

# Chatbots in Marketing - A morphology of literature

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## **Chatbots in Marketing - A morphology of literature**

### **Abstract:**

The prevalence of chatbots in marketing related functions has been on the rise as they are capable of providing 24/7 service and reducing employee workload in handling customer calls. However, the academic literature on chatbots in marketing has been sparse and scattered. As a way of structuring and compiling the existing literature, morphological analysis was performed. Morphological Analysis involves dividing the whole problem into pertinent but clearly distinguishable components such as dimensions (At a higher level) and variants (At a smaller level) and studying the interaction between the variants. In this study, a total of 11 dimensions and 296 variants were obtained. To eliminate inconsistent configurations, a cross-consistency assessment was performed. A representation of the option spaces has been given in the article.

*Keywords: Chatbots, Morphological Analysis, Literature Review*

*Track of the paper: Digital Marketing and Social Media*

## **1. Introduction:**

Owing to their ability to provide 24/7 service and reduce employee workloads, Chatbots have recently seen wide application in the field of Marketing, in functions such as as E-commerce, Analytics etc., (Vukovic & Dujlovic, 2017). Despite reports that speak of the rapid acceptance of chatbot adoption among customers, which is estimated to be at 136% (Sweezy, 2019), there are contrasting views which claim otherwise – that customers prefer interacting with humans over artificial agents (Sentence, 2019; Press, 2019).

This leads us to looking at the existing academic literature on these bots, which are scattered and sparse, owing to the nascency and interdisciplinary nature of the area (Io and Lee, 2017). Thus, through this paper, the authors aim to bring a structure to the extant academic literature on text based chatbots through Morphological Analysis.

For this, the authors review the extant literature through the use of Morphological analysis, a technique that has previously been robust for problem structuring (Ritchey, 2006), solving non-quantifiable problems (Ritchey, 2002) and for identifying gaps in literature (Sudhindra et. Al., 2014). Through this technique, the authors intend to firstly identify the dimensions of text-based chatbots that have been studied so far, see which of them have been widely studied together and give a comprehensive view of academic literature related to chatbots in marketing.

The rest of the paper has been organized as follows: Section 2 contains a brief review of the Morphological Procedure; Section 3 contains the methodology that was followed in the current literature review; Section 4 contains the findings of the review and includes the description of dimensions, the Zwicky Box and the Cross Consistency Matrix; Section 6 includes the Discussion and Conclusion of the study.

## **2. Morphological Analysis (MA):**

Morphological analysis is the study of how each part of a problem conforms and contributes to the study of the whole (Xin et. Al, 2010). It is the process by which a problem under study is iteratively broken down into each of its essential and non-overlapping building blocks – called dimensions – which are made up of sub-dimensions and variants (Álvarez & Ritchey, 2015). These dimensions, when taken together, make up the entire problem (Sudhindra, Ganesh, & Arshinder, 2014). After this, a morphological field, also known as a Zwicky Box, is constructed that consists of all the possible values of each of the dimensions identified (Ritchey, 2006). Each combination of the variants of these dimensions is called a configuration. While a large number of these configurations can be obtained, not all of them need to be “Consistent”, in that some of the configurations may not follow logical or

normative conclusions. Thus, to filter out all the inconsistencies, a cross consistency assessment is carried out (Voros, 2009), in which all the combinations that are logically inconsistent are eliminated. At the end of this method, an option space can be studied for selected or all dimensions, which consists of each possible configuration. Finally, the morphological method gives a structure to the problem and gives way to finding new possible set of configurations.

### **3. Methodology:**

This section describes how Morphological Analysis has been applied in this paper. Before delving into MA, a systematic literature review of chatbots was carried out to identify the extant research work using the framework proposed by Tranfield, Denyer, and Smart, 2003. First, a review protocol was developed detailing the scope of the study, the inclusion criteria and exclusion criteria. To ensure quality, the scope of the study was limited to peer reviews journal and conference publications that are either Scopus Indexed or in ABDC journal quality list. Next, the material collection process (Leiras, Jr, Peres, Bertazzo, & Yoshizaki, 2014) was done by using the following keywords:

Chatbots [OR] Conversational Agents [OR] Virtual Service Agents [OR] Messenger Bots [OR] E-Service Agent [OR] Service Robots

The research articles obtained were further filtered using the following criteria:

#### *3.1. Inclusion criteria:*

- Journal Articles or Conference proceedings that are either listed in ABDC journal quality list or in Scopus
- The scope of the article under consideration should be limited to ‘text based chatbots in Marketing’. Studies on voice-based or robotic agents were excluded.
- Methodologies included: Empirical and Conceptual / theoretical papers

Following these criteria, a total of 157 papers (87 Journal papers and 70 conference papers) were obtained through search done on academic databases like Scopus, EBSCO, ScienceDirect, JSTOR, Web of Science, Google Scholar and Proquest. Manual reading of abstracts (and the full paper, wherever necessary) was done to further filter out the irrelevant papers. Finally, a total of 53 papers were found to be within the scope of the problem.

The perusal of these papers led to identifying 11 dimensions. The process of identifying these dimensions involved breaking down the entity under study, Chatbots in Marketing, into clearly distinguishable, pertinent components which constitute the whole entity when put together.

Generally, in a morphological analysis, the dimensions are formed through the judgment and discussion among the authors. However, in this case, the authors used means-end-chain (Parasuraman, Zeithaml and Malhotra, 2005) model to anchor the dimensions. This model helps to understand cognitive structures and states through which consumers hold information about a product in memory at multiple levels of abstraction (Olson and Reynolds, 1983). At the more basic level, there are concrete and specific cues (such as website features) that trigger perceptual attributes (such as site aesthetics, flexibility, reliability etc.). Evaluation on these attributes coalesce into evaluations along more abstract dimensions (such as website information quality) that lead to global assessments, behavioral intentions and actual behavior.

Once the dimensions were identified, the set of concepts, constructs and measures studied were classified in such a way that they either form sub-dimensions or variants of these dimensions. To make the study insightful given the limited amount of literature available, the authors have represented up to the sub-variant level, wherever applicable. Totally, 11 dimensions and 296 variants have been studied and presented in this study.

To analyze which of these variants have been studied together so far and to identify logical inconsistencies in data, a cross-consistency assessment (CCA) was carried out. CCA is the procedure in which a pair-wise comparison is done on all the variants through a cross consistency matrix, to see which of them are mutually consistent, that is they can co-exist by themselves (Ritchey, 2002; Ritchey, 2006). Conversely, two variants are said to be logically inconsistent if they cannot be studied theoretically, empirically inconsistent if the relationship between the two variables have been disproven empirically and normatively inconsistent if the interaction of two variables will lead to ethical concern (Ritchey, 2002). As research on chatbots in marketing is still in its nascent stage, this paper only highlights some of the logical inconsistencies through the cross consistent matrix. Here, pairwise assessment of variants has been carried out to give a picture of the logical inconsistencies.

#### **4. Findings:**

This section gives a description of the Dimensions, sub-dimensions and some of the variants that have been identified through the morphological analysis and the cross-consistency assessment of the same. The Morphological framework has been presented in Table 1 (To be made available on request).

#### 4.1. *Dimensions:*

From the literature, a total of 11 dimensions were identified with respect to chatbots in marketing. The following is the description of each dimension and its corresponding sub-dimensions.

##### 4.1.1. *DIM1: Context:*

The context dimension refers to the instances and purposes for which chatbots have been studied in the literature so far. The subdimensions are:

**Industry:** Various industries under which chatbot has been studied in the literature.

**Role of chatbot:** It gives us an idea of the roles that a chatbot assumes in a marketing setting such as personal shopper, helper etc., which form the variants of this sub-dimension.

**Tasks:** The different tasks a chatbot has been used for such as answering FAQs, negotiation, persuasion, customer service etc.

**Types:** The different types of chatbots such as embodied, disembodied etc.

##### 4.1.2. *DIM2: Platform of use*

This dimension discusses about the online location of the bots.

**Social Media:** social media platforms like Messenger, Telegram etc. to place chatbots.

**Stand-alone:** The bots are placed on the website / app of the brand directly.

##### 4.1.3. *DIM3: Nature of customer Queries*

It describes the different type of queries or requests that a customer can have for a chatbot.

**Informational requests:** Requests made regarding the utilitarian aspect of the purchase interaction – such as questions about product specifications, etc.

**Feedback and Recovery:** Comments or opinions voiced by the customers expressing their emotions such as excitement, disappointment etc., about the product or service.

**Question Framing:** This sub-dimension is different from the other two sub- dimensions as it speaks about the way that a customer can frame a question.

##### 4.1.4. *DIM4: Customer Characteristics:*

This dimension contains the characteristics of the customers who are using the chatbots.

##### 4.1.5. *DIM5: Design cues and input features*

It refers to the cues that are built into the chatbot and that are concrete, which can be seen / felt by the customer easily (Parasuraman, Zeithaml and Malhotra, 2005), which act as antecedents for the customer to perceive attributes, outcomes and values from the interaction with chatbot. It comprises of eight sub-dimensions.

**Hedonic Input features:** The input features that are not essential for the utility or the basic functioning of the bot but will add to the enjoyment or pleasure of using it.

**Functional Input features:** The input features that are essential for the functioning of the chatbot, such as relevance, correctness, error rate etc. comprise this sub-dimension.

**Mode of Implementation:** Platform as a service, or Software as a Service (Bello, 2019)

**Anthropomorphic Design:** The design cues that are included for making the chatbot seem more humanlike or anthropomorphic are called anthropomorphic design cues.

**Types of Marketing Messages / Media:** This sub-dimension includes various types of media and messages that a chatbot can exchange with customer such as images, videos etc.

**Dialogue Design:** The design cues that have to be included in the dialogue of the agent such as cues for sympathy etc. are grouped under this sub-dimension.

**User Interface Design:** The visual cues that have to be included in the user interface such as the color scheme, carousel, avatar etc. have been grouped under this sub-dimension

**Design cues for Quality:** It comprises of the set of design cues that improves chatbot's quality such as Human handover, Efficiency etc. Minimal set of commands etc.

#### *4.1.6. DIM6: Chatbot communication:*

This dimension discusses the types of responses that a chatbot gives to the customer. It is comprised of the following components:

**Chatbot Answers:** Responses of a chatbot when it doesn't know the answer to a query – passive (random answer) or active (try to learn the answer from the customer).

**Interaction Style:** The interaction style of the chatbot can vary depending on the purpose or type of marketing communication based for which it has been deployed.

**Discourse Intention:** refers to the intention of the parties involved in the discourse.

#### *4.1.7. DIM7: Perceived attributes:*

The first level output that a customer experiences directly because of the design cues that have been built into the Chatbot has been referred to as Perceived attributes (Parasuraman, Zeithaml and Malhotra, 2005). Four categories of perceived attributes have been observed:

**Functional attributes:** These set of attributes mainly fulfill the utility requirements of the customer. Examples: Perceived Relevance, Perceived Informativeness, Learnability etc.

**Experiential attributes:** Those attributes that are directly experienced by the user as they relate to sensory or mental stimulations. Examples: Spine tingling perception, perceived ease of use etc.

**Social attributes:** The attributes that the user perceives in the chatbot based on the way of interaction. Examples: Social Presence, Consistent Position during conversations etc.

**Emotional Attributes:** include set of emotional features or feelings that a user perceives from a chatbot. For example, the attribute Perceived Risk, Eeriness of that chatbot.

#### *4.1.8. DIM8: Perceived Qualities:*

The perceived attributes lead the user to perceive some qualities of the chatbot (Parasuraman, Zeithaml and Malhotra, 2005), which he/she uses to evaluate the performance of the agent. The following sub-dimensions have been identified under this dimension:

**IS Model Qualities:** Extracted from the IS Model, it lists three different variants that a chatbot can be evaluated by: System quality, information quality and service quality.

**Communication Quality:** This sub-dimension talks about the set of perceived variables that lead a user to perceive high / low quality of communication.

**Recommendation or Decision Quality:** This refers to the quality of the recommendation of the chatbot and how it fits with the expectations of the customer.

**Perceived Shopping Value:** The utilitarian or hedonic value that a customer perceived from shopping online or offline after the interaction with the chatbot

**Message Quality:** The qualities of the messages that are sent by the chatbot such as how supportive or sincere the messages are have been grouped under this dimension.

**Chatbot Characteristics:** The utilitarian and hedonic value that a customer perceives based on the interaction with the chatbot, irrespective of the actual shopping experience.

#### *4.1.9. DIM9: Overall Assessment of the Interaction*

Based on the perceived qualities of the chatbot, the customers make assessment of the interaction as a whole – that is, they form an attitude towards the bot such. This acts as a bridge between the perceived qualities and the behavioral intents of the customers.

#### *4.1.10. DIM10: Behavioral and Intentional Outcomes*

This dimension comprises of the final outcomes from the interaction from the customer's perspective. Thus, there are two sub-dimensions to this dimension:

**Outcomes towards the company:** include behaviors that can benefit or harm the company

**E-Consumer Productivity:** This set of variants depict how the productivity of a customer, through efficiency, effectiveness etc., is affected because of the presence of the chatbot.

#### *4.1.11. DIM11: Tangible Outcomes for the Company*

Finally, these outcomes are the ones that are tangible and directly impact the growth and development of the brand.

The Morphological Analysis Framework (MAF) or Zwicky Box was developed based by representing the grouping of variants into sub-dimensions and dimensions. For example, Intelligence, Relevance, Perceived Ease of Use, Spine Tingling perception, Pleasure, Dominance, Social Presence were some of the options that were identified, that belong to the



Perceived attributes of the system. However, these can be further grouped based upon their nature into functional (Intelligence, relevance), experiential (Perceived Ease of Use, Spine Tingling perception), social (Social Presence) or emotional attributes (Pleasure, Dominance) as described above. That is, the variants are the different forms that a sub-dimension or a dimension could take. The MAF has been given in Table 1[to be presented on Request]

From the variants identified in the MAF, CCA was done and the logical inconsistencies were identified. For instance, it is not logical to say that the experiential or emotional attributes will be perceived because of functional design cues and input features. Thus, they have been marked as inconsistencies. Similarly, other inconsistencies have been marked in the matrix.

As (Ritchey, 2002) states, the mutually consistent configurations can then be studied by the use of a 'single driver input' to see the option space for the configurations related to that particular input. As (Parasuraman, Zeithaml and Malhotra, 2005) have stated, the Design cues and input features essentially act as antecedents while the Perceived attributes, Perceived Qualities and Outcomes act as consequences. Owing to the large number configurations, a representation of the option space of the variants of the Design Cues and Input Features dimension across Perceived Attributes dimension has been given below in Figure 1. The cells representing inconsistencies have been marked with slanted lines whereas those representing combinations that have been studied have been colored black.

## **5. Discussion: F**

From the analysis above, it can be observed that though the extant literature on text based chatbots in marketing is low in quantity, a good portion has been studied at least at the conceptual level.

From the Zwicky Box given in Table 2, the following areas can be identified as dominant areas of research currently: Perceived Social Attributes, Dialogue Design, User Interface Design, Functional Input Features, Attitudinal Customer outcomes (specifically Customer Satisfaction), and Applications across Industries.

It can also be seen that most of the research related to this topic are empirical in nature and a good number of these have been carried out using the Wizard of Oz methodology. From the Table 2, a total of  $(56 \times 8 \times 4 \times 8 \times 57 \times 24 \times 32 \times 18 \times 89)$ , that is 10,05,37,15,23,072 number of configurations are possible for this morphology. From the cross-consistency assessment performed, it can be seen that some of these configurations are inconsistent and of the consistent configurations, only a small number have been studied together in the academic literature till now. This can be explained by the nascency of the research area.

*Table 1: Number of variants in each dimension*

<b>Name of the Dimension</b>	<b>Number of Variants</b>
Context	56
Chatbot Communication	8
Platform of use	4
Nature of customer queries	8
Perceived attributes	57
Perceived qualities	24
Outcomes	32
Customer characteristics	18
Design Cues and Input features	89

This gives vast scope of future research on research areas such as:

- The impact of hedonic input features on the perceived communication quality
- The interaction of functional input features and hedonic design cues
- Which industries are chatbots most suitable and accepted for?
- How does the nature of customer query (For instance, product information) mediate or moderate the impact of hedonic design cues on perceived attributes, qualities and outcomes?
- How the presence of a chatbot could lead to better perceived quality of the website and the shopping experience that arises from using the website
- The impact of presence of dialogue design cues on the perceived recommendation or decision quality of chatbots
- What attributes of chatbots are perceived in the presence of hedonic cues but absence of certain functional design cues and how do these perceived attributes translate to qualities and ultimately outcomes of the interaction.

The above mentioned are merely a fraction of the existing research gaps that can be examined with respect to the role of text based chatbots in marketing. Further gaps could be identified and explored through a thorough examination of the cross-consistency matrix. The academic implications of this study include bringing a structure to the area and putting into perspective the untapped areas of research. This work also has managerial implications in that, it provides practitioners with the different avenues to consider to optimize the fit, performance and customer acceptance of the bot.

## **6. References – To be submitted on request**

Design Cues		Experiential Attributes										Perceived Attributes										Social Attributes							
		Perceived Novelty	Perceived Ease of Use	Naturalness of the conversation	Spine-tingling perception	Perceived Playfulness	Aesthetic Appeal	Fun to Use	Frustrating to use	Listening	Consistent Position During Conversation	Self Efficacy	Personality	Social Presence	Perceived Humanness	Perceived Intrusiveness	Sympathy	Likeability	Perceived Helpfulness	Similarity with User	Comprehension	Perceived Sadness	Perceived Understanding	Funny and Interesting	Entertainment	Mindful Anthropomorphism	Mindless Anthropomorphism	Conversational Intelligence	
Hedonic Input Features	Interoperability																												
	Portability																												
	Entertainment																												
	Trendiness																												
	Brand Mission, goals and Values																												
	Understanding of user and needs																												
	Role / Job of Chatbots																												
	Personality Model																												
	Understand																												
	Customization																												
Need Fulfilment																													
Correction questions after a block of questions																													
Delivery of Information																													
Functionality																													
Security																													
Interactions																													
Problem Solving																													
AttrakDiff																													
Number of likes on social media																													
Message Count																													
Error Rate																													
Relevance																													
Correctness																													
Question Recommendation																													
Feature																													
Grammar																													
Time on task																													
Software as a Service																													
Platform as a Service																													
Linguistic Cues																													
Agent Information Display																													

Figure 1: Representation of Option Space of Design Cues and Input Features and Perceived Attributes dimension