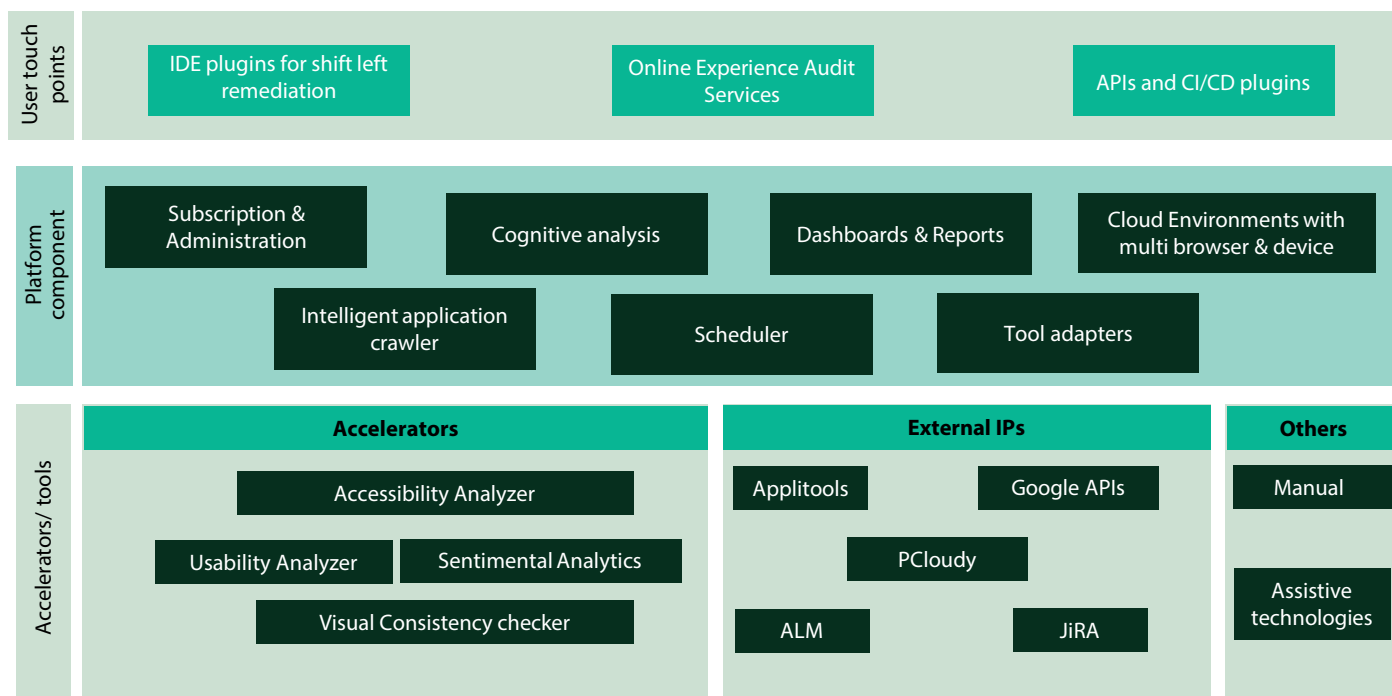


Figure 2 Automation approach for evaluating holistic customer experience

An automation approach should be comprehensive enough to provide a collaboration environment between testers, developers, auditors, and the customers. It needs accelerators or external tools to measure and analyze

various aspects of customer experience. Cognitive analysis to ensure continuous improvement in customer experience is a key success factor for every enterprise. As shown in the picture, complete automation can never be achieved as

some assistive or manual verification is required. For example, JAWS screen reader to test the text to speech output. Also, the platform needs to have the integration capabilities with external tools for end-to-end test automation.

Conclusion

As the digital world is moving towards personalization, QA teams should work on data analytics and focus on analyzing user behavior and activities, leveraging various available testing tools. They should also focus on adapting new and emerging testing areas like AI based testing, Persona based testing, Immersive testing, 2D illustration testing etc. These new testing areas can help in identifying the issues faced in providing the best customer experience, quantify the customer experience and can help in improving it.

Since there is considerable amount of time, money and effort are put into QA., for ensuring good ROI, QA team should start taking customer experience as a personality-based experience and work upon all major aspects mentioned above. QA teams should look beyond the normal hygiene followed for digital platforms, dig deeper and adapt a customer centric approach in order to make digital prints suitable to the user in all the aspects.



References

1. Customer Experience Validation - Offerings | Infosys
2. https://www.gartner.com/imagesrv/summits/docs/na/customer-360/C360_2011_brochure_FINAL.pdf
3. The Future of CX 2022, a trends report by Freshworks

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