

# **INTERACTIVITY FEATURES OF ONLINE NEWSPAPERS: FROM A FACSIMILE MODEL TO A MULTIMEDIA ONE. *INTERACTIVITY IN ONLINE JOURNALS***

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**Abstract:** The purpose of this article is to know the current interactivity options in online newspapers. To do this, we analyze the concept of (structural) interactivity and establish a measuring tool based on some previous methodologies. This model includes a classification of newspapers into stages of development. In this way, we provide a tool, which allows media firms to know the degree of interactivity in newspapers, assessing what dimensions and parameters are being incorporated. It was applied to a sample of 21 online newspapers. Results show poor implementation of participation and customization options. There is a niche to be covered by sections of user-generated content and closer collaboration journalists-citizens. It will require a real adaptation to the new possibilities of interaction with readers at different levels of involvement and participation. The majority of newspapers are classified in a digital stage and some of them are close to the multimedia phase.

**Keywords:** digital newspapers; structural interactivity; interactivity evaluation in digital press; human-computer interaction.

**Título:** INTERACTIVIDAD EN PERIÓDICOS EN LÍNEA: DEL MODELO FACSÍMIL AL MULTIMEDIA.  
*INTERACTIVIDAD EN PERIÓDICOS EN LÍNEA.*

**Resumen:** El objetivo de este artículo es conocer las opciones de interactividad de periódicos en línea. Para esto, se analiza el concepto de interactividad (estructural), identificando sus componentes y definiendo un modelo de evaluación, basada en diversas metodologías que analizan la interactividad en periódicos digitales. Este modelo incluye una clasificación de periódicos en etapas de desarrollo. La herramienta permite conocer el nivel de interactividad de los periódicos y compararlos con otros, indicando qué dimensiones y parámetros están siendo incorporados y cuáles no. El modelo fue aplicado sobre 21 diarios internacionales. Los resultados revelan una escasa implementación de las opciones de participación y personalización. Existe un gran nicho en cuanto al contenido generado por los usuarios y la colaboración periodistas-ciudadanos. La mayoría de los diarios se encuentran en una fase digital. Esto requerirá una verdadera adaptación para las nuevas oportunidades de interacción con los lectores, en distintos niveles de desarrollo.

**Palabras clave:** periódicos digitales; interactividad estructural, evaluación de la interactividad en medios digitales; interacción ser humano-máquina.

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## **1 INTRODUCTION**

Interactivity is a complex concept and it can manifest itself in various forms (Ghose, Dou, 1998; Liu, Shrum, 2002). Originally, interactivity was an “attribute of face-to-face conversation” (Rafaeli 1988). However, the development of technologies, specially the Internet, led us to a computer-mediated communication (Rafaeli, 1988; Şanlier, Tağ, 2005), to a “cyber-interactivity” (Mcmillan, 2002). In that regard, Kiousis (2002, p. 372) defined interactivity as “the degree to which a communication technology can create a mediated environment in which participant can communicate [...] and participate in reciprocal message exchange”. In a different way, Liu and Shrum (2002) defined interactivity as “the degree to which two or more communication parties can act on each other, on the communication medium, and on the messages and the degree to which such influences are synchronized”. Two elements can be highlighted in both definitions: 1) interactivity as “a variable characteristic of communication

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settings" (Rafaeli, 1988); 2) machine, users and message as the three major components of it. That allow us to introduce Broekhuizen and Hoffmann (2012) and Larsson (2011), who classified interactivity at three levels: the message exchange process (message-centered approach), technology features and user's perceptions of a technology (perceptual approach).

In literature, these are common measures of cyber-interactivity analyses. Briefly, Fortin (1997), cited by Dholakia, Zhao, Dholakia and Fortin (2000), remarked the importance of control and direction of the communication in interactivity, introducing the user-information interaction idea: "The degree to which a communication system can allow one or more end users to communicate alternatively as senders or receivers (...), or to seek and gain access to information on an on-demand basis where the content, timing and sequence of the communication is under control of the end user, as opposed to a broadcast basis"; Singer (2006) also highlighted the role of readers and their power to modify mass media discourses; Kenney, Gorelik and Mwangi (2000) stressed the active search for discoveries by users and the choices offered by designers of interactive media; in (Chung, 2008; Deuze, 2003; Larsson, 2011, 2012a, 2012b) interactivity was conceptualized as a continuum of medium to human options, where medium-human and human-medium interactivity focused on the web 2.0 concept; Mcmillan (2002) built a model of cyber-interactivity, where machine and users are the main aspects, and evaluated it using both perception-based and feature-based measures. She considered four perspectives: mass communication, organizational communication, individual communicators and media features. All of them have been influenced by technologies, but mass media is one of the fields that quickest changes, i.e., that continually evolves (Boczkowski, 2010; Guallar, 2015; Webster, Ksiazek, 2012).

The ways of publication and reading of newspapers, sources of information, channels for disseminating news and audiences are being modified by technologies. Multi-platform distribution (PCs, tablets, mobile phones) and new methods of payment are being developed. Also, the amount of news and the ways that people access to them grow exponentially. As new tools appear, readers' options increase, causing audience fragmentation. Most of these changes are related to interactivity, "the main characteristic of new media in general, and Web 2.0 in particular" (Kazeroun, 2015, p. 42). As it modifies pieces of news and the websites of newspapers, companies should step their re-adaptation up to this new scenario. In this regard, one the most interesting contributions is Rost (2006, p. 195-200), who focused on the role of mass media as suppliers of interactivity possibilities.

In the next figure, some of the previous approaches are summarised, highlighting which subject was studied by each author.

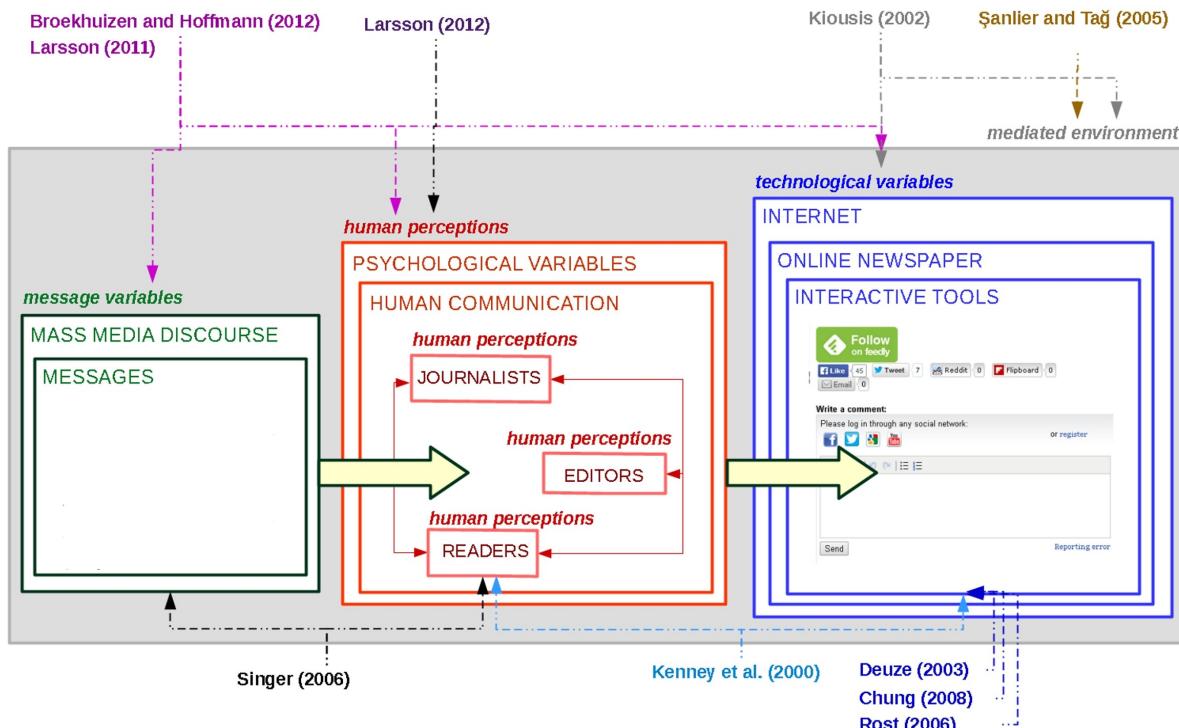


Figure 1. Subjects of study of the different approaches for the interactivity concept.

Based on Rost (2006, p. 195-200) and from the newspaper perspective, interactivity was operationally considered as a product of the interaction between technological tools designed by newspapers and the use of them by readers. This definition involves a structural view of interactivity (Broekhuizen, Hoffmann, 2012), also called “feature-based interactivity” (Song, Zinkhan, 2008). It focuses on technological features of newspaper websites and the tools that make them be performed. In this perspective, all the features can “be measured by observing the number and type of interactive features on a website” (Voorveld, Neijens, Smit, 2011). But what kind of interactive features should be examined? And, once these features are identified, what tools allow the users to interact with/on a newspaper website?

The purpose of this paper is to know the options of interactivity in newspapers websites. More specifically, the aims are: 1) to deepen the concept of (structural) interactivity, identifying its key components; 2) To offer a tool for measuring interactivity in online newspapers; 3) to offer a way to classify a newspaper according to the degree of development of its interactivity dimensions. Interactivity, as an active quality (Rafaeli, 1988) can make a company stand out from the competition. In this way, this paper offers to researchers and companies an update means to know the state of a newspaper website, throughout a period of time or comparing it with competitors, facilitating the decision-making of newspaper companies. The next section focuses on the structural interactivity concept, components and models to measure it in newspapers. After, the methodology to measure interactivity in online newspapers is explained: first some details about the sample of newspapers is shown; then a methodology to build a tool in order to measure interactivity in these newspapers, in terms of degree of development, is detailed. Next, some findings are presented. Finally some conclusions and trends and lines for future researches are presented.

## **1.1 STRUCTURAL INTERACTIVITY: CONCEPT, FEATURES AND METHODOLOGIES**

As already stated, structural interactivity in online newspapers deals with technology and user's options. It provides “news audiences with increased choice options and event allowing them to participate in the production of information” (Chung, 2008). For her, interactivity is a continuum where exist some kind of customization options (medium-human interactivity) and content submission features (human-medium interactivity). Kenney, Gorelik and Mwangi (2000) stress the active search by users and the choices offered by designers as characteristics of interactivity. The three-dimension conceptualization interactivity of Deuze (2003) embraces navigational, functional and adaptive aspects. The first one let the readers navigate “in a more or less structured way through the site’s content”. The second point is about content production and interaction between users or users-producer; the latter involves that “every action of the user has consequences for the content of the site”. Singer (2006) submits that interactivity encompasses “a range of user capabilities, (...) to providing feedback to professional communicators to engaging in online discourse and forming virtual communities”. These aspects are summarized by Rost (2006, p. 195-200; 2014, p. 53-88), who asserts interactivity is “the gradual and variable capacity that has a mass media to give users / readers a greater power both in content selection and possibilities of expression and communication”. In this regards, he claims that there are two types of interactivity: Communicative and selective interactivity.

Communicative interactivity can be understood as the technical, editorial and business process that provokes the arousal, processing and publishing of readers' contributions in professional publications (Thurman, Hermida, 2010), and can be linked to citizen journalism (Lasica, 2003). It involves that readers can publish content in the newspaper regardless of the medium, exchanging their traditional role (Dholakia, Zhao, Dholakia, Fortin, 2000). Thus, Barrio (2013) highlights three different approaches of participative journalism: 1) the media includes content created by citizens; 2) these contents are shown in newspapers as additional information; 3) the citizen participate actively in the process of creating the information, under the supervision of journalist. So, there are different levels of communicative interactivity (Broekhuizen, Hoffmann, 2012; Rost, 2014, p. 58-59). Some tools of communicative interactivity are blogs, comments, polls and social networks, as “platforms where audiences and journalists converge to share information, comment on information and occasionally collaborate” (Canter, 2013). Also, live blogs, an evolution beyond the comments inside the articles (Steensen 2014; Tereszkiewicz 2014; Thurman, Walter, 2013).

Selective interactivity has to do with the contents and visual and aesthetic appearance, including browsing and retrieval options and customization possibilities (Rost, 2014, p. 57). In this regard, it involves: 1) Textual interactivity: the different ways in which people access to information published and/or distributed by online newspapers; 2) Hypertextuality: the “interconnection of text and multimedia resources using links” (Palacios, Mielniczuk, Barbosa, Ribas, Narita, 2002). Pavlik (2001, p. 15-18) prefers the term “hypermediality”, conceiving it as a new kind of journalism where news items are contextualized in a better way and a more active and participative audience is possible. It could be classified as a subclass of textual interactivity; 3) Customization (or personalization) features: the adaptation of the newspapers' settings to the readers' preferences. It is one of the trends in the content supply by new online media business models (Campos Freire, 2010). Thurman (2011) and Thurman and Schifferes (2012) distinguish two types: a) explicit personalization: The reader can directly choose some customization options, such as content

syndication by e-mail; b) implicit personalization: information or visual appearance is inferred from the user navigation data.

To Usher (2014, p. 151) interactivity has to do with a reorientation of online journalism, which includes multimedia as a new way to narrate a news story. So structural interactivity concept also includes aspects related to multimediality, “the combined use of kinds of basic information [text, sounds, photos and videos, infographics, cartoons and graphics] in the same environment and juxtaposed or integrated” (Guallar, Rovira, Ruiz, 2010). The use of different formats facilitates information sharing, visualization and assimilation of content by users. Following this argument, Pérez-Montoro (2016) notes that “content including infographics cause a significant increase in social user interactivity respect to that content”.

## 1.2 MEASURING INTERACTIVITY IN NEWSPAPERS WEBSITES

In this section, some methodologies that measure specific dimensions and tools of interactivity in online newspapers are described.

Schultz (1999) was one of the first authors that analysed participation and multimedia elements in newspapers. The author applied a ten-question form to 101 American online newspapers, concluding that these were characterized by “few and token interactive options”, in terms of participation; Cowen (2001) combined interviews and observation of 5 British newspapers websites, focusing mainly on information access and participation. He concluded that newspapers should facilitate community publishing and invest in R&D in order to adapt to the continuous changes; Palacios, Mielniczuk, Barbosa, Ribas and Narita (2002) applied an own-designed observation form to 44 free Brazilians newspapers to study their hypertextuality, participation, personalization, multimedia and memory elements. They determined that the resources offered by newspapers were clearly underused and they still retained strong characteristics of printed edition; Cely Álvarez (2004) used hypertext, updating, participation and personalization features in order to build a proposal to evaluate online newspapers. Based on it, she classified online newspapers into three stages: in the first one, the newspaper was a copy of the printed edition of the newspapers; in the second one it could be updated constantly but does not use personalization possibilities; in the latter, “new cyber-media”, involved hypertext, participation and personalization options.

Dimitrova and Neznanski (2006) focused on the presence of hyperlinks, multimedia and participative elements in a sample of 26 newspapers websites. They verified the evolution of online media from a reproductive stage of print newspapers to another that highlighted the interactive and multimedia possibilities. They established a four-stage evolution, from a facsimile model to a multimedia one; Quandt (2008) researched in multimediality and participation opportunities in 10 online newspapers from France, Germany, United Kingdom, Russia and United States using a standardized codebook. The author found that a general lack of multimedia content and direct interaction with journalists existed. The expected democratic and journalist revolution with the technological and social development had not occurred; A comparison between The New York Times, The Guardian and 6 Greek newspapers was carried out by Spyridou and Veglis (2008). To do this, they applied the six dimensions model of Heeter (1989), including 46 evaluation elements. They highlighted the absence of a large structural interactivity in the Greek newspapers analysed and a “slow and ineffective development of online journalism in Greece”. The authors put forward some reasons, such as the lack of technical and experts, small media market, low digital literacy or political dependence;

Zamith (2008), based on Schultz (1999), proposed one of the most complete methodologies. This model was applied to 22 and 27 Portuguese online newspapers, in 2006 and 2007, respectively. Participation, hypertextuality, multimediality, immediacy, ubiquity, memory, personalization and creativity were analysed. The results stressed a poor exploitation of the online newspapers’ potential (less than 25%); López-Aguirre (2009) studied the customization, multimediality and information access parameters of some Mexican online newspapers. As a conclusion, he established different kinds of textual interactivity services: 1) Current information services, which included content syndication and news alert services; 2) Reference information services, i.e. dictionaries, calendars, business directories, city maps, etc.; 3) Retrospective information services;

Palacios (2011) collected some of the most important works in analysing online newspapers, both in Portugal and Spain. Each chapter of the book provided a set of tools to evaluate one particular feature of the newspaper websites. Particularly, Meso, Natansohn, Palomo and Quadros (2011) was useful for analysing the interactivity elements and Palacios, Ribas (2011) provided a guide to evaluate the information access on online newspapers; Zamith and Osório (2012) applied their own methodology to analyse more than 20 Portuguese online newspapers, from 2006 to 2010. It was organized into 9 features: participation, hypertext, multimedia, instantaneity, ubiquity, usability, memory, personalization and creativity. The study confirmed a slow but steady increase in the use of interaction possibilities in

newspapers. Some notable results were better among national newspapers than regional ones, but non-significant differences were observed among general and specialized newspapers; López Carreño and Pastor Sánchez (2010) designed a model of Spanish journalistic website where standard and advanced services were classified into information access, participation, multimediality, customization and entertainment, commercial and complementary services. In this way, media companies and researchers could both analyse the status of a specific newspaper and use this model as a reference for future changes;

Rodríguez-Martínez, Codina and Pedraza-Jiménez (2010) developed a methodology for analysing interactivity in 8 online Spanish newspapers. This model was based on 23 indicators, and grouped into three sections: general, specific internal and specific external; the last two focused on the Web 2.0 possibilities. They observed an increased presence of participation tools and the consolidation of Web 2.0 in the digital news environment. After, they updated this methodology in Rodríguez-Martínez, Codina and Pedraza-Jiménez (2012) by adding three indicators, and organized all of them into parameters and dimensions: cooperation, participation, content creation, information access, socialization and communication; Said-Hung, Arcila-Calderón and Méndez-Barraza (2011) expanded Rodríguez-Martínez *et al.* (2010) and analysed 30 Colombian newspapers in the Web 2.0 environment. An online newspapers ranking was fixed based on accessibility, visibility, popularity, personalization, participation and access information parameters. The authors highlighted a low exploitation of both interactivity and customization possibilities; Finally, Said-Hung and Valencia-Cobos (2012) combined Rodríguez-Martínez *et al.* (2010) and Said-Hung *et al.* (2011) in order to analyze 101 American newspapers. After that, the results were linked to social and demographic data, concluding that leading newspapers are mostly set in North America, Colombia or Chile. Furthermore, the density of users connected to Internet influenced the evolution of newspapers. They made some recommendations, such as journalists trained in hypertextuality and multimediality and more participation tools.

As conclusions, the previous contributions could be summarized in the following points: 1) the existence of a low exploitation of interactivity possibilities, especially in the early works, when websites of newspapers were similar to the printed edition; 2) a tendency to measure participation, textual interactivity, personalization and multimediality on online newspapers, highlighting participation and personalization as the most important features for the future; 3) interviews with both the newspaper' staff and readers, observation and surveys were common techniques, but the most used was the observation form; 4) a tendency to use dimensions and indicators to analyzed interactivity in newspapers. Regarding this topic, most of them were included by Rodriguez-Martínez *et al.* (2012); 5) newspapers websites are in a continuous evolution, where interactive options are commonly linked to web 2.0 tools (Cervinschi, Butucea, 2010), making the difference. In the next section, these contributions were used to build a methodology to know the state of newspapers in relation to structural interactivity.

It was tried to cover recent studies (from 2014 to 2016) in this section by searching for scientific papers from both Scopus and Web of Science (WoS). However, specific literature about methodologies to measure interactivity in online newspapers from an information technologies perspective were not found. Despite this issue, it is worth highlighting two more references: Codina and Pedraza-Jiménez (2016). This reference focuses on the Articulated System of Analysis of Digital Media or Sistema Articulado de Análisis de Medios Digitales (SAAAMD), in Spanish. As in previous works, the authors present some basic elements of this system, such as parameters and indicators, both general and specific; Guallar Abadal and Codina (2016) applied the work described before to design a model to analyze digital newspaper archive.

## 2 METHODOLOGY

### 2.1 A MODEL TO MEASURE STRUCTURAL INTERACTIVITY IN ONLINE NEWSPAPERS

The next model was designed in order measure structural interactivity in online newspapers. It is mainly based on Rodríguez-Martínez *et al.* (2012), as they were the most comprehensive investigations in relation to this paper. Furthermore, it was completed by defining a way to classify the newspapers into one of four possible stages of evolution, based on Cabrera González (2001), Cely Álvarez (2004), Codina (2006), Codina, Pedraza, Noci, Rodríguez-Martínez, Montoro and Cavaller-Reyes (2014), Dimitrova and Neznanski (2006), López Carreño and Pastor Sánchez (2010) and Palacios and Ribas (2011).

The Table 1 shows variables, parameters, indicators and values used to measure interactivity in online newspapers. The parameters were classified taking into account the variables previously identified in the section 1: participation, textual interactivity, personalization and multimediality. Regarding the scores, Rodríguez-Martínez *et al.* (2012) and Codina and Pedraza-Jiménez (2016) used two ratings, 0 or 1 (yes or no) and 0 to 3. Nevertheless, the results in February 2015 showed some distortions. Then the '*Value column*' was modified, scoring from 0 to 1 as follow: atomic

indicators could be answered with yes (1) or not (0) -A-; molecular indicators, with the next set of values: 0, 0'33, 0'67, 1 -B-.

The indicators contained in grey cells were modified or added to Rodríguez-Martínez *et al.* (2012). For example, items 1.7 and 6.4 were added from López Carreño and Pastor Sánchez (2010) and Meso *et al.* (2011, p. 55). Some reasons are detailed hereafter: a) 1.7 Polls make possible to know the reader's opinion in some question; b) 1.8. It is important to know if users can interact in communities, a common service in the web 2.0; c) 3.5. Availability of daily editions of newspapers is useful as dates let us follow the evolution of events and it is one of the most common criteria for access to pieces of news in the short term; d) 3.6 In spite of the fact of being simple, sitemaps are very useful for ascertaining the structure of the website; e) 5.8 "One of the most highly touted features of the Web 2.0 era is the rise of blogging" (O'Reilly 2005); f) 6.4. Homepage is one more shortcut to access a newspaper; g) 7.1/7.6 Multimedia items are common in news. However, newspapers are including video, audio, infographics, drawing and graphic items more and more, especially in recent years. To know the state of this implementation is desirable.

Variable	Parameter	ID	Indicator	Value (0-1)
PARTICIPATION OR COMMUNICATIVE INTERACTIVITY	Interaction newspaper - user or user - user	1.1.	Users can communicate with the author of the news	A
		1.2.	Users can contact the newsroom	A
		1.3.	Readers can comment news published by the newspaper	A
		1.4.	Users can vote published news	A
		1.5.	Users can comment posts published in blogs	A
		1.6.	Users can modify or correct published content	B
		1.7.	Readers can participate in polls created by the newspaper	A
		1.8.	Users can contact other users	A
	Publication of content created by users	2.1.	Users can create blogs	A
		2.2.	Users can publish texts	B
		2.3.	Users can publish photos	A
		2.4.	Users can publish videos	A
		2.5.	Exclusive section for content created by users	B
		3.1.	Information access from the front-page	A
		3.2.	Information access from the sections	A
TEXTUAL INTERACTIVITY	Information access	3.3.	Information access from the related news	B
		3.4.	Information access from the search engine	B
		3.5.	Information access browsing by newspaper editions	A
		3.6.	Information access from site map	B
		3.7.	Information access from user's recommendations	B
		3.8.	Information access from external platforms Web 2.0.	A
	Different version of information	4.1.	Printed edition of the newspaper (e-paper)	B
		4.2.	Global version of the newspaper	B
		4.3.	Constantly updated version	B
		4.4.	Printed edition adapted to the Web (e-paper +)	B
	Newspapers on Web 2.0 platforms	5.1.	Presence of the online newspapers in audiovisual platforms	B
		5.2.	Presence of the online newspapers in image platforms	B
		5.3.	Use of own social network	B
		5.4.	Presence of the online newspapers in professional social network	B
		5.5.	Presence of the online newspapers in friendship social network	A
		5.6.	Presence of the online newspapers in micro-blogging platforms	A
		5.7.	Links between newspaper website and social networks	B
		5.8.	Blogs linked to the newspaper	A
PERSONALIZATION	Personalized information access	6.1.	Interface adaptation depending on the user interests	B
		6.2.	Content syndication on mobile or e-mail	B
		6.3.	Subscription to alerts or newsletter	B
		6.4.	Convert the newspaper website on the homepage	A
MULTIMEDIALITY	Information in different formats	7.1.	The newspaper usually includes textual information	A
		7.2.	The newspaper usually includes images on news	A
		7.3.	The newspaper usually includes video on news	A
		7.4.	The newspaper usually includes infographics on news	A
		7.5.	The newspaper usually includes drawing and graphic on news	A
		7.6.	The newspaper usually includes audio items on news	A

Table I. Model to analyze interactivity in online newspaper.

To further illustrate the different degrees of interactivity, and based on data previously obtained, each newspaper can be classified into one of the next stages that identify “concrete settings and levels of interactivity in online journalism” (Schultz 2000):

- 1) *Facsimile model*: Is a reproduction of the printed edition of newspapers, often in PDF. News from the paper version and the digital one are the same. (Larsson, 2012a; Spyridou, Veglis, 2008) called this model *shovelware*.
- 2) *Adapted model*: Digital and printed newspapers are very similar, however the first one adds some features of the digital era, essentially images and hyperlinks. Hyperlinks connect news to other news, sources and even external platforms, such as Facebook or Twitter. Content syndication is possible.
- 3) *Digital model*: Pieces of news are created specifically for the Internet environment, and may or may not coincide with those published in the printed edition. They include hyperlinks and different kinds of multimedia. The first newspaper archive, providing retrospective information, may be available. Content syndication is a common service. Some tools facilitate readers’ participation (blogs, communities, comments on news, etc.) and let them share news via social networks.
- 4) *Multimedia model*: Newspapers incorporate most of the interactive elements, which had already appeared in the previous stages, now they have evolved. Readers’ participation choices increase with new options of sharing information. Others allow both to select content and to access to specialized services (i.e., personalization). Content syndication and aggregation are common services with new possibilities such as restrict syndication to specific sections, certain journalists or blogs, etc. This stage is also named *social multimedia stage* (Abadal, Guallar, 2010, p. 40) as it incorporates multimedia and social elements (participatory interactivity).

## 2.2 MEASURING STRUCTURAL INTERACTIVITY IN A SAMPLE OF ONLINE NEWSPAPERS

We applied the previous model in a designed sample. This is based on geopolitical, historical and economic scope and divides the world into 5 parts. According to Gross Domestic Product (GDP), the richest countries from each area were selected. For each country, we chose the national newspaper with highest readership. The data were gathered from 4International Media and Newspaper (4IMN 2012), which collects data from web accesses and printed newspaper sales. The procedure yielded a sample size of 21 newspapers (see table below).

<b>Zone of the world</b>	<b>Country</b>	<b>Newspaper</b>
European Union + North Europe	Germany	Süddeutsche Zeitung
	France	Le Monde
	United Kingdom	The Daily Telegraph; Financial Times, The Economist
North America	United States of America	The New York Times; The Wall Street Journal
Latin America	Brazil	O Globo
	Mexico	El Universal
Former Republics USSR	Russia	Pravda
Sub-Saharan Africa	Nigeria	Nigerian Tribune
	South Africa	Independent Online
Asia	China	China Daily
	India	The Times of India
	Japan	Asahi Shimbun
Middle East	Saudi Arabia	Arab News
	United Arab Emirates	Gulf News
	Israel	Yedioth Aharonot
	Turkey	Today's Zaman
Oceania	Australia	The Australian Financial Review
North Africa	Egypt	The Daily News Egypt

Table II. Sample of newspapers.

Our line of research focuses on a politics-economics domain ontology. In this sense, we have some restrictions when selecting newspapers: The newspapers should, in the main, contain political and/or economical news. Indeed, the most important financial newspapers were also chosen (Financial Times, The Economist and The Wall Street Journal); If possible, English, Spanish, French or Portuguese being the languages of the news items; since specialized media may be incomprehensible for non-experts, general information newspapers were chosen. In spite of this fact, for Australia, The Australian Financial Review had to be chosen.

The data collection was performed for five separate weeks by observation (Guallar, Rovira, Ruiz, 2010), in February 2014, August 2014 and July 2015. In this way, data consistency is ensured. Fieldwork was conducted in January 2016.

### 3 RESULTS

Below, results for each dimension of interactivity are described (Table III, in the Appendix, shows the results obtained after the analysis). Next, some aspects of the newspapers are detailed and then they are classified into one of the stages of development.

#### 3.1 FINDINGS AND DESCRIPTIONS OF DIMENSIONS AND PARAMETERS OF STRUCTURAL INTERACTIVITY

Generally speaking, newspapers showed the same tendencies of development. Participation was the least developed parameter while multimedia was the most developed one. The next Figure shows the results for all the parameters analyzed using the model described in section 2. for the least developed newspaper (Arab News), the average of newspapers in the Adapted Model, the overall average, the average of newspapers in the Digital Model, and the most advanced newspaper (The New York Times).

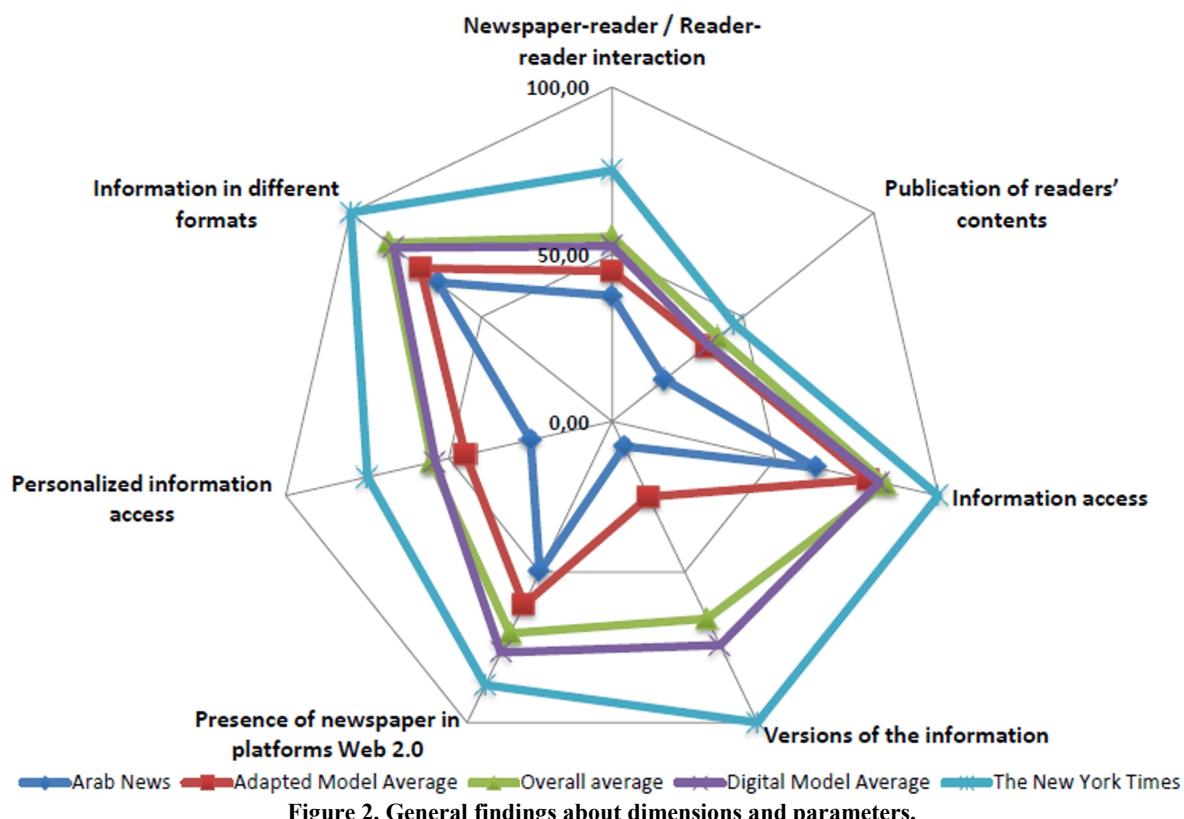


Figure 2. General findings about dimensions and parameters.

Concerning communicative interactivity, more than half of newspapers (57.14%) facilitated a way to contact the editorial staff, as a kind of allowing users to share their opinions via anonymous online comments (Nielsen 2014). However, communication with journalists is an under-exploited possibility (23.81%); by providing “commentary and debate spaces, online newspapers create the opportunity for active communication, that is easy and accessible for ordinary users” (Weber 2013). It is possible on all the websites, except on O Globo (this media updated its website and now it is possible to comment directly into the news). This is consistent with Fondevila-Gascón, Beriain (2013) and Weber (2013) who stated that this is one of the most popular forms of user participation; Voting news items was the least developed indicator (<4.76%). It should be noticed that there are several ways for rating news, such as recommend buttons, “Likes” on Facebook or the times that a piece of news has been shared. However, it is not possible to know the meaning of voting or what is being evaluated.

Regarding the publication of readers’ content, the most common format is text. Almost all newspapers offered this possibility, mainly by Letters to the Editor, the first type of online interaction reader-media, since it already existed in

printed newspapers (Rafaeli, 1988; Rost, 2014, p. 60). Gulf News, The Universal and O Globo were the only newspapers that allow texts, pictures and videos to be sent (90.48%, 28.57% and 23.41%, respectively). In The New York Times, some kind of readers (journalists, artists, etc.) could send in a video. Both The Universal and O Globo (Eu-Reporter) had an exclusive section for this kind of information. Results are in line with previous papers, such as Cowen (2001), Quandt (2008), Spyridou, and Veglis (2008), who remarked a low exploitation of the possibilities of communicative interactivity in newspapers.

In relation to textual interactivity, all the newspapers developed hypertext tools but, surprisingly, Arab News and Today's Zaman did not make use of hyperlinks between related pieces of news. Regarding the search engines, The Australian Financial Review was the most advanced newspaper, with options for text and video searching. Information access by user recommendations (68.25%) was frequent and tended to be present on Homepage, sections or even on each webpage; Daily editions of newspapers were found on <65% of the websites, with great differences between Arab News and The New York Times (the less and most developed newspaper, respectively); Two types of printed newspaper editions were found: 1) A fee-required reproduction of the paper edition, usually in PDF, which was able to zoom in and navigate on sections (63.49%) and 2) A fee-required reproduction of the paper edition but including updated news (The New York Times); Concerning dissemination of the last news (77.78%), Financial Times was the only newspaper that allowed searches of them, and The New York Times offered some personalization options in this section. Other media, with different levels of development, allowed searches of news by dates, full-text or journalists criteria, and ranking the results by date or relevance; In relation to the presence of newspapers on Web 2.0 platforms, all newspapers had one or more active accounts on *Facebook* and *Twitter*. Moreover, almost 3/4 of newspapers (74.60%) are active on audiovisual platforms (Youtube, Dailymotion and Vimeo). The New York Times stood out as the most advanced newspaper, with videos hosted on Youtube, Vimeo and its own server. Photography communities (Pinterest, Instagram and Flickr) and own social networks were the least developed parameters (41.27% and 20.63%). Only 4 newspapers developed their own social networks and both The Universal and Pravda used a forum. The Times of India's community, *Spirituality*, worked independently and users could write their own articles or blogs, contact other users, etc. Nearly 90% of newspapers linked up to social networks correctly; 2/3 newspapers had blogs, where journalists write and readers comment and relevant figures, occasional collaborators or experts could also participate.

Regarding customization options, the results confirmed some previous works, such as Said-Hung, Arcila-Calderón and Méndez-Barraza (2011) and Zamith (2008), which pointed out that customization possibilities were underused in the websites. For example, interface adaptation according to user's interest content was the most advanced indicator (11.11%), but the least widespread. This option was available by subscription in only 4 newspapers. It might be due to complexity; Content syndication and newsletters were two of the most common services (92.06% and 82.54%, respectively). In this way, some newspapers sent out "Today's headlines" or "The most important news today", while others allowed readers to choose sections of interest and frequencies (i.e. daily or weekly). New customization options included new types of email subscriptions: section headlines, author's articles, subject (broader than section), geographical area, etc.; Other possibilities of personalized access to information could be highlighted, for instance, recommendations of The New York Times were based on reader's recent navigation; Making the newspaper website the reader Homepage was rarely used by newspapers (19.05%) and just 4 included it as a service.

Finally, concerning multimediality possibilities, text, images and video were used in all newspapers. So, this was the most developed parameter. Audio was implemented by 1/3 of media and infographics by more than half. New options of multimedia searches in terms of text, video and image were developed. Süddeutsche Zeitung, for instance, allowed images searches; Audio, the less used format (33.33%) may become a common format in the future since newspapers were starting to include it, such as The New York Times and El Universal. Also Süddeutsche Zeitung published the most important pieces of news in this format and The Economist and Financial Times had podcasts available in some sections. Audio pieces of The Wall Street Journal were embedded in news, specific web pages and podcast area; furthermore, new specific multimedia sections were been developed. In this sense, The New York Times, O Globo, The Telegraph and China Daily were the most advanced media. The news of a media may appear in others that belong to the same corporate group.

### **3.2 CLASSIFYING THE NEWSPAPERS INTO ONE STAGE OF EVOLUTION**

Based on the observation of newspapers' websites, a final score for each newspaper in a way similar to Said-Hung *et al.* (2011) was established. Then they were classified into stages, according to the next four intervals: [0.00-0.24]: facsimile model; [0.25-0.49]: adapted model; [0.50-0.74]: digital model; [0.75-1.00]: multimedia model. In the Figure 3, newspapers were displayed according to the results, an average newspaper was also added (61.03%). As can be

seen, all newspapers have surpassed the first phase, *facsimile model*, and lied in a range from 38% to 85%, approximately.

One third of newspapers were in an *adapted phase* where online editions contained some interactive elements such as hyperlinks, and sharing news buttons, text, image and video formats are common. Textual interactivity was rather limited, especially regarding information versions, and only the *constantly updated version* item was valued positively. Personalization options remained virtually undeveloped (16.67%) and multimediality is the parameter with the best score. Asahi Shimbun was the least advanced newspaper (38.57%).

Nearly 2/3 of newspapers were classified in a *digital phase*, where print and digital editions were clearly split in different ways. The average values indicated that most newspapers have worked especially on multimediality (79.37%), information access (78.57%) and presence on Web 2.0 platforms (68.85%). O Globo, which recently updated its website (O Globo, 2014), has focused on content-publication-by-readers options (80%) and information access (83.3%). El Universal (74.54%) is close to the multimedia stage but is penalized because of the under exploiting of participation and customization possibilities. Very close, The Wall Street Journal was the most developed newspaper.

The New York Times (83.45%), Süddeutsche Zeitung (75.48%) and Gulf News (75.12%) were the only newspapers in the *multimedia stage*. The first one attained high levels in almost all parameters (from 75% to 100%), except for *content-publication-by-users* (46.67%). This leadership could be explained because of its think tank, its experience and traditional leadership in the international market.

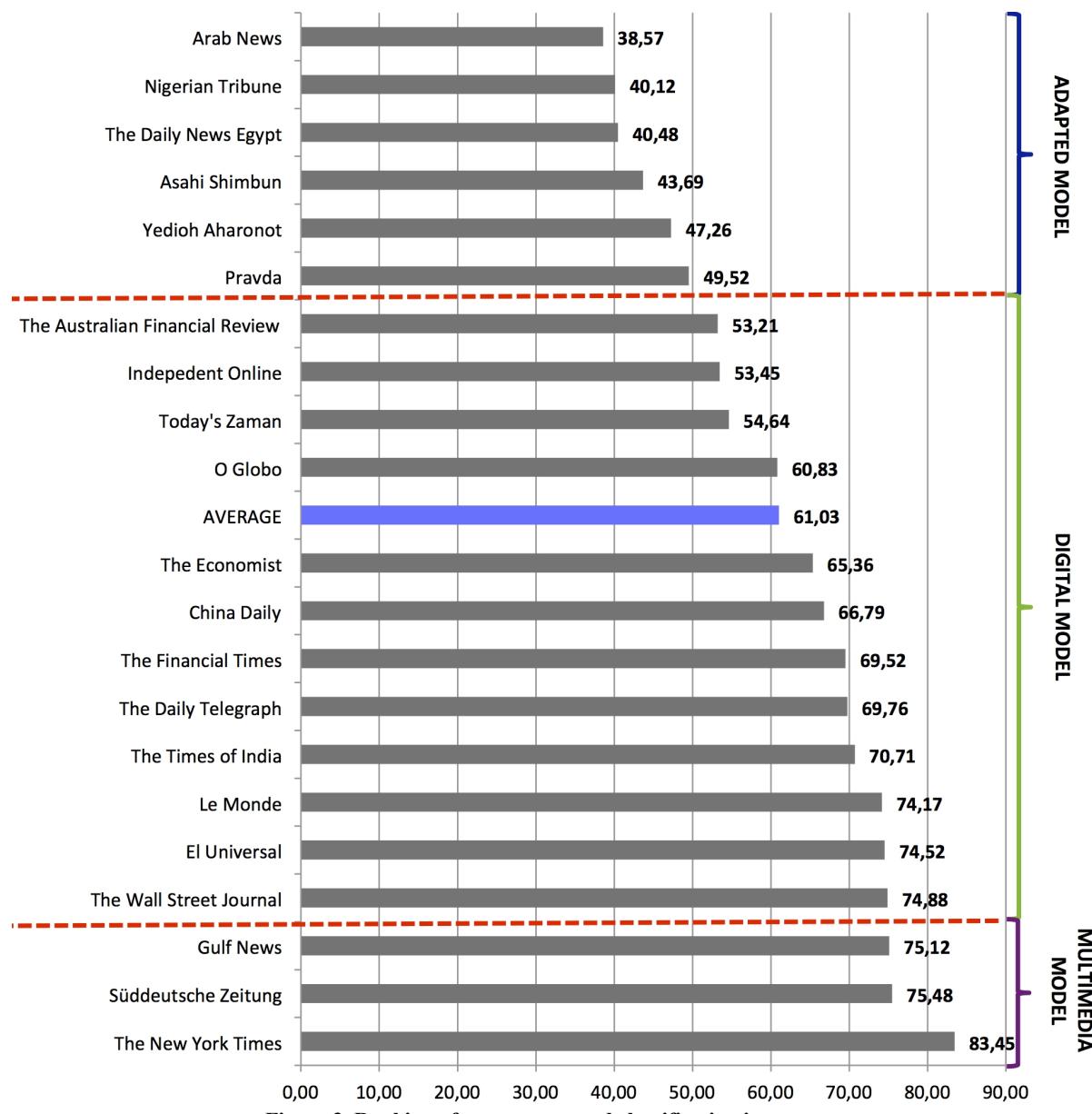


Figure 3. Ranking of newspapers and classification into stages.

#### 4 CONCLUSIONS AND FUTURE STUDIES

This section is organized into two sections: the model and conclusions and recommendations for media companies.

##### 4.1 ABOUT THE MODEL TO MEASURE STRUCTURAL INTERACTIVITY

This work provides both model and diagnostic information. This allows media companies to know about the degree of interactivity of their newspapers and to compare it to their competitors, assessing which dimensions and parameters are being incorporated and which are leaving out. That is, it helps firms to redesign their newspapers and to gain better economic benefits. We believe this model could complete the one defined by (Rodríguez-Martínez *et al.* (2012), by including new items and a classification of newspapers into stages of development. It is extensible, allowing the inclusion or deletion of elements and even incorporating new stages of evolution of newspapers. A new aspect of analysis, for example, could be the 'live blogs' that are characterized by greater involvement of readers through humour or including paralinguistic elements. It should be applied regularly to detect interactivity trends on newspaper.

Furthermore, simply adding features to websites does not make them more interactive nor guarantee higher perceptions of interactivity. So, this work could be complemented with researches focus on messages, perception of

interactivity and technologies that make interactivity possible. Another study could focus on the relationship website-external platforms, such as Facebook and Twitter. As shown in the results section, almost all media have profiles on social networks, but not all are active. More feedback on the comments or reactions of users in social networks could enhance interactivity perceptions.

One reason for the poor results of some newspapers could be paywalls. The choice of the paywall system can be crucial and could affect the development of the interactivity features and the very survival of newspapers. In fact, some papers, such as Voorveld, Neijens and Smit (2011), pointed out that registration could negatively affect interactivity perceptions. The registration requirements may have affected our results by limiting the proper analysis of some aspects of the study. Then, some data was based on the description of the subscription offers. A full access to newspaper websites had been more adequate.

#### 4.2 CONCLUSIONS AND RECOMMENDATIONS FOR MEDIA COMPANIES

Some newspapers have worked to increase publication of content-created-by-readers and, not least, reader-journalist interaction. However, efforts in newspapers have not been sufficient and this dimension is still the less developed. The literature review also emphasized the need to involve readers in the media, allowing them to participate actively in content production, share opinions and to get involved with the newspaper. If the newspaper industry generates both communities of targeted readers and a good public relations strategy, they will probably obtain more incomes, and probabilities for their survival and profitability will increase. In line with other works, this study shows a poor implementation of user-generated content publication tools. Only 2 media clearly allow the newspapers to publish reader-generated content in any format, and only 2 media have an exclusive section for it. Therefore the “mutual discourse or the responsive dialogue”, the two types of two-way communication identified by Mcmillan (2002), was not yet widely produced.

Another issue focuses on communication between journalists and readers. Few media facilitate direct communication between author and readers. On the other hand, it is greater the number of media that allow to contact with the editorial department, in order to modify or to correct a text, although it is not significant. However, almost all media allow readers to comment pieces of news or posts created by the media. Polls are a way to meet an overall opinion on a particular issue, though they are not being heavily exploited. They could become both a way to engage readers and to know what they think about an issue. Regarding voting news, a resource hardly used, could be enhanced with new options. For example, allowing readers to specify the direction of the vote, as it did recently with Facebook buttons reactions.

Participation could become another mechanism of economic survival. It will require a real adaptation of the websites of the newspapers to the new possibilities of interaction with readers at different levels. All this suggests that business models of the newspaper industry are changing but also there is a great niche to be covered with more sections of user-generated content and a closer collaboration between journalists and citizens.

Customization options could be essential because of the problems of time available and volume of information. The results indicate that syndication and newsletter have spread widely, but not so with the possibilities of adaptation to the tastes and interests of readers. Even the simple option to define the media website as the Homepage of the readers' browser is unexploited. A poor implementation of customization options and a close relationship between customization and subscriptions were found.

With reference to multimediality, text, image and video are common formats on the sample. However, how companies use these formats differ: some newspapers used video as a part of a piece of textual news; others show videos as independent items and complemented by textual notes. Other kinds of formats (infographics, drawing formats and audio) were in process to be implemented by overall newspapers and that could make a difference. This may also help optimizing participation, since a correlation between these dimensions could exist. For example, the more multimedia options, the more sharing of news.

Concerning textual interactivity, efforts focused on access to information by hypertext. Search engines need to be improved by facilitating searches for any format and type of information, such as people or events. In this sense, newspapers should use both specific metadata schemes for journalism and knowledge management tools, such as thesauri and ontologies for annotation content. They could make the content retrieval easier. The daily editions of newspapers are the less developed option; it should work on facilitating access by exploiting the related news, contact with the authors, infographics, etc. Regarding the presence of newspapers on Web 2.0 platforms, tools and aggregators are growing up, so active profiles of newspapers in Web 2.0 platforms are compulsory in order to reach as many

readers as possible. However, it requires more involvement, a profile must not be reduced to publish pieces or news. Media companies and journalists should use these channels to interact with readers, beyond emails or comments on news.

Most of the newspapers are in a digital stage, still adapting to the digital environment, and some of them are close to the multimedia phase. Süddeutsche Zeitung and Gulf News rank next The New York Times. It could suggest that geography does not influence in the interactivity development, but this aspect needs more extensive research, by drawing on a broader sample or by defining a national sample. As can be seen, information technologies play a key role in the emergent business models. The highlighted changes and trends should be taken into account as potential modifications that newspaper industries could perform in order to develop the interactivity in their products. In this way, they could improve their engagement with their users and let them become *prosumers*. In other words, to identify changes and absences in interactivity features, by applying the proposed model, could be translated into engagement, and this could lead to reciprocal benefits.

Finally, since these newspapers are the most read in the countries of reference, it was considered that the degree of interactivity in their websites can represent the highest level of development of the interaction option in their areas. However, this sample would need to be expanded to contrast these results. Future studies could focus on a large sample of digital newspapers, with which to contrast the results of this study.

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## APPENDIX

The following table show the data collected in the last performed in July 2015.

COMMUNICATIVE INTERACTIVITY OR PARTICIPATION		INTERACTION NEWSPAPER-USER OR USER-USER																				%	
		Süddeutsche Zeitung	Le Monde	The Daily Telegraph	The Economist	The Financial Times	The New York Times	The Wall Street Journal	O Globo	El Universal	Pravda	Nigerian Tribune	Independent Online	China Daily	The Times of India	Asahi Shimbun	Arab News	Gulf News	Yedioh Aharonot	Today's Zaman	The Australian Financial Review	The Daily News Egypt	
11	1	0	0	0	0	1	1	0	0	0	0	0	0	1	0	0	0	0	0	1	0	23,81	
12	1	1	0	0	1	1	1	1	0	1	1	0	0	0	0	0	1	1	1	1	1	57,14	
13	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	95,24	
14	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4,76	
15	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	66,67	
16	1	1	1	0	1	1	0	0	0	0	0	0,33	0,33	0,33	0,33	0	0,33	0,67	0,33	1	0	41,27	
17	1	0	1	0	0	0	0	0	0	1	0	0	1	0	1	0	1	1	0	0	0	33,33	
18	1	1	1	0	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	0	1	80,95	
% 87,5 75 62,5 37,5 50 75 62,5 25 62,5 37,5 25 54,17 54,17 54,17 41,67 41,67 37,5 41,67 45,83 54,17 37,5 37,5 50,40																							
21	0	1	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	14,29	
22	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	90,48	
23	0	0	0	0	0	0	0	0	1	1	0	0	1	0	0	0	1	1	0	0	0	28,57	
24	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	1	1	0	0	0	23,81	
25	0	0	0,33	0	0	0,33	0	1	1	0,33	0,33	0	0,33	0	0,33	0	1	0	0	0,33	0	25,40	
% 20 40 46,67 20 20 46,67 20 80 80 46,67 26,67 20 46,67 20 26,67 20 80 60 20 26,67 0 36,51																							
31	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	100,00	
32	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	100,00	
33	1	1	1	0,67	1	1	1	1	1	1	0,67	0,33	0	1	1	1	0	1	0	1	0	69,84	
34	1	1	1	0,33	1	1	1	1	0,67	0,67	0,67	0,67	0,67	0,33	0,67	1	0,33	0,33	1	0,33	0,67	1	0
35	1	0,67	1	0	0	1	1	0	0	1	0	0	0	0	1	0	0	0	1	0	1	41,27	
36	0	0,33	1	1	1	1	0	1	1	1	1	1	1	1	1	1	0,67	1	1	1	0	1	
37	1	0,67	1	0,67	1	1	0,67	1	0,33	0,67	0	1	0,67	1	0,33	0,67	1	0	0,67	1	0	68,25	
38	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	100,00	
% 87,5 83,33 100 70,83 87,5 100 83,33 83,33 75 83,33 62,5 66,67 66,67 79,17 100 66,67 62,5 87,5 54,17 66,67 87,5 62,5 78,57																							
41	1	1	0	1	1	1	1	1	1	1	0	0,33	0	1	1	1	0	0	1	0	1	63,49	
42	1	1	1	1	1	1	1	1	1	1	0	0	1	1	1	0	0	1	0,33	0,67	0,67	0	
43	1	1	1	1	1	1	1	1	0,67	0,67	1	0,67	0,67	1	0,67	0,33	1	0,33	0,33	1	0,33	77,78	
44	1	1	1	0,67	1	0,67	1	0,67	0	0	0	0,00	0	0,67	0	0	0	0,67	0	0,67	0	38,10	
% 100 100 75 91,67 91,67 100 91,67 66,67 66,67 25 25 41,67 83,33 75 16,67 8,333 91,67 16,67 66,67 41,67 33,33 62,30																							
51	0	1	1	1	1	1	1	1	0,67	1	1	0,67	1	1	1	1	0	0,67	1	0	0,33	0,33	
52	0	1	0	1	1	1	1	0	0	0	0	0,67	0,33	1	0	0,33	1	0,33	0	0	0	41,27	
53	0	0,33	1	0	0	0	0	0,33	0	0	0,33	0	0,33	1	1	0	0	0	0	0	0	20,63	
54	0,67	0,67	1	1	1	1	1	1	0,67	0,33	0	0	0,33	1	0,33	0,33	1	0,33	0,33	0,33	0,67	58,73	
55	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	100,00	
56	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	100,00	
57	1	1	1	1	1	1	1	1	0,67	0,67	1	0,67	0,67	0,67	0,67	1	0,67	1	1	1	1	1	
58	1	1	1	1	1	1	1	1	1	1	0	0	1	1	1	1	1	0	0	1	0	66,67	
% 58,33 87,5 87,5 87,5 87,5 87,5 91,67 62,5 62,5 41,67 75 87,5 87,5 54,17 50 75 45,83 58,33 45,83 58,33 68,85																							
61	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0,33	0	0	11,11	
62	1	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	92,06	
63	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	82,54	
64	1	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0	1	0	0	0	19,05	
% 75 50 50 50 50 75 75 25 75 50 50 50 50 50 75 16,67 25 50 58,33 50 50 25 51,19																							
71	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	100,00	
72	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	100,00	
73	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	100,00	
74	1	1	0	1	1	1	1	1	1	1	0	0	0	0	1	1	0	1	0	0	1	57,14	
75	1	1	1	1	1	1	1	1	1	1	0	0	1	1	1	1	1	1	1	1	1	85,71	
76	1	0	0	1	1	1	1	1	0	1	0	0	0	0	0	0	1	0	0	0	0	33,33	
% 100 83,33 66,67 100 100 100 83,33 100 50 50 66,67 66,67 83,33 83,33 66,67 100 50 66,67 83,33 66,67 79,37																							
AVERAGES	2015	75,48	74,17	69,76	65,36	69,52	83,45	74,88	60,83	74,52	49,52	40,12	53,45	66,79	70,71	43,69	38,52	75,12	47,26	54,64	53,21	40,48	61,03
	2014	68,33	67,14	58,45	60,24	64,52	79,79	67,98	60,83	74,52	44,05	38,51	67,80	65,89	68,81	53,69	43,33	63,69	46,79	45,95	49,29	49,52	59,01
		↑	↑	↑	↑	↑	↑	↑	=	=	↑	↑	↓	↑	↑	↑	↓	↑	↓	↑	↑	↑	

Table III. Data collected after analyse the interactivity in newspaper websites.