Designs for Social Science Study of Globalized Future Scenarios

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Abstract

This paper is based on the theoretical and methodological developments produced in "Social production of communication and social reproduction in the age of globalization." It presents new content analysis models, based on logical and systemic methodologies. It describes how these designs have been applied to the analysis of the content of scientific and technical publications, which operate on the relationships between "globalization" and social applications of ICTs. Using these methodologies, the set of "future scenarios" that are shaped by the social uses of information and knowledge, as conceived in academic and professional milieus, has been identified. The paper makes the models and protocols that were tested in this research available to the scientific community.

Keywords: Social Changes, Globalization, Information and Communication Technology, Future Scenarios, Content Analysis

1. The R+D+I Research on which this Paper is Based

"Social production of communication and social reproduction in the age of globalization" is a study funded by the Spanish national R+D+I program for the promotion of knowledge and basic research.[i] It was conducted by the "Social Identities and Communication" Research Group at the Universidad Complutense de Madrid, to which the authors of this paper belong.

This research was conceived and conducted to contribute new knowledge in the following developments:

(1) Generation of logical and systemic methodologies for the study of socio-historical changes.

We define "socio-historical changes" as irreversible changes in the organization and operation of societies.

(2) Design and testing of models for the analysis of "future scenarios."

We define "future scenarios" as representations of socio-historical changes that establish links between the foreseeable status and functioning of societies and the links that are taking place in the present.

(3) Use of the models and results obtained from their application in social and human science studies that take into account the impact of social uses of knowledge and information.

The transfer of results for each of these developments requires specific publications. More specifically, this paper refers to the developments mentioned in *(2)*. It describes the designs created to identify and analyze representations of socio-historical changes put forward in future scenarios. These are content analyses used in social and human sciences: either in retrospective studies - to find the "state of the art" - or in prospective approaches, working with future scenarios. Both types of analysis have been carried out in this research. The designs described in this paper were applied and tested, analyzing the scenarios of a globalized future that are put forward in scientific and technical publications when links are established between those prospective representations and the social applications of information and communication technologies.

The theoretical and methodological basis of these designs is described in other publications. In any case, in the course of the exposition, the theoretical and methodological concepts required to explain these designs are defined. Throughout the exposition, hyperlinks are included that lead to online files providing a systematic list of publications and research in which the expositions that cannot be included here can be found.

This paper develops the models and protocols designed, in sufficient detail for their use in other researches that use materials that include contents of interest for the study of socio-historical changes. The examples that illustrate the designs have been taken from some of the researches that are using these models and their results.

2. Design and Testing of Models for the Analysis of Future Scenarios

"Social production of communication and social reproduction in the age of globalization" is a macro-sociological and socio-historical study, which is therefore included in the field of prospective studies:

a) It is a macro-sociological study because it analyses processes that involve three systems on which the action of social agents has an impact. They are different systems, but connected to each other. More specifically, the following are taken into account:

- Transformations in the social production of communication [CS]
- That are linked to social changes [SS]
- And to changes in the groups to which communication refers [SR].[ii]

This macro-system refers to *a situation*that is currently undergoing changes due to certain social uses of information and knowledge. From now own, it will be known as ╟ the current situation ╢

The relationships between these three systems may be specified by means of this notation:
The current situation: ╟ [CS]∩ ([SS] ↔ [SR]) ╢

b) It is a study of contents identified in the "socio-historical dynamics." These are processes that are regarded as ongoing and expected to lead to some socio-historical change.

The following notation is used: *Socio-historical dynamics:* ⌈ ►*DS*► ... ⌋

c) ***It is a prospective study, as it analyses representation of the socio-historical changes*** *that are regarded as* foreseeable, whether they be desirable or not. They are the *"future scenarios"*

A prospective design establishes links between the macro-sociological processes that shape "the current situation" and "*socio-historical changes*". This can be represented using the following notation:

╟ current situation ╢ ∩ *"socio-historical changes"* (table 1)

3. Selection of Sources to Obtain Contents

The corpus of texts selected was taken from scientific and professional publications. They describe dynamics that, in their authors' view, will ultimately change the organization or functioning of societies. These are prospective forecasts, as they establish links between those dynamics and certain current social uses of information and knowledge. When these forecasts can be transcribed into a narrative corresponding to the *prospective design reproduced in Table 1*, a "future scenario" referred to "*Social production of communication and social reproduction in the age of globalization*" has been identified.

The sources were identified using logical search engines in the own and third party funds and documentary resources available at the Universidad Complutense de Madrid (UCM). A total of 70 books, 10 book chapters, and 33 papers in scientific journals were selected and analyzed.[iii]

The sources that meet the following criteria contain *relevant information* to the object of study:

a) They include references to *transformations in communications* relative to *non-communicational changes* and also mention their impact on the status or future functioning of societies.
b) There is an implicit or explicit reference to a time horizon. A comparison is made in the texts:

- Between the past and the present and perhaps the future;
- Or else between the present and the future.

The criterion followed to distinguish between "past, present, and future" is the one used in the source.
The protocol that includes these specifications is reproduced in Table 2.
The references used in this protocol for source selection correspond to the contents taken into account in the analysis of *future scenarios*.

4. Use of Logical Criteria to Design Content Analyses

4.1 'Future Scenarios' as Content Analysis Units

As was stated, the future scenarios selected for the analysis of "Social production of communication and social reproduction in the age of globalization" describe the links between the macro-sociological processes that constitute the "current situation" and the dynamics that lead to "socio-historical changes." "Future scenarios" constitute the corpus used for content analysis; and each of them is an analysis unit.[iv]

Future scenarios arise from the information included in the sources. But those contents were collected and described following a model. The model created to carry out that systematic organization of information was shown in Table 2. They systematize the multiple, open, undefined, and polysemous representations found in the sources.

A total of 2,300 future scenarios were identified and transcribed. The texts that describe future scenarios have those characteristics:

- On the content level, each future scenario logically expounds ONE ARGUMENT (one single one).[v]
- On the configuration level, the elements of the narrative and their organization reproduce the prospective design shared by all scenarios. (Described in Table 1)

Narratives that meet both conditions are "well-formed texts".[vi]

4.2 Transcription of Each Scenario into a 'Sentence'

Texts that have both characteristics are called "sentences." They are defined as follows:

A "sentence" is the transcription of an argument onto a well-formed narrative, following a design that makes that reasoning comparable to alternative ones.

To meet these requirements, sentences must be part of one single narrative corpus. And they must be built sharing the same model. All future scenarios are sentences. They are comparable narratives: because they have the same structure, are decomposed and recomposed into the same *formations*; the latter into the same *parts*; and each part into identical *components*. Comparisons between future scenarios can be made both on a unit scale and on the scale of any of its disaggregations. In order to be comparable, future scenarios must be part of the same corpus, in which they play the role of analysis units.

Sentences referring to future scenarios constitute a corpus of narratives describing relationships between macro-systems. So they can be analyzed using systemic methodologies. It should be pointed out that when a narrative has been transcribed into sentences that are logically well-formed, textual and systemic descriptions are comparable and interchangeable. This equivalence enables analysts to work on two levels at once:

- On the "discourse" level, to operate on the *sense* of the description of a scenario when it is described in a sentence.
- On the "organizational" level, operating with the *configuration* of each future scenario, when it is described in a systemic model.[vii]

5. Systematic Organization of the Sentences into 'Fields'

The text described by each sentence has the following parts:

* Part 0: Origin of information
* Part 1: Communicational transformations
* Part 2: Social and group changes
* Part 3: Dynamics that will be modified in the course of globalization.

Each of them is disaggregated into one or more FIELDS OF ANALYSIS, which serve for the classification and *systematic* exploitation of the data. This design is shown in Table 3 and is later developed. [viii]

The 2,300 sentences were transcribed using a computer application, where they were arranged into these fields. Given that the corpus organized is very broad and representative, sets have been obtained in each field that can be used to create *protocols of reference*.

Protocols of reference are models that systematize the empirical results of the analysis of the contents of scientific and technical publications. They *refer* to the universe of representations relative to the *interface* ⌈ICT uses s↔ globalization transformations⌋ at the level of its structural items, which are THE FIELDS.

The protocols applied and being made available to researchers can be used:

- To arrange the sentences;
- To create analysis variables and categories;
- To generate groupings and criteria.

As can be seen, the *protocols of reference* that are reproduced as follows encompass the various parts of the research.

6. The Fields of Systematic Analysis and their Protocols of Reference

** Part 0: Origin of information*

- FIELD 1: Pertaining to the sources.Includes two types of data:

(a) The data usually required for a citation (title, author, data and location of publication, publisher, etc.)
(b) To whom the information is attributed (institutions, organizations, administrations, etc.)

The protocol shown in Table 4 was generated.

To show how sentences are disaggregated into FIELDS, we will use the following future scenario as an example: "User access to digital networks (is a transformation) that makes it possible to replace on-site communications by virtual ones" Resource to this service plays the role of keeping the links between family members who are separated by emigration. “The virtualization of family interactions has consequences for migratory dynamics"

** Part 1: Communicational transformations. Disaggregated into fields 2 and 3:*

- FIELD 2: Includes what is transformed (or can be transformed) in the communication system [CS].
In the example, the transformation consists in the fact that "*User access / to digital networks*" is possible.
Field no. 2 records separately:

- The transformation (*user access*)
- The element of the Communication System that is transformed (*the networks that become digital*)

- FIELD 3:Includes the impact that transformation has (or may have) on components of the communication system (CS).

Impact on its status, organizations, uses, services, functions, etc. In the example: ... *makes it possible to replace face-to-face communications by virtual ones*//.

The indications found in the texts examined regarding communicational transformations may refer to:

- **Some of the Communication System levels:**
  - Infrastructural, technological: channels, networks, devices, etc.
  - Structural, organizational: communications companies, user communities, etc.
  - Suprastructural, of representations: contents and forms of narratives
- **The activities performed by the agents in communication processes**. The agents involved taken into account in this study take part in communicational interactions:
  - As producers and/or emitters mediating in the process, creating, disseminating, distributing communicational materials for recipients.
  - As information recipients and/or users who access, select, receive, consume or apply the information or knowledge acquired.
- **The mediations specific to communication**. The communicational products handled by the recipients and/or users are the result of the communicational activity of others (producers, emitters...) who take part in any of the mediation tasks: they select objects of reference about which they offer narratives that are cognitively mediated (insofar as they contain a representation, not other possible representations of the objects of reference) as well as structurally mediated (insofar as they are presented in specific ways, taking up communication space and time).

The details can be seen in the ***Protocol for the systematic organization of [CS] transformations****, disaggregated into three tables that correspond* to three kinds of transformations:

Table 5: Transformations of the organization and components of communication systems
Table 6: Transformations of communication processes and the parties involved in them
Table 7: Transformation of communication mediations

* Part 2 Social and group changes.Disaggregated into fields 4 and 5:

- FIELD 4: Includes the impact of the transformation of [CS] on some components of the social system [SS] and on the agents that are mentioned as having experienced the impact of those incidents [SR].

Usually, the impact on [SS] is stated by means of a verb. In the example: *Use of this service (replacing face-to-face communications by virtual ones) plays the role of / maintaining social links...*

These references can be classified on the basis of the following criteria:

- **Elements belonging to any of the three levels of social system analysis**
  - Infrastructural, technological: when the change has an impact on other, non-communicational infrastructures or has an environmental impact.
  - Structural, organizational: when it has an impact on public services, institutions, social movements, etc.
  - Suprastructural, of collective representations: when it has an impact on ethics, shared values, collective identities, etc.
- **The activities performed by social agents:** changes in socialization, politics, work, finance, conflicts, etc.
- **The activities performed by social mediators**, their contents and effects, when they are changed and have an impact on (or receive the impact of) transformations in public communication.

It has the following protocol (Table 8), which uses a change typology that is symmetrical to the Communication System [CS] transformation typology, distinguishing between:

***** Changes in SOCIAL SYSTEM ORGANIZATION AND COMPONENTS.
***** Changes in SOCIAL PROCESSES and the agents involved in them.
***** Changes in SOCIAL MEDIATIONS[ix]

- FIELD 5: Reserved for the specification of the agents involved in the incident (entities, groups mentioned as involved, impacted). Following the previous example: ... *between family members who have been separated by emigration.*

The corresponding protocol (Table 9) is as follows:

* Part 3: Dynamics that will be modified in the course of globalization. Disaggregated into a single field:

- FIELD 6:Includes any incidents which the changes identified can have on the previous fields, on globalized society and its dynamics. In the example: *"the virtualization of family interactions has consequences for migratory dynamics"*

Creation of 'Future scenario' Subsets

7. Creation of "Future Scenario" Subsets

The description of the scenarios can be the same one in any of the parts of the narrative. They can share part 1: *Communicational transformations;*or else part 2: *Social and group changes*; or else part 3: *Dynamics that will be modified in the course of globalization.* All the scenarios that share parts constitute a subset of the corpus.

For example, there is a subset of scenarios that share the following description of part 1: Communicational transformations: *"User access to digital networks makes it possible to replace on-site communications by virtual ones."* It has been termed (the subset of) <future scenarios related to "*the virtualization of interactions*">.This subset includes many scenarios, three of which have been selected to illustrate this explanation. The disaggregation of the scenarios in Table 8 makes it possible to see what they share and what distinguishes them from each other.

Each scenario provides a different plot. All three plots are developed from "*the virtualization of interactions*"; but each of them takes different impacts and impacted parties into account.

These are the plots of the scenarios used as examples:

Example 1. “The virtualization of family interactions has consequences *for migratory dynamics”*
Example 2. "The virtualization of interactions among the populations is facilitating *the political involvement of civil society"*
Example 3. "The virtualization of bureaucratic interactions is transforming *relationships between citizens and public administrations*"

These three examples of scenarios are presented in Table 10.

By means of these operations on sentences, all the future scenarios are obtained that are related *to a certain communicational transformation* or *to a certain social change* can be identified. Subsets of scenarios that have *a specific socio-historical change* in common can also be identified. These latter subsets are the ones of most interest in this research. They concern the conceptions of globalization in the field of study pertaining to social production of communication.

The future scenario subsets that share a reference to the same socio-historical changes can be generated by means of various grouping scales. The subsets can be grouped into typologies, using more general grouping criteria. Aggregation into typologies yields results that are usually more intelligible and explanatory (Bernete, 2014).

In this research, the criterion used to generate typologies was *socio-historical dynamics*.It was verified that seven out of every ten sentences could be classified into any one of the nine dynamics identified in the corpus. These are the following:

(1) Humanization // De-humanization
(2) Enlightenment // Obscurantism
(3) Creativity // Routinization
(4) Information // Misinformation
(5) Control // Autonomy
(6) Socio-historical transformations // Reproduction
(7) Appearance // Disappearance of monopolistic-global capitalism
(8) Change // Stabilization of labor organization
(9) Power centralization // De-centralization

These ways of processing information derive from the application of structural and discriminative techniques.[x]

8. Summary and Ways to Exploit the Database byCross-Referencing the Set of Future Scenarios and the Set of Social Uses of ICTs

So far we have shown: why this study is macro-sociological, socio-historical and prospective; the criteria which the sources should meet to be considered sources containing information that is relevant to the object of study; how ‘future scenarios’ constitute the corpus used for content analysis; the model that we follow to collect and describe the information included en the sources; and finally, the way in which we arrange the argument of each ‘future scenario’ into fields of analysis, which serve for the classification and systematic exploitation of the data.

Certainly, the social uses of ICTs have multiple dimensions and can be analyzed on different levels; in each of them the impact of said actions would be manifested in different aspects. The analysis of the scenarios pertaining to social users of ICTs and their impact on the reproduction or transformation of globalized societies can thus be carried out applying different criteria. Researchers decide which criteria suit them; but they should have a set of criteria and should make it explicit.

The following are some examples taken from research generated from "*Social production of communication and social reproduction in the age of globalization*.” They correspond to four different criteria for the study of social uses of ICTs. Each criterion makes the study of the set and subsets of sentences *conditional upon* social applications which the research makes explicit.

- Criterion 1: The researcher wishes the scenarios to be analyzed *in terms of the communicational domains* where the communicational transformations are taking place. In this example, a distinction is made between the applications of ICTs that take place in the domains specified below.It is understood that this criterion allows for other alternative distinctions.

Communicational domains where the communication system transformations are produced or applied (in this case, several categories, one single category, or no categories can be noted):

(1) Communication
(2) Information
(3) Journalism
(4) Advertising
(5) Political Propaganda
(6) Public relations
(7) Marketing

- Criterion 2: The researcher wishes to analyze the scenarios in terms of the various *agents involved in the communicational transformations*. In consequence, this places a condition on the systematic organization of the scenarios, distinguishing between social uses where the various agents appear to be involved.

Agents involved in the communicational transformations:

(1) Generality
(2) Countries, Nations, States
(3) Organizations
(4) Groups
(5) Individuals
(6) Animals

- Criterion 3:The researcher analyses the scenarios in terms of *the orientation of the social uses made of ICTs.* It makes systematic organization of the scenarios conditional upon their correspondence to the orientations or goals listed below:

(1) Education(learning, studying, teaching, knowing, understanding, qualifying)
(2) Analysis (analyzing, defining, operating, interpreting analyses, assessing, researching)
(3) Creation (creating, developing, designing, providing, contributing, offering)
(4) Application (applying, making, producing, using technologies)
(5) Management(planning, leading, managing, organizing, promoting, achieving)
(6) Interaction (all activities aimed at relating and communicating)

- Criterion 4:One of the criteria for the study of the mediating guidelines underlying social uses of ICTs consists in examining the *level* on which effects take place. To this end, the following categories have been used:

1) Changes on the level of *doing* (activities, interactions between individual and collective agents...)
2) Changes in the *being* of the society and its organizations.
3) Changes in *belief* or knowledge (rules, values, programs, models, ideologies, mindsets, worldviews...)

The categories included in each of the levels can be *crossed* with the dimensions or categories included in any other criterion. For example, they can be crossed with the social applications of ICTs,[xi] the set of which is given in Table 11 [near here]:

As was already mentioned, the specific results of these analyses have been published in other papers. This paper describes the designs created to identify and analyze representations of socio-historical changes put forward in future scenarios. We believe that the models and protocols shown may be used in new research with materials that include contents of interest for the study of socio-historical changes in the field of information, communication and society.

Table 1: The Prospective Design of "Social Production of Communication and Social Reproduction in the Age of Globalization"

Notation corresponding to macro-sociological and socio-historical analyses
►╟ [CS] ∩ ([SS] ↔ [SR]) ╢ ∩ ⌈►*DS*►⌋
The descriptions of this design are **"future scenarios"**

1) This notation specifies that it is constituted by two **formations:**
╟ The current situation ╢∩⌈ *"socio-historical dynamics"*⌋

2) All the "future scenarios" include in every formation the same *parts*, constituted by identical *components*, which are organized taking the same *relationships* into account:
- In "the current situation" ╟ [CS] ∩ ([SS] ↔ [SR]) ╢ twopartsare distinguished: (1) communicational transformations [CS] and (2) the changes of a social nature in which a group is involved ([SS] ↔ [SR])
- In "socio-historical changes" ⌈►*DS*►⌋ one single part,*DS,* includes the historical dynamics that undergo changes.

3) In all "future scenarios" the relationships between formations, parts, and components are taken into account and specified by means of "∩" and ↔

4) Finally, changes and transformations are seen from the same temporal point of view.

Functions of the signs:

Delimitation signs:

The ╟ ╢ signs delimit the set of the components of the current situation.
The ⌈ ⌋ signs delimit components of *socio-historical changes*.
The ( ) signs delimit subsets of components
The [ ] signs designate the corresponding systems.

***Relationship signs*:**

The "∩" sign indicates some kind of relationship between the parts linked.
The ↔ sign indicates that impact is usually in both directions.

Process signs:

The ► indicator, placed before a formation, specifies that it is diachronic (develops and changes over time).[a]

[a] A UCM repository containing online resources that provide the basis for the macro-sociological study of changes and related technical applications can be found via the following link: http://eprints.ucm.es/24147/

Table 2: Protocol for Source Selection. List of References that are taken into Account

I. Transformations In Communication that are Reflected in Public Communication [Scp].[A]Transformations that Transcend (Or Will Transcend) to Other, Non-Communicational Systems [Ss]- [Sr]

Reference types:

- Transformations of public communication systems
- Transformations of public communication processes
- Transformations of public communication mediations

And, correlatively:

II. CHANGES IN ***NON***-COMMUNICATIONAL SYSTEMS [***SS]- [SR***], that are (or will be) related to transformations in public communication systems [SCP].

Reference types:

- Changes in social system organization and components
- Changes in social processes
- Changes in social mediations
- References to groups involved in social changes

↓

III. Insofar as Those Relationships are Related (Or May Become So) to Social Reproduction in the Age of Globalization

Reference types:

- Reproduction or transformation of the states, dynamics, of globalized society.

[a] "Public communication" uses communication systems that are **not** privative and do **not** have access restrictions (by definition).

Table 3: Systematic Organization of Future Scenarios into Fields

*** Part 0: Origin of information**		
FIELD 1: TO WHOM THE INFORMATION IS ATTRIBUTED		
Part 1: Communicational transformations		
FIELD 2: WHAT IS TRANSFORMED INTO [SCp] (Or can be transformed)		FIELD 3: WHAT IMPACT THAT TRANSFORMATION (or transformations) HAVE (or can have) ON [SC]
Transformation (innovation, evolution, development, rearrangement, replacement...) **in question:**	Element of public communication (SCp) being transformed:	Communicational impact(s) mentioned: It has an impact on, makes possible, has the consequence of, introduces... …Certain states(s), organization(s)... …Certain use(s), application(s)... …Certain feature(s)... …Certain function(s)...
*** Part 2 social and group changes**		
FIELD 4: WHAT CHANGES (DOES NOT CHANGE) (Or may change or not change)		FIELD 5: ON WHOM THOSE (NON) CHANGES WILL HAVE AN IMPACT
Sense of the change (or non-change) mentioned: (That communicational transformation) **has an impact on**, affects, is reflected in, is related to... **-- A given change:** (increase, decrease, appearance, disappearance, reappearance **of**...) **-- A given NON change:** (permanence, maintenance, continuity **of**...)	NO communicational item (from (SS) or (SR) which changes (or does not change):	**Entities, groups... mentioned as receiving an impact** (concerned, involved...)
*** Part 3: Dynamics that will be modified in the course of globalization.**		
FIELD 6: WHAT IMPACT those (non) changeshave (or can have) ON SOCIAL REPRODUCTION IN THE AGE OF GLOBALIZATION (Non) social change related to the transformation of public communication has an impact on, makes possible, has the consequence of..... the reproduction/transformation of certain state(s) certain dynamics... of the age of globalization		

Table 4: Protocol for the Systematic Organization of the Institutional Sources to Which the Information is attributed

The sources are recognized, perform, provide, play... a role, a function in a group or institution. They are the representatives, spokespeople, members... of institutions, organizations, corporations, groups... (stable or temporary); or else they are the organization, corporation, or group itself.
(Open) set of institutional sources. Examples.

INSTITUTIONAL SOURCES	***EXAMPLES OF INSTITUTIONAL SOURCES***
By default, the author of the material analyzed is regarded as its sources	• Other writers, popularizers...
Communication companies, organizations*	• Communications, information, news businesses, agencies, departments, cabinets... • Advertising, image... • Publishers... • ...
Pubic administrations, institutions, organizations* (supranational, state, regional, local)	• Executive government bodies; • Presidency, ministries... • Armies, police forces... • Related to any kind of public service: (transport, healthcare, education... • Legislative bodies (parliaments...) • Judicial bodies (judges, prosecutors...)
Educational, scientific, cultural, arts institutions, organizations *	• Universities, institutes... • Research centers, teams, researchers, archives... • …
Organizations, professional associations, lobbies *	• E.g. consumer, user associations • Professional associations • Trade unions; workers' associations • Employers' associations • ....
Capital and financial institutions, organizations, companies	• Markets • Banks • …
Institutions, organizations, and companies from all production industries *	• Commerce, business... • Agricultural... • Industrial... • Services and transport... • …
Institutions, citizens' organizations, charities, NGOs*	• Family, neighborhood, youth, immigrant associations • Protester, victims groups • Associations for aid to refugees, elderly people, diseased people, the third world... • …
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They exist but cannot be identified	.....

* Their representatives, members, spokespeople; whoever plays these roles

Table 5: Transformations of the Organization and Components of Communication Systems

Characteristics: public communication [SCp] components belong to different levels (Open) set of elements of public communication systems corresponding to each level:		
INFRASTRUCTURAL, TECHNOLOGICAL ELEMENTS (examples)	STRUCTURAL, ORGANIZATIONAL ELEMENTS (examples)	SUPRASTRUCTURAL ELEMENTS OF THE REPRESENTATIONS (examples)
- ICTs, /NEW TECHNOLOGIES... their technological components or features - TECHNICAL CHANNELS / SUPPORTS... .../--- - DEVICES, tools... computers, mobile telephones .../--- - MEDIA: printed, audiovisual, digital, etc. - COMMUNICATION NETWORKS. Online/digital networks... other networks, any other infrastructure	MEDIA COMPANIES; communication/information organizations, cabinets, services, .../--- SOCIAL NETWORKS, VIRTUAL GROUPS... BLOG, FORUM, VIRTUAL COMMUNITY... .../---	THE CONTENTS OF THE NARRATIVES, descriptions... of communication, which provide mediate REPRESENTATIONS, visions, interpretations of the world (of collective subjects: their being, doing, power, wants, circumstances and environments...)

Table 6: Transformations of Communication Systems and the Parties Involved in them

Characteristics: certain activities performed by certain agents take place The agents involved in the public communication taken into account in this study take part in communicational interactions: - As producers and/or emitters, mediating in the process and/or - As recipients and/or users of the mediated information (open) set of activities and Agents involved	
ACTIVITIES TAKING PLACE IN THE PUBLIC COMMUNICATION PROCESSES in one or several processes	AGENTS INVOLVED in one or several activities
- MEDIATING ACTIVITIES RELATED TO THE PRODUCTION, REPRODUCTION... OF COMMUNICATIONAL MATERIALS (PRODUCTS) Producing, creating, reproducing, disseminating, processing... mediated knowledge, information...	... OF THE AGENTS WHO ARE INSTITUTIONAL MEDIATORS - Producers, creators, disseminators, mediators of public communications (professional or not)... - Are mentioned, but not differentiated
MEDIATION ACTIVITIES RELATED TO DISTRIBUTION, DISSEMINATION, SELECTION OF RECIPIENTS Issuing, resending, transferring, disseminating, intercepting...	- Emitters, issuers, disseminators... - Potentially censors, controllers of networks or their contents... - Are mentioned, but not differentiated
ACTIVITIES FOR USE AND APPLICATION OF THE COMMUNICATIONAL MATERIALS	... OF THE AGENTS WHO ARE USERS
ACTIVITIES RELATED TO ACCESS, RECEPTION, OF THE COMMUNICATIONAL MATERIALS... WITH NAVIGATION, LOCATION OR SELECTION Receiving, navigating, selecting, joining networks...	- Recipients, internet users, audiences... - Are mentioned, but not differentiated
ACTIVITIES RELATED TO USE Using, applying, consuming, mediated information and knowledge	- Users, consumers... - Are mentioned, but not differentiated

Table 7: Transformation of Communication Mediations

Characteristics:the communicational materials (products) are the result of the communication activity of others (producers, issuers...) who take part in mediation tasks (closed) set of mediated communication production and its characteristics	
Mediated Communication Production Tasks	**Characteristics of the Mediation Tasks**
CERTAIN INSTITUTIONAL MEDIATORS ARE INVOLVED	IN TASKS RELATED TO THE PRODUCTION, REPRODUCTION... OF COMMUNICATION MATERIALS
WHICH SELECT OBJECTS OF REFERENCE AS ELEMENTS OF PUBLIC DEVELOPMENTS	Real or virtual, tangible or intangible, possible or impossible OBJECTS OF REFERENCE... things, subjects, knowledge, events, desires... They refer to some and ignore others; perhaps they are concealed or minimized. Thus the creation of public developments takes place, as well as the ensuing referential control
ABOUT WHICH A NARRATIVE IS OFFERED	(A NARRATIVE, description, presentation... which is cognitively and structurally mediated) The information included in the narrative can be assessed on the basis of these dimensions: informative/redundant 1. New/banal 2. Relevant/irrelevant 3. Creative, innovative/stereotypical (significant)
... THE NARRATIVE IS COGNITIVELY MEDIATED...	It includes certain REPRESENTATIONS, AND NOT OTHER REPRESENTATIONS, OF public developments, as a result of the cognitive mediation that takes place: 1. When certain reference data about those developments are provided and not other data; 2. And certain judgments, assessments... and not others are mentioned. 3. The reference data and assessment data are included in a set of TOPICS
... WHICH IS ALSO STRUCTURALLY MEDIATED	THE NARRATIVE TAKES UP CERTAIN COMMUNICATIONAL TIME AND SPACE • It is achronous, synchronous, index; • On print, digital support.... • Presented in a certain format, design, treatment... • In documents, words or images, that are static, dynamic, interactive...

Table 8: Protocol for Systematic Organization of Changes in the Social System [SS] which are or will be related to Transformations in the Communication System [CS]

***** Changes in Social System Organization and Components.

Refers to elements belonging to any of the three levels of social system analysis
(open) set of general categories Examples:

INFRASTRUCTURAL, TECHNOLOGICAL ELEMENTS	*STRUCTURAL, ORGANIZATIONAL ELEMENTS*	*SUPRASTRUCTURAL, COLLECTIVE REPRESENTATION ELEMENTS*
Environment Infrastructures	Public services Social networks and social change	• Cognitive capacities • Complex knowledge, intelligibility, dissemination • Virtualization and referenciability • Objectivity, truthfulness • Collective representations • Collective identities • Ethics, values

***** Changes in SOCIAL PROCESSES and the agents involved in them.
REFERS TO THE ACTIVITIES PERFORMED BY SOCIAL AGENTS.
(open) set of general categories Examples:

- Social movements:
- Demographics, migrations/
- Conflicts (geopolitical, ethnic, racial, religious...)
- Economy
- Finance
- Labor
- Politics
- Governance Public policy
- Socialization
- Education
- Everyday life
- Personal relationships
- Anomies/...
- Science, research
- Transfer of knowledge

***** Changes in SOCIAL MEDIATIONS
REFERS TO THE ACTIVITIES PERFORMED BY SOCIAL MEDIATORS, THEIR CONTENTS AND EFFECTS
(Open) set of general categoriesExamples:

- *Mediating institutions*
- *Social mediators*
- *Social mediation*

Table 9: Protocol for Systematic Organization of References to the Groups that Appear as Involved in the Communication System Transformations which have an Impact on the Social System

COMMUNITIES, GROUPS	*EXAMPLES*
PRIMARY GROUPS	• "All families" (not a specific family) • "All groups of friends" (not a specific group) • "All neighbors" (not a specific neighborhood) • .../....
IDENTITY GROUPS (via belonging or reference)	• By sex, age, status (e.g. "women", "the elderly", "singles", "youth" ... • By ethnic group, race (e.g. "gypsies", "blacks"... • By activity (e.g. "students," "executives," "office workers", "the unemployed"...) • By anomie (e.g. "the sick", "alcoholics"... • By status (e.g. "the rich", "the poor"... • By belief (e.g. "Christians," "Muslims"...) • By identity criteria ("protesters"...) • .../....
ADMINISTRATIVE GROUPS	• "Voters", "taxpayers", "illegal immigrants" • .../....
THE COMMUNITY	• As a whole (e.g. "society," "human beings," "future generations"...) • By nationality, residence (e.g. "Europeans", "Spaniards", "Basques", "Third World people"...) • By relationship channel: the virtual community, audiences • .../....
.../....	• .../....

Table 10: Three Examples of Scenarios Referring to "The Virtualization of Interactions"

Example 1. Scenario plot: The virtualization of family interactions has consequences for migratory dynamics"				
"User access / to digital networks /	... makes it possible to replace face-to-face communications by virtual ones//.	Use of this service plays the role of / maintaining social links	... between family members who are separated by emigration //	The virtualization of family interactions has consequences for MIGRATORY DYNAMICS
Example 2. Scenario plot: "The virtualization of interactions among the populations is facilitating the political involvement of civil society"				
"User access / to digital networks /	... makes it possible to replace face-to-face communications by virtual ones//.	This service is used to call for mobilizations...	... among the civil population//	"The virtualization of interactions among the populations is facilitating THE POLITICAL INVOLVEMENT OF CIVIL SOCIETY"
Example 3. Scenario plot: "The virtualization of bureaucratic interactions is transforming relationships between citizens and public administrations"				
"User access / to digital networks /	... makes it possible to replace face-to-face communications by virtual ones//.	This service is used for online processing of citizens'...	administrative procedures	"The virtualization of bureaucratic interactions is transforming RELATIONSHIPS BETWEEN CITIZENS AND PUBLIC ADMINISTRATIONS"
FIELD 2: What is being transformed or will be transformed	FIELD 3: What impact it has or will have on [CS]	FIELD 4: What is changing or will change	FIELD 5: Who are experiencing or will experience the impact [SR]	FIELD 6: What impact it can have on social reproduction
Part 1: Communicational transformations		* Part 2 Social and group changes		* Part 3: Dynamics that will be modified in the course of globalization.

Table 11: Levels on Which Uses of ICT Have an Impact, According to Their Social Applications[a]

Social Applications of ICT	Level on Which Effects Take Place			Total
	On the level of DOING	On the level of BEING	On the level of BELIEVING	
Social (s.e.)	**632**	397	403	1432
Politics	179	**228**	26	433
Administrative	16	**45**	4	65
Economic	138	**295**	54	487
Labor	33	**71**	7	111
Cultural	97	**145**	29	271
Scientific	14	**56**	29	99
Educational	51	**67**	22	140
Info-communicational	41	**64**	28	133
Cognitive	20	**136**	24	180
Existential	**142**	107	16	265

[a]This table is taken from Velarde (2013). This paper is not meant to provide analyses of the data, which are given in the corresponding researches. But one of the observations made in this paper should be highlighted: the descriptions of the way in which the mediations of social uses of technological innovations refer most frequently to *the state of organizations rather than to social action.* And least frequently, to *the information that orients those applications.*

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Footnotes

[i] R+D+i project, reference CS020010-22104-C03-01. 01/2011 to 31/12/2013

[ii] The Reference System of System of Reference Objects is constituted by everything about which information is exchanged.

[iii] Sources are sought that can provide different approaches to <the socio-historical changes involving communicational uses of information and knowledge>. The exploration can start by the sources describing the <state of the art>. And it is gradually extended by searching for other sources mentioned in the citations in each source analyzed. The search should continue until the sources only provide redundant references.

[iv] Krippendorf (2012) is suggested as an introductory publication of reference on content analysis. Qualitative designs are systematized in Mayring (2000). Quantitative designs are systematized in Weber (2012).

[v] For construction of arguments, see Blackburn (2014).

[vi] For transcription and logical operations, see Shapiro (2009). In Spanish, the following are available: Deaño (1974) andGarrido (1997).

[vii] A UCM repository containing online resources that provide the basis for the logical analysis of narratives and related technical developments can be found via the following link: [anonymized]

[viii] The theoretical foundations for these designs to do research into social production in communication can be found in books by Manuel Martín Serrano (1974 y 2008).

[ix] A UCM repository containing online resources that provide the basis for the systemic analysis of narratives and related technical developments can be found via the following link: [anonymized]

[x] A UCM repository containing online resources that provide the basis for structural and discriminative content analysis of narratives and related technical developments can be found via the following link: [anonymized]

[xi] A UCM repository containing online resources that provide the basis for structural and discriminative content analysis of narratives and related technical developments can be found via the following link: [anonymized]. As M. Martín Serrano (2008, p. 81) pointed out, 'the ideological models of mediation are identified by testing them using logical models'. Quantitative and qualitative research converge from the viewpoint of logical relations analysis. See Brannen (2005) for a current approach to the trends that suggest greater rather than less convergence between approaches; and Bryman, Becker & Sempik (2008) for a study of quality criteria for research into quantitative, qualitative and mixed methods.