

# Exploring the Role of NVivo Software in Marketing Research

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## Abstract

There is a growing interest in using software for qualitative data analysis to better manage the huge amount of digital data generated by online communities. This paper performs an exploratory single case study focusing on the Facebook page of a mobile phone industry firm to explore, using the NVivo software, customer-to-customer (C2C) interactions in the area of consumer brand engagement within an online setting. In an attempt to deepen the potential of using NVivo for qualitative research in social media domain, the authors suggest that this study will provide a useful overview for managers, decision makers, and researchers to understand how to investigate online phenomena like consumer brand engagement with more innovative tools.

*Keywords:* qualitative data sources, NVivo, NCapture, consumer brand engagement, social media.

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## Introduction

Digital platforms has facilitated consumers' interactions within online contexts (Braun *et al.*, 2016; Hollebeek *et al.*, 2014), and transformed the way in which people connect with each other and share information. Online brand pages have become new touch points for

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customers' daily interactions about their personal emotions, perceptions, knowledge, etc. (Bolton *et al.*, 2014). Accordingly, online communities represent key drivers of customer engagement (Cabiddu *et al.*, 2014; Gummerus *et al.*, 2012; Van Laer *et al.*, 2013) and customer satisfaction (i.e., higher trust, affective commitment etc.) toward brands (Gummerus *et al.*, 2012).

Customers' interactions within online contexts is still an under-explored topic (McKenna *et al.*, 2017) which requires further scholarly attention (Kamboj and Rahman, 2017; Libai *et al.*, 2010). Since digitalization of consumers' interactions has brought new "virtual" speeches that generate a larger amount of data to be managed (Ranfagni *et al.*, 2014), there is a growing interest in exploiting the opportunities provided by social media platforms. To date, there is still a small number of studies focused on users' interactions within virtual brand communities (Zaglia, 2013) exploring online phenomena through digital data provided by social media platforms (Germonprez and Hovorka, 2013; Vaast and Levina, 2015; Floreddu *et al.*, 2014; Moi *et al.*, 2017; Frau *et al.*, 2018). Moreover, the innovative tools currently available for conducting research (Ranfagni *et al.*, 2014) can easily handle data generated online (Cho *et al.*, 2017), overcoming traditional methodologies usually chosen to perform qualitative research in this stream of research (Du Plessis, 2017). Furthermore, few studies explore the features and paths of online brand community engagement from consumer perspective, i.e. consumer brand engagement within online contexts (Dessart *et al.*, 2015; Hollebeek *et al.*, 2014).

For these reasons, this paper aims to perform a qualitative data analysis to explore C2C interactions within an online setting. Through the use of NVivo software, our study deepens the understanding of C2C interactions within online brand communities (Braun *et al.*, 2016) in the realm of consumer brand engagement (Dessart *et al.*, 2015; Hollebeek *et al.*, 2014). We suggest new ways of exploring this topic by exploiting digital data through new qualitative research tools. In so doing, we try to answer the following research questions:

Research Question 1: To what extent is it possible to exploit digital data generated by online communities to perform qualitative research?

Research Question 2: Given the importance of online customer-to-customer interactions for online customer engagement, how can C2C interaction types be explored using NVivo?

This article has a methodological focus. It describes the development and process of the research and provides only sketches of the data and analysis necessary to understand how the research evolved.

## **1. Theoretical background**

### *1.1. Qualitative research in online contexts*

Computer-based tools as websites, Web 2.0 applications, social networks etc. has triggered the emergence of online communities where individuals create, share, interact, and collaborate to generate digital content (Bowden *et al.*, 2017; Mačiulienė and Skaržauskienė, 2016). Digital tools play a critical role from both an economic and social perspective because of the growing importance they assume in consumers' daily life (Van Dijck, 2013).

Online communities represent fundamental sources of data (Ranfagni *et al.*, 2014) elicited by users' interactions through blogs, forum, social networks etc., and have revolutionized the way in which people communicate with each other (Torres, 2017). Most of studies about online communities typically encompass quantitative methodologies (McKenna *et al.*, 2017) which enable the deepening of the structure of relationships using, for instance, statistical approaches like big data analytics (Whelan *et al.*, 2016). Conversely, qualitative studies concerning this stream of research are limited, and less attention is committed to investigating online phenomena by purely exploiting data generated by digital platforms (Frau *et al.*, 2018; Moi *et al.*, 2017).

Research on social contexts is a complex task. Quantitative methods better delineate the research boundaries of the investigated field like the use of hypothetic-deductive methods to test key relationships (Levina and Arriaga, 2014) such as social network analysis for clustering users and text mining (Ransbotham and Kane, 2011), but are not able to capture deeper observations, attitudes, and insights on what it is happening within networks (Whelan *et al.*, 2016). Qualitative methods, despite general issues like the management of a huge volume of data (McKenna *et al.*, 2017), are better for studying internal dynamics of networks, capturing deeper insights of consumers, trust, etc. (Crossley, 2010).

Throughout literature there are many qualitative methodologies used to investigate topics in business and social sciences realms (Chandra *et al.*, 2017) within online communities, such as interviews (Bowden *et al.*, 2017; Mačiulienė and Skaržauskienė, 2016), content analysis (Munzel and Kunz, 2014), ethnography (Torres, 2017) and digital ethnography (Ranfagni *et al.*, 2014). These methodologies have numerous advantages. For example, interviews disclose multiple ways to interpret the relationship between situations and behaviors in an online community (Mačiulienė and Skaržauskienė, 2016). Content analysis enables to link research insights from literature analysis with the data obtained during the qualitative research (Mačiulienė and Skaržauskienė, 2016), while ethnography collects

data during face-to-face encounters (Torres, 2017). Recently, ethnography has evolved toward digital ethnography, that is, “the observation of consumer behavior through their online discourse” (Ranfagni *et al.*, 2014, p. 726). The evolution of ethnography driven by digital technologies has developed new areas in market research and online brand communities (Ranfagni *et al.*, 2014) to explore new phenomena in innovative ways (McKenna *et al.*, 2017), giving rise to “netnography” stream of research (Kozinets, 2002).

Nevertheless, there is a very narrow set of qualitative research that investigates online phenomena by directly using data from social media platforms as key source (e.g. Floreddu *et al.*, 2014; Frau *et al.*, 2018; Germonprez and Hovorka, 2013; Moi *et al.*, 2017). However, as we show in the next paragraph, due to the growing opportunities triggered by digital platforms and IT-mediated social interactions, qualitative research within online contexts is evolving in new directions by adopting more innovative methodologies like the use of software applications (Ranfagni *et al.*, 2014).

### **1.2. Inside online brand communities: The qualitative research of C2C interactions through NVivo software**

As previously mentioned, qualitative research within online communities was mainly investigated through typical qualitative methodologies, such as interviews (Tomazelli *et al.*, 2017), ethnography or participant observation (Torres, 2017) etc. However, the growing emergence of online social interactions has brought new methods to conduct qualitative research for the easier access to information, like digital ethnography (Murthy, 2008) and netnography (Kozinets, 2002; Uhrich, 2014).

Nonetheless, the use of IT tools to perform qualitative research on online communities like software or data analysis is still very narrow despite the growing interest by scholars in using open source software as new means to conduct qualitative research (Chandra *et al.*, 2017) particularly to enhance transparency (Woods *et al.*, 2016), credibility, reliability and rigor (Sinkovics and Alfoldi, 2012). Moreover, software applications are useful in avoiding manual data analysis and managing information more efficiently (Bazeley and Jackson, 2013), since the huge amount of data generated by digital platforms requires to filter information according to the specific topic to be investigated (McKenna *et al.*, 2017)

The set of software applications used by scholars is wide: computer-assisted qualitative data analysis (CAQDAS) (Chandra *et al.*, 2017); NVivo; Leximancer (Hallier Willi *et al.*, 2014; McKenna *et al.*, 2017); ATLAS (Li, 2010); etc. They are designed to solve problems of qualitative

data analysis such as subjectivity, time-consuming process and vagueness in understanding a phenomenon (AlYahmady and Alabri, 2013). Among them, the qualitative data analysis software NVivo developed to manage “coding” procedures is widely considered as the most appropriate tool to conduct qualitative data analysis (AlYahmady and Alabri, 2013). In their work, Cho *et al.* (2017) point out that NVivo easily handles large amounts of data from interviews. Backlund and Backlund (2017) explain that, given the possibility to perform flexible coding schemes, NVivo allows to explore qualitative relationships among concepts, categorizing meanings or phrases by affinity and assigning them to the appropriate theme. According to Sinkovics (2016), this qualitative research software can manage, analyze and store from “different types of data from transcribed interview texts over videos and images to bibliometric information imported from reference manager software. Newer versions of the software can even import data from social networking sites such as Facebook and LinkedIn” (p. 333). NVivo software is “designed to remove rigid divisions between data and interpretation ... [and] offers many ways of connecting the parts of a project, integrating reflection and recorded data” (Richards, 1999, p. 4). It is also deemed as the best tool for easily conducting team research in the same project (AlYahmady and Alabri, 2013; Wong, 2008). According to Bazeley and Jackson (2013) NVivo advantages may be synthesized as: manage data, manage ideas, query data, model visually and report. Its usefulness may be extended not only to qualitative data analysis processes but also to theorizing objectives (Bringer *et al.*, 2006).

To explain the role addressed by qualitative methods in contributing to the reflexive interrogation and scoping of data in digital societies, we focus our attention on online brand communities (Kamboj and Rahman, 2017). The spread of technologies has encouraged online communities to engage better with customers and foster interactions among them (Smaliukiene *et al.*, 2015). Online communities are crucial drivers of customer engagement (Cabiddu *et al.*, 2014; Gummerus *et al.*, 2012; Van Laer *et al.*, 2013) since customers interact with each other to share their experiences, passions, impressions, etc. (Frau *et al.*, 2018; Moi *et al.*, 2017; Zaglia, 2013) of brands, and current research is growing in this direction (Smaliukiene *et al.*, 2015).

Online context as social networks, blogs, sites, and online communities is gaining importance as key source of C2C interactions and driver for exchanging information, learning about other customers’ behaviors (Libai *et al.*, 2010), capturing customer satisfaction and loyalty (Moore *et al.*, 2005).

Throughout qualitative studies concerning online C2C interactions, there are some key methodologies usually adopted by scholars, such as in-depth interviews as the best way to gain deeper insights and information

concerning customer engagement (Braun *et al.*, 2016), and the netnography approach to perform online content analysis of computer-mediated interactions (Camilleri *et al.*, 2017; Smaliukiene *et al.*, 2015). As previously mentioned, the use of software for qualitative analysis of C2C interactions is very narrow. Du Plessis (2017) used QDA Miner qualitative data analysis software which ensures the reliability of the coding scheme to study social media content communities. Other studies adopted NVivo software to perform a wide range of different analysis. For example, Bowden *et al.* (2017), used the software to transcribe interviews, to coding data and develop specific interpretative frameworks focused on consumers' engagement with the brand, the online brand community and the dynamic interaction between them. Camilleri *et al.* (2017) adopted NVivo to conduct a qualitative thematic analysis through a matrix-coding query analysis of posted guest reviews and hosted responses. Smaliukiene *et al.* (2015) performed a netnographic research by coding online forums and classifying data according to C2C interactions and provider-to-customer interactions. Finally, Xu *et al.* (2016) performed a thematic analysis of data concerning C2C online interactions focused on emotions, attitudes, etc. (see Table 1).

Table 1 – Examples of analyses performed through NVivo

<i>Author(s)</i>	<i>Conceptualization</i>	<i>Research question(s)</i>
Bowden <i>et al.</i> (2017)	Exploring consumer engagement to identify positively/negatively engagement and examine interrelated objects of brand and online brand communities for engagement spillover effects.	“To what extent does positively and negatively valenced engagement co-exist in an online brand community?” “Can two distinct, yet interrelated engagement objects (for example, a brand, online brand community) differentially shape consumer engagement?” “Can positive/negative engagement with a focal engagement object influence positive/negative engagement with another focal object?”
Camilleri <i>et al.</i> (2017)	Building a framework of guest-host hospitality value creation practices for value creation or destruction.	“How the sharing economy creates a distinct value proposition for its consumers?”
Smaliukiene <i>et al.</i> (2015)	Exploring value co-creation to identify patterns of actions of online travel service providers and consumers.	“How do global travel service companies develop customer-supplier relationships through maintaining interaction and matching resources?”
Xu <i>et al.</i> (2016)	Investigating C2C interactions on an independent complaints site for airline travelers.	“What forms of C2C interaction assist service recovery, and what is the role of those online participants in service recovery?”

Source: Own elaboration.

Despite the growing use of NVivo for qualitative thematic analysis, there is a lack of research on how NVivo performs qualitative research on C2C interactions within an online brand community through the netnography methodology.

## **2. Research method**

### *2.1. Research context*

In our study, we chose to explore online C2C interactions in the realm of consumer brand engagement (Dessart *et al.*, 2015; Hollebeek *et al.*, 2014). Facebook drives interactive communication among consumers through the sharing of digital contents with powerful and strategic messages (Kim *et al.*, 2015) as multiple expressions of customer engagement (Hollebeek *et al.*, 2014; Tafesse, 2016) like sensory, emotional, and social stimulation (Addis and Holbrook, 2001). According to the literature, consumer brand engagement can take place along three main dimensions (Dessart *et al.*, 2015; Hollebeek *et al.*, 2014): “cognitive processing” (cognitive dimension) or consumer’s level of brand connection, recognition and processing of the brand as “a set of enduring and active mental states that a consumer experiences with respect to the focal object of his/her engagement” (Dessart *et al.*, 2015, p. 35); “affection” (emotional dimension) or consumer’s level of personal bond, affection and feelings with the brand; “activation” (behavioral dimension) or consumer’s level of time and efforts spent on the brand. Within these categories of consumer brand engagement, Dessart *et al.* (2015) identify additional sub-dimensions. In the realm of affective engagement, “enthusiasm” is a feeling of excitement and interest expressed by consumers within the online brand community, whereas “enjoyment” is a feeling of happiness which arises from interacting with online community’s members. For cognitive dimension, “attention” is the voluntary time spent within the online community to interact with the brand, while “absorption” is a deeper level of attention and concentration spent to see contents posted in the brand page. Finally, for behavioral engagement, “sharing” is the moment in which the consumer shares and exchanges an experience or idea about the brand, “learning” is the act of looking for information, opinions or help toward the brand by interacting with other consumers as well, and “endorsing” is the act of supporting or expressing their preference to the brand.

In our research, we used NVivo to analyze different types of customer-to-customer interactions along these dimensions and sub-dimensions of consumer brand engagement (Dessart *et al.*, 2015; Hollebeek *et al.*, 2014).

## 2.2. Data collection

We provide a stepwise process for conducting data analyses with NVivo (Cho *et al.*, 2017; Sinkovics, 2016) to show how to analyze digital data captured through C2C interactions within an online brand community by exploiting a qualitative software and collecting digital data with NCapture (see Figure 1-A). We focused our attention on Huawei Facebook page because the multiple interactions that take place enabled us to answer our research questions.

Huawei Technologies Co. Ltd. is a Chinese company of ICT and telecommunications that develops systems, network solutions, and technological products all over the world. It is one of the most important brands in the mobile and telecommunications industry. Its mission is to provide cutting-edge technology to people all over the world and to foster an increasingly “connected” world by providing extraordinary experiences for people.

Figure 1-A – Dataset collected with NCapture and uploaded in NVivo

ID	Post ID	Poste.	Post	Tagged	Link	Link Name	Link Description	Video	Type
6	398979293 474793_13 188453348 21513	Huawei Mobile	"I never would have guessed that I was capable of taking that many steps." Nina Garcia talks to @HuffingtonPost about how she used the #HuaweiFit to keep her fit and fab wherever her life takes her: <a href="http://huft.to/28KYFH">http://huft.to/28KYFH</a>		<a href="http://hu">http://hu</a>	Project Runway Judge Nina Garcia's Healthy Travel Advice: Learn From The French	huffingtonlin Garcia is one of those tonpo enviable women where you st.co have to ask, "How does she do it all?" The 51-year-old is the Fashion Director at Elle and Mane Cla...		link
7	398979293 474793_13 157756747 28459	Huawei Mobile	Watch how Mate 9 survived Jerry Rig Everything's bend, scratch and burn test!	Jerry Rig Everything	<a href="https://">https://</a>	Mate 9 Durability Test - Bend Test, Scratch and BURIN test	youtu Get your Mate 9 HERE! Will the Mate 9 stand up the daily abuse of every day life? Is the screen made of quality glass? Does it have re...	<a href="https://www">https://www</a>	video
17	398979293 474793_13 178878549 17261	Huawei Mobile	ISO 50 4.5mm f/2.2 1/25 sec Lunch with a view.  With the #Mate9 and Leica Dual Camera, you can turn the everyday into the unforgettable. What places have you been dying to photograph? Tell us below. Photo cred: @WrongRob		<a href="https://">https://</a>	Timeline Photos			photo

We focused our attention on the US Huawei Facebook page for the greatest number of likes and followers. Using NCapture, we collected digital content shared from September 2011 to February 2017 to explore how C2C interactions take place, i.e. posts, photos, links, status, videos, comments, number of likes for each post (see Table 2). Then we imported them into NVivo as a dataset source (Figure 1) and further deepened the analysis by looking at customers’ reactions (for example, love, laugh, and hate) to analyze how the dynamics of C2C interactions work.



Table 2 – Summary of data sources captured with NCapture

Data source	Type	Number
Huawei US official	Post	3.380
Facebook page	Photo	1.858
	Link	616
	Status	707
	Video	323
	Comment text	26.441

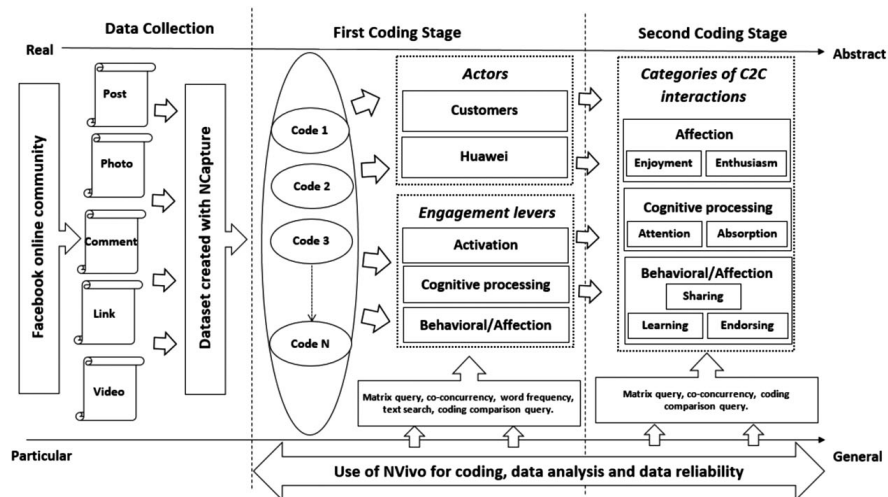
Source: own elaboration.

### 2.3. Data analysis

NVivo can organize data using nodes to place meanings on different parts of the text, tree nodes or groups of nodes, and free nodes that are those not added to a tree.

In exploring online C2C interactions for consumer brand engagement, we performed a two-step coding process for data analysis (Figure 2). We followed a “like to like” coding scheme (Bazeley and Jackson, 2013) by performing a content analysis to match the insights identified during the literature review with the collected data (Mačiulienė and Skaržauskienė, 2016).

Figure 2 – Digital data analysis flow



Source: Adapted from Saldaña (2009).

In the first step, we coded data in three main nodes named “Cognitive processing,” “Affection,” and “Behavioral/Activation” (Hollebeek *et al.*, 2014). Following the definitions provided by the literature, for Cognitive processing we captured contents in which, starting from company’s input, customers start a virtual interaction based on the sharing of recognizing the brand or being stimulated to learn more about the brand (Dessart *et al.*, 2015; Hollebeek *et al.*, 2014). For Affection, we coded contents where users share positive emotions, moods, and personal feelings with the brand (Dessart *et al.*, 2015; Hollebeek *et al.*, 2014), and for Behavioral/Activation dimension, we coded contents on customers’ experience in using a product or service and spending time with it (Dessart *et al.*, 2015; Hollebeek *et al.*, 2014; Payne *et al.*, 2008) (see Table 3).

Table 3 – First step of analysis: Consumer brand engagement levers, definitions, descriptions, and examples

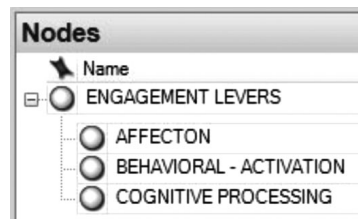
<i>Engagement Lever</i>	<i>Definition</i>	<i>Description</i>	<i>Example</i>
Affection	Consumer’s degree of positive brand-related affect (Hollebeek <i>et al.</i> , 2014)	Content where customers express positive opinion/mood toward brand/product	C.B.: “Best android phone on the market right now, hands down!”
Cognitive processing	Consumer’s level of brand-related thought processing and elaboration (Hollebeek <i>et al.</i> , 2014)	Content where customers recognize brand and are stimulated in learning more about brand/product	R.M.: “I read that the [product name] will be available on June 26, at a cost of about 600.00 USD. Is this availability for the US? PLEASE SAY YES!!!”
Behavioral/Activation	Consumer’s level of effort and time spent on a brand (Hollebeek <i>et al.</i> , 2014)	Content where customers share daily life episodes using product or express to spend time in using product	B.S.: “I take pictures of my children enjoying life and the works around them.”

Source: own elaboration.

In the first step of analysis, we aimed to categorize contents according to the three engagement levers to explore the kind of content that customers share within the brand community. For non-textual contents as pictures and videos, we used them to improve our understanding of the research context, coding videos on their “verbal” content and photos on related posts/comments written by the company and customers. We created a family node (Engagement Levers) following the “like to like” logic (Bazeley and Jackson, 2013). Accordingly, Behavioral/Activation, Affection and Cognitive

processing child nodes were linked to the Engagement Levers parent node (Figure 3-A). Nodes and child nodes were associated with “case” Actor to distinguish between contents created by the Customers or Huawei. Due to this coding scheme, we coded a comment on customer experience in using Huawei products at the node Behavioral/Activation. Selecting “case” Customers, we searched for associations between nodes, looking for coding co-occurrences and running a matrix query with NVivo.

Figure 3-A – First step node structure



In the second step of the analysis, we further explored C2C interactions in the realm of consumer brand engagement by investigating the sub-dimensions identified by Dessart *et al.* (2015). We used keywords of customers’ messages, like “I’m happy” and “My mood is not good” for Affection, “In the past I was” and “I remember that” for Cognitive processing, and “we create” “we intend to” or “we use Facebook for” for Behavior/Activation.

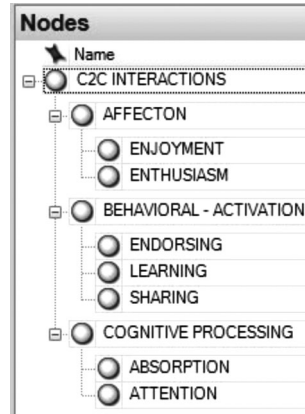
In this step, we opted again for a “like to like” coding scheme and kept the “case” Actors from the first step in order to study interactions between customers. We created another sub-level of nodes containing Behavioral/Action, Cognitive processing, and Affection child nodes: Enthusiasm, Enjoyment, Attention, Absorption, Sharing, Learning, and Endorsing (Figure 3-B). Finally, we went deeper into the analysis because of NVivo’s query section and look for types of C2C interactions. We performed a “Word Frequency” for selected items (Behavioral/Action, Cognitive processing, and Affection nodes) and looked for one hundred most frequently-mentioned words with a minimum length of four letters. From the list, we removed words as “still,” “even,” and “also” in the Stop Words List because useless for our analysis. Then, we focused on words like “love,” “like,” and “happy,” closed to Affection engagement lever, or words as “know,” “learn,” and “share” linked to Behavioral/Activation lever, or words like “using,” “want,” and “need” for Cognitive processing lever. For each word, we ran a Text Search query and looked at selected items to find matches including stemmed words and synonyms. Through Word Tree branches, we could determine how the conversation among customers occurred by identifying different types of C2C interactions.

Table 4 – Second step of analysis: Types of C2C interactions, definitions, descriptions, and examples

<i>Engagement Lever</i>	<i>Type Of C2C Interaction</i>	<i>Definition</i>	<i>Description</i>	<i>Example</i>
Affection	Enthusiasm	Consumer's level of excitement/ interest (Dessart <i>et al.</i> , 2015)	Content in which customers express excitement/interest about brand/ product/service	E.S.: "Got my [product name] today and it's awesome! Great job and keep up the good work"
	Enjoyment	Consumer's feeling of pleasure and happiness (Dessart <i>et al.</i> , 2015)	Content in which customers share/ exchange pleasure/ happiness toward brand/product/ service by interacting with other users	R.C.: "the watch makes me go crazy yihaaa love it, love Huawei!"
Cognitive Processing	Attention	Time spent actively thinking and being attentive (Dessart <i>et al.</i> , 2015)	Content in which customers share daily life spent time with products/ online brand page	J.M.: "We Americans use your devices everyday as much as possible"
	Absorption	Consumer's concentration and immersion (Dessart <i>et al.</i> , 2015)	Content in which consumers express engagement within brand's page (i.e. contest, event, launch of a new product)	A.H.: "Should be fun at this event. I cannot wait to see the Huawei village"
Behavioral/ Activation	Sharing	Act of providing content, information, experience, ideas (Dessart <i>et al.</i> , 2015)	Content in which consumers exchange experience with brand/product/ service	M.N.: "There was an issue with my SIM card. First experience with Huawei service. Resolved perfectly and quickly"
	Learning	Act of seeking content, information, experience, ideas (Dessart <i>et al.</i> , 2015)	Content in which consumers learn from others' experience, information, ideas toward brand/ product/service.	B.A.: "Is there any way to get all these Google apps off my phone? Every time I tried to download an app, I can't because I don't have enough space left. Uninstalling doesn't help either"
	Endorsing	Act of sanctioning, support, referring (Dessart <i>et al.</i> , 2015)	Content in which consumers support or recommend brand/ product/service to others	M.P.: "I just got the [product name]. It's incredible! It's a really easy big-screen phone to hold. Has anyone told you that the camera is crazy good? Because it is!"

Source: Own elaboration.

Figure 3-B – Second step node structure



In each stage two of the co-authors performed the coding process simultaneously and separately. We checked codes' robustness through a coding comparison query and discussed inconsistencies until we achieved a Kappa coefficient value above 0.75.

### 3. Findings

Our study explores how to use NVivo to capture different levers of engagement and types of C2C interactions within an online context. For the validity of our qualitative data, we try to achieve: 1) a *descriptive validity*, stating each theme and describing what the theme stands for (meaning of the theme), 2) an *interpretive validity* by interpreting with accuracy what is going on in the data collected from the digital platform; 3) a *theoretical validity* by supporting the theme with evidence from the data (for example, quotes from customers, results provided by NVivo queries) (Maxwell, 1992). We filled the descriptive validity in methodological section where we provided a definition, description, and a name for each theme and some illustrative quotes (see Table 3 and 4). In this section, we discuss the second and third point.

#### 3.1. Affection engagement

Using NVivo, we were able to capture digital contents for Affection engagement posted by Huawei. We observed several posts of the firm aimed at encouraging consumers' emotions, such as "Enjoy more of what you love with a 5.9-inch screen and long-lasting battery." or "Books,

records and a kiss with someone special. That's Christmas. #ShareTheLove." These posts fostered customers' responses like "I love my Huawei, high performance at a mid-range price." or "Switching from [a competitor] to Huawei. My 1st Huawei, and I Love it" (point 3, theoretical validity, see Maxwell, 1992). This lever of engagement represents the firm's input to trigger C2C online interactions concerning affection toward the brand or the product. We also observed virtual interactions among customers through reactions expressed by "like" or "heart" Facebook buttons on other customers' comments as a form of non-verbal interaction. Affection engagement is even clearer when Huawei shares pictures of its devices, triggering positive reactions and interactions among consumers sharing their personal impressions. Affection engagement is triggered by the firm and transmitted through verbal (i.e. posts and videos) and non-verbal (pictures and emoji) inputs.

Going deeper into the interpretive validity (point 2, see Maxwell, 1992), we looked for interactions about enjoyment and enthusiasm (Dessart *et al.*, 2015) and ran a Word Frequency at *affection* node to understand the kind of C2C interactions for affection lever of engagement (see Table 5).

Table 5 – Most frequent words in Affection node according Enjoyment and Enthusiasm definitions

<i>Engagement Lever</i>	<i>Type Of C2C Interaction</i>	<i>Word</i>	<i>Ranking</i>	<i>N° of Quotation</i>
Affection	Enthusiasm	Great	15	430
		Love	5	798
	Enjoyment	Like	6	774
		Happy	30	206

Source: Own elaboration with data provided by a Word Frequency query.

To get further information, we contextualized each word running a Word Tree. "Great" is ranked 15<sup>th</sup> in Affection node and used 430 times. "Great" concerns **enthusiasm C2C interactions** since the tree branches show customers' excitement about the company, the products, and their characteristics, like great work/job, great company/Huawei, great products/devices/phones/watch, and great pictures/photos/selfies/apps/features. Some customers expressed enthusiasm about the value for money claiming great offer/price/value. Therefore, customers are engaged through affection lever and their interactions are characterized by enthusiasm mainly expressed as a feeling of greatness linked with a variety of elements (the company, its work, its products, and products' features). At affection node, we found the words love, like, and happy, which are linked to **enjoyment C2C interactions**, ranked respectively 5<sup>th</sup>, 6<sup>th</sup> and 30<sup>th</sup>, and quoted 798, 774, and 206 times. Love is stated toward the firm (and its

products) and the community's members. On the one hand, we found branches of posts like I love Huawei/I love my [product names] and I'm in love with Huawei [product names]. On the other hand, a branch with posts structured as: I love you [name of the community member] or, I love [name of the community member]. The word "like" have branches with posts focused on the company and its products. Another branch reveals what customers like doing: I like to travel/play/know/learn, or I like to have/buy/purchase company products. Finally, the word "happy" regards wishes exchanged among the community members: happy birthday/Friday/father day/thanksgiving and so on. A large branch reflects enjoyment from the products: I am happy with my/the [product names]. We can assert that C2C interactions are characterized by enjoyment expressed by appreciation, love and happiness strongly focused on the brand and its products.

### 3.2. Cognitive processing engagement

For Cognitive process lever, we get many posts on brand's social attitude like "(...) Tag a friend who'd love to be doing this right now.", or "(...) Tag a friend you wish you could be out in the sun with right now," which triggered reactions (like, heart and smile) and customers' replies by tagging friends or commenting. Firm encourages interactions within and outside its online community and closeness between customers and their friends. Experiential contents shared by Huawei also concerns events: "Four days of exciting events, screenings, masterclasses, and special guests... See the famous faces who joined"; "We're excited for tomorrow's event! Stay tuned for more #CES2016 news." The brand engages with customers in a virtual environment and customers react positively sharing events and personal photos.

We looked for interactions concerning *attention* and *absorption* (Dessart *et al.*, 2015) and ran another Word Frequency at Cognitive processing node (see Table 6).

Table 6 – Most frequent words in cognitive process node according Attention and Absorption definitions

<i>Engagement Lever</i>	<i>Type Of C2C Interaction</i>	<i>Word</i>	<i>Ranking</i>	<i>N° of Quotation</i>
Cognitive process	Attention	Use	14	431
	Absorption	Want	10	509
		Need	19	379

Source: Own elaboration with data provided by a Word Frequency query.

For **Attention C2C interactions**, the word “use” is 14<sup>th</sup> in the World Frequency list and is mentioned 432 times. Running the Word Tree, we observed branches poor on information. The most informative ones were “I use my [device]” and “I use your [device]” where we gleaned how customers employ their devices: “heavily,” “on a daily basis,” “for everything, music, emails, etc.,”. The fact that the most representative word in the Cognitive process node is at the 14<sup>th</sup> place and the information provided by the Word Tree is limited could mean that the brand does not exploit this aspect of cognitive process and C2C interactions are weakly influenced by Attention. By analyzing the **Absorption C2C interactions**, we identified “want” and “need,” ranked 10<sup>th</sup> and 19<sup>th</sup> in Cognitive process node, and cited 509 and 379 times. In the Word Tree linked to “want” there are three branches about customers’ desires: I want the/a/this [device/product name] where customers talk about their wishes for company products as they want to “download pictures,” “watch contents,” “replace [the old mobile],” “make some orders,” etc. Word “need” indicates a good correspondence between what customers need and what they want. We get three branches: I need the/a/this [device/product name]. Customers adopted verbs mostly related to communication with someone: I need to “talk to,” “contact,” “send,” “get in touch with,” etc. Consequently, we can say that even if the cognitive process lever of engagement is not characterized by Attention in the C2C interactions, it is in some way influenced by Absorption C2C interactions.

### 3.3. Behavioral/Activation engagement

Finally, we detected **Behavioral/Activation** engagement. It concerns the sharing of contents such as consumers’ photos with Huawei devices: “New Huawei Mobile phone,” “Got my [product name] yesterday... very happy with everything...” and firm replies “Hi [customer name], we’re glad to hear that you’re happy with the [product name] Huawei smartphone. (...) Enjoy your new device!,” while other customers react with likes and comments. Interactions starts from customers’ inputs differently from previous engagement levers. We ran the third Word Frequency at Behavioral/Activation node (see Table 7).

About **Sharing C2C interactions**, the word “share” is ranked 16<sup>th</sup> and mentioned 414 times. Running its Word Tree, we observed that despite sharing contents, branches provided scant information, so that C2C interactions do not take advantage of Behavioral/Activation engagement. “Know” and “Learn” are linked to **Learning C2C interactions**, ranked 13<sup>th</sup> and 23<sup>rd</sup>, and quoted 535 and 262 times. In Word Tree, “know” owns branches of customers’ posts that want to know “anything about”;



Table 7 – Most frequent words in Behavioral/Activation node according Sharing, Learning, and Endorsing definitions

<i>Engagement Lever</i>	<i>Type Of C2C Interaction</i>	<i>Word</i>	<i>Ranking</i>	<i>N° of Quotation</i>
Behavioral/ Activation	Sharing	Share	16	414
		Know	13	535
	Learning	Learn	23	262
		Good	20	379

Source: Own elaboration with data provided by a Word Frequency query.

“where”; “why”; “when”; “how”; “what” etc. about the brand, its products, and services. Word “learn” generates a Word Tree of two main branches: I would/’d learn to/how to (...), and I would/’d learn more about (...). In the first one, customers talk about what they like to learn in their lives in conversation untied to the brand or the brand’s product/service: “snow ski,” “swim,” “paint,” “sing,” “dive,” “surf,” “cook,” etc., while in the second, C2C interactions concern company’s products: I would/’d learn more about “[product names],” “tablet,” “the device,” “Huawei watch,” etc. Finally, for **Endorsing C2C interactions**, we detected “good” and 3 branches: price appreciation as “good price,” “good money for a phone,” “good deal”; like of devices or their features “good shots,” “good devices,” “good products,” “good phone,” etc.; congratulations to the company like “good job” and “good work.” We can say that Behavioral/Activation engagement strongly leverages on Endorsing and Learning during C2C interactions, while it is almost not affected by Sharing.

## Conclusions

This paper offers interesting insights on how to explore C2C interactions within online brand communities (Braun *et al.*, 2016) in the realm of customer engagement (Dessart *et al.*, 2015; Hollebeek *et al.*, 2014) by exploiting digital data through NVivo.

Digital tools represent new drivers of C2C interactions for sharing personal emotions, perceptions, knowledge, etc. (Bolton *et al.*, 2014). Accordingly, online communities are crucial for customer engagement (Cabiddu, *et al.*, 2014; Floreddu *et al.*, 2014; Gummerus *et al.*, 2012) as brands improve customer satisfaction, trust, affective commitment, etc. Despite the growing relevance of this topic (Kamboj and Rahman, 2017), studies on users’ virtual interactions within online communities is still narrow (Zaglia, 2013) particularly qualitative studies of online phenomena directly exploiting data provided by digital platforms (Germonprez and

Hovorka, 2013; Vaast *et al.*, 2013; Vaast and Levina, 2015). Given the advantages of using innovative tools (Ranfagni *et al.*, 2014) to manage digital data (Cho *et al.*, 2017), we believe it is interesting to adopt them to perform qualitative research within this field of research (Du Plessis, 2017).

Our findings extend previous literature by showing the extent to which it is possible to exploit digital data generated by online communities to perform a qualitative research. Previous research mainly adopted methodologies such as interviews (e.g. Bowden *et al.*, 2017; McKenna *et al.*, 2017), content analysis (Munzel and Kunz, 2014) and digital ethnography (Ranfagni *et al.*, 2014). In our study, we exploited NVivo software to collect and explore digital data provided by an online community to perform a qualitative research. Our findings demonstrate that it is possible to exploit digital data through NCapture to collect all data from online brand page, capturing all C2C interactions. NVivo allowed also to perform a more efficient analysis of data reducing manual tasks and time to discover trends, themes, and to make conclusions. NVivo enables to manage data and ideas, query data, model visually, and reporting.

Furthermore, our findings extend previous studies on online C2C interactions in the realm of customer brand engagement by exploring them through NVivo. Scholars conceptualize some dimensions, namely, Cognitive processing, Affection and Behavioral/Activation, and sub-dimensions, as enthusiasm, enjoyment, attention, absorption, sharing, learning, and endorsing (Dessart *et al.*, 2015; Hollebeek *et al.*, 2014). Our findings explore these dimensions in the realm of C2C interactions until we get to the heart of the customers' conversations (i.e. love, like and happiness for Enjoyment in Affection engagement). In doing so, we developed a new explorative methodology by creating a list of most-quoted words for each NVivo node, identifying the proper words based on theme definition and analyzing conversations' topics by exploiting Tree Word created by NVivo.

### ***Academic and managerial implications and future research***

Our work has several implications for both academic and managerial perspectives. From an academic perspective, drawing on consumer brand engagement dimensions (Dessart *et al.*, 2015; Hollebeek *et al.*, 2014), this research provides interesting insights about this stream of research within an online context by exploring consumer brand engagement dimensions on a Facebook page through NVivo and NCapture. Qualitative research carried out in this way enables researchers to avoid time-consuming tasks such as conducting, transcribing interviews, coding digital contents manually, and facilitate team data analysis (AlYahmady and Alabri, 2013).

From a managerial perspective, managers and marketers may exploit NCapture to get online C2C interactions and easily analyze them through NVivo to understand how customers interact with each other, and implement effective customer engagement strategies to attract and retain customers.

Overall, this study has several limitations. It represents a first attempt to explore the potential of using the NVivo tool for qualitative research in social media. Future research could examine customer brand engagement realm in other forms of virtual interaction (i.e. B2B) or across different digital platforms or brands to observe, by using the NVivo software, how online interactions take place in different settings. It may be also useful to use NVivo software to further extend consumer brand engagement dimensions and look for new dimensions.

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