

CREATIVE ECONOMY AND SUSTAINABLE HUMAN DEVELOPMENT: A THEORETICAL APPROACH FOR CONVERGENCES AND DIVERGENCES

Guilherme Fráguas Nobre

Per citar o enllaçar aquest document:

Para citar o enlazar este documento:

Use this url to cite or link to this publication:

<http://hdl.handle.net/10803/663421>

ADVERTIMENT. L'accés als continguts d'aquesta tesi doctoral i la seva utilització ha de respectar els drets de la persona autora. Pot ser utilitzada per a consulta o estudi personal, així com en activitats o materials d'investigació i docència en els termes establerts a l'art. 32 del Text Refós de la Llei de Propietat Intel·lectual (RDL 1/1996). Per altres utilitzacions es requereix l'autorització prèvia i expressa de la persona autora. En qualsevol cas, en la utilització dels seus continguts caldrà indicar de forma clara el nom i cognoms de la persona autora i el títol de la tesi doctoral. No s'autoritza la seva reproducció o altres formes d'explotació efectuades amb finalitats de lucre ni la seva comunicació pública des d'un lloc aliè al servei TDX. Tampoc s'autoritza la presentació del seu contingut en una finestra o marc aliè a TDX (framing). Aquesta reserva de drets afecta tant als continguts de la tesi com als seus resums i índexs.

ADVERTENCIA. El acceso a los contenidos de esta tesis doctoral y su utilización debe respetar los derechos de la persona autora. Puede ser utilizada para consulta o estudio personal, así como en actividades o materiales de investigación y docencia en los términos establecidos en el art. 32 del Texto Refundido de la Ley de Propiedad Intelectual (RDL 1/1996). Para otros usos se requiere la autorización previa y expresa de la persona autora. En cualquier caso, en la utilización de sus contenidos se deberá indicar de forma clara el nombre y apellidos de la persona autora y el título de la tesis doctoral. No se autoriza su reproducción u otras formas de explotación efectuadas con fines lucrativos ni su comunicación pública desde un sitio ajeno al servicio TDR. Tampoco se autoriza la presentación de su contenido en una ventana o marco ajeno a TDR (framing). Esta reserva de derechos afecta tanto al contenido de la tesis como a sus resúmenes e índices.

WARNING. Access to the contents of this doctoral thesis and its use must respect the rights of the author. It can be used for reference or private study, as well as research and learning activities or materials in the terms established by the 32nd article of the Spanish Consolidated Copyright Act (RDL 1/1996). Express and previous authorization of the author is required for any other uses. In any case, when using its content, full name of the author and title of the thesis must be clearly indicated. Reproduction or other forms of for profit use or public communication from outside TDX service is not allowed. Presentation of its content in a window or frame external to TDX (framing) is not authorized either. These rights affect both the content of the thesis and its abstracts and indexes.



DOCTORAL THESIS

CREATIVE ECONOMY AND SUSTAINABLE HUMAN DEVELOPMENT:
a theoretical approach for convergences and divergences

Guilherme Fráguas Nobre

2017



DOCTORAL THESIS

CREATIVE ECONOMY AND SUSTAINABLE HUMAN DEVELOPMENT:
a theoretical approach for convergences and divergences

Guilherme Fráguas Nobre

2017

Compendium of Publications

JOINT DOCTORAL PROGRAMME IN LAW, ECONOMICS AND BUSINESS

Supervised by: Juan Gonzalo Escobar Marulanda

Presented in partial fulfilment of the requirements for a doctoral degree from the
University of Girona

To Heloiza Helena, my wife.

In the house of every Greek and Roman was an altar; on this altar there had always to be a small quantity of ashes, and a few lighted coals. It was a sacred obligation for the master of every house to keep the fire up night and day. Woe to the house where it was extinguished. Every evening they covered the coals with ashes to prevent them from being entirely consumed. In the morning the first care was to revive this fire with a few twigs. The fire ceased to glow upon the altar only when the entire family had perished; an extinguished hearth, an extinguished family, were synonymous expressions among the ancients.

Numa Denis Fustel de Coulanges

The Ancient City

Acknowledgements

Dr Renan Goetz was the first person that I have contacted at UdG, and he was wonderful.

Dr Nela Filimon is one of the most brilliant persons that I ever met. Thank you for working with me. It was an honor.

Dr Gonzalo Escobar is a man beyond compare, a fine researcher that I dare to consider a friend. Thank you, sir, for your ‘sustainable human’ support.

My most profound gratitude to the University of Girona, an institution that I love.

My sincere appreciation to the Doctoral School staff, specially to Mrs. Àngels Carreiro.

Many thanks to Mr. Ángel Rueda, who always assisted with the computers.

The City Hall of Girona was very attentive and helpful. Thank you, Mrs. Glòria Plana and Georgina Andreu.

I am in debt to the UNESCO Chair for Sustainable Human Development, which has housed me. Thank you very much Dr. Jordi de Cambra.

Our gratefulness to the family of Francesc Garrido Bonmatí and Montserrat Castells Busquets, who made our stay at Girona so lovely. Thank you, Jordi!

To our friends lots of love: Laia, Marisa, Anaïs, Andreu, Romina, Marina, Patrícia, Adriana, etc. Hey Saulo, you too!

To Girona, que “m’enamora”.

List of publications resulting from the thesis:

- 1) **Nobre, G. F.** (2015) A economia criativa e o valor potencial da Escola de Comunicações e Artes. *Revista Organicom* 12(23), p. 180-190. ISSN 2238-2593. Latindex 33.
- 2) **Nobre, G. F.** (2016) Creative Economy and Sustainable Human Development. *Revista Economía Creativa* 6, p. 85-106. ISSN 2395-8200. Latindex 36.
- 3) **Nobre, G. F.** (2016). Creative industries and dematerialization of the economy: ideas on communications and public relations. In: Farias, L. A.; Lopes, V. S. C. 10^o ABRAPCORP: comunicação, economia criativa e organizações. Porto Alegre, ediPUCRS, p. 269-287. ISBN 978-85-397-0871-0.
- 4) **Nobre, G. F.;** Matuck, A. (2016) Communicative and artistic machines: some remarks on authorship, copyright, and liability. *International Journal of Humanities and Applied Sciences* 5(2), p. 145-149. ISSN 2277-4386.
- 5) Matuck, A.; **Nobre, G. F.** (2016) Communicative and artistic machines: a survey of models and experiments on artificial agents. *International Journal of Computer, Electrical, Automation, Control and Information Engineering* 10(10), p. 1668-1672. eISSN 2010-3778.
- 6) **Nobre, G. F.;** Gil, P. G. (2017) Economia criativa e capital comunicacional. In: Farias, L. A.; Lopes, V. S. C.; Scroferneker, C. *Comunicação, economia e indústrias criativas*. Porto Alegre, ediPUCRS. ISBN 978-85-397-0981-6.
- 7) **Nobre, G. F.** (2017) Creative economy at Girona, Spain: a potential, a hope, and investments to be. (accepted by *Revista Economía Creativa*, ISSN 2395-8200. Latindex 36).
- 8) **Nobre, G. F.** (2017) Economy, economics, and sustainable human development: towards a ‘hyperplaneless economics’. (accepted by APDR Congress 2017).

List of abbreviations:

AG – Algoritmos Genéticos (see GA)
AI – Artificial Intelligence
CC – Communicational Capital (Capital Comunicacional)
CCI – Creative and Cultural Industries
CE – Creative Economy
EC – Economia Criativa or Economia Creativa (see CE)
ECA – School of Communications and Arts (see USP)
e-MTA – Campus Euromediterraneo de Turismo y Agua
FAU – Faculty of Architecture and Urbanism (see USP)
GA – Genetic Algorithms
GDP – Gross Domestic Product
GI-BAR-TAR – Girona, Barcelona, and Tarragona
HDI – Human Development Index
ICT – Information and Communications Technologies
IDH – Índice de Desenvolvimento Humano (see HDI)
MDG – Millennium Development Goals
NGO – Non-Governmental Organizations
ParcUdG – University of Girona’s STP
PE – Political Economy
P&D – Pesquisa e Desenvolvimento (see R&D)
POLI – Polytechnic School (see USP)
PR – Public Relations
R&D – Research and Development
SHD – Sustainable Human Development
STP – Science and Technology Park
TIC – Tecnologias da Informação e da Comunicação (see ICT)
UCI – University-Creativity Index
UdG – University of Girona
USP – University of São Paulo

List of tables and figures:

Chapter 1: Creative Economy and Sustainable Human Development.

Table 1. Comparative estimation between SDH and CE

Chapter 2: Creative industries and dematerialization of the economy: ideas on communications and public relations.

None

Chapter 3: A economia criativa e o valor potencial da Escola de Comunicações e Artes.

Figure 1.1 Different classification systems for the cultural and creative industries
-----: **Economia criativa e capital comunicacional.**

Table A. Different approaches to the communicational capital

Chapter 4: Communicative and artistic machines: some remarks on authorship, copyright, and liability.

-----: **Communicative and artistic machines: a survey of models and experiments on artificial agents.**

None

Chapter 5: Creative economy at Girona, Spain: a potential, a hope, and investments to be.

Figure 1. Macro-magnitudes and taxes

Figure 2. Total Economy for Girona

Figure 3. Other services and Construction. Other commerce.

Figure 4. Creative companies distribution by zones.

Table 2. Three ways to create market value in the experience economy.

Figure 5. Creativity Indicators

Chapter 6: Economy, economics, and sustainable human development: towards a 'hyperplaneless economics'.

Figure 1. 3D hyperplanes, 2D projections, intersections, and max/min points.

Table of contents:

Acknowledgements.....	2
List of publications resulting from the thesis:.....	3
List of abbreviations:.....	4
List of tables and figures:	5
Table of contents:	6
1. Thesis summary:.....	7
2. General introduction:.....	8
3. Hypothesis:.....	15
4. Objectives:.....	16
5. Methods:	17
6. Papers:.....	19
5.1.Creative Economy and Sustainable Human Development	20
Intercalary remarks I.....	42
5.2.Creative industries and dematerialization of the economy: ideas on communications and public relations.....	43
Intercalary remarks II.....	63
5.3.A economia criativa e o valor potencial da Escola de Comunicações e Artes.	64
5.4.Economia criativa e capital comunicacional.....	76
Intercalary remarks III.....	103
5.5.Communicative and artistic machines: some remarks on authorship, copyright, and liability.....	104
5.6.Communicative and artistic machines: a survey of models and experiments on artificial agents.....	110
Intercalary remarks IV.....	115
5.7.Creative economy at Girona, Spain: a potential, a hope, and investments to be....	116
Intercalary remarks V.....	146
5.8.Economy, economics, and sustainable human development: towards a ‘hyperplaneless economics’.....	147
7. Conclusions:	160
References:	165
Appendix:	178

1. Thesis summary:

The thesis relates the 'creative economy' with the 'sustainable human development', tracing a parallel between economic growth (e.g. GDP) and human development (e.g. HDI). The aspect of sustainability is addressed through the potential dematerialization of production and immaterialization of consumption, offering the 'creative industries' as one of the candidates to convey both – together with services and ICTs. Communications technologies are shown, by the way, partially as the source of the communicational capital: sometimes implemented at universities and companies in a very human mode, but sometimes constituted as *automata economicus* – artificially intelligent machines able to create wealth in an independent and creative way. Also, the thesis approaches the Girona's creative economy, interested on how both the University of Girona and its Science and Technology Park may participate in such matter. The bond between the University and the creative economy is analyzed further by the case of the University of São Paulo (Brazil) and its departments – focusing its School of Communications and Arts. It is suggested that Girona, more than exclusively investing to get more creative industries, may also present itself as a managerial contractor to the creative sectors – eventually adopting the broader concept of the 'experience economy' by the Scandinavian perspective. Finally, the thesis recalls for the centrality of persons to the economy, relativizing the power of economics and its impersonal paraphernalia.

Resumen

La tesis relaciona la "economía creativa" con el "desarrollo humano sostenible", trazando un paralelo entre el crecimiento económico (e.g. el PIB) y el desarrollo humano (e.g. el IDH). El aspecto de la sostenibilidad se aborda a través de la potencial desmaterialización de la producción e inmaterialización del consumo, ofreciendo a las "industrias creativas" como uno de los candidatos para conducir a tanto - junto con los servicios y las TIC. Las tecnologías de las comunicaciones se muestran, por cierto, parcialmente como la fuente del capital comunicacional: a veces implementadas en universidades y empresas en un modo muy humano, pero a veces constituidas como *automata economicus* - máquinas artificialmente inteligentes capaces de crear riqueza de manera independiente y creativa. Además, la tesis aborda la economía creativa de Girona, interesada en la participación tanto de la Universidad de Girona como de su Parque Científico y Tecnológico. El vínculo entre la Universidad y la economía creativa es analizado aún más por el caso de la Universidad de São Paulo (Brasil) y sus departamentos - enfocando su Escuela de Comunicaciones y Artes. Se sugiere que Girona, más allá que invertir exclusivamente para tener más industrias creativas, también puede presentarse como un proveedor gerencial para los sectores creativos - eventualmente adoptando el concepto más amplio de la "economía de la experiencia" por la perspectiva escandinava. Finalmente, la tesis recuerda la centralidad de las personas en la economía, relativizando el poder de la *economics* y su parafernalia impersonal.

2. General introduction:

This thesis focuses the role played by real persons at the creative economy and at the sustainable human development. Both are about persons: being creative, creating value and wealth, promoting economic growth and human development, changing their production/consumption patterns, using communication to cooperate and to foster businesses, building and programming machines with creativity and expressive capabilities, etc. This thesis is also about Girona: what can be said about its creative economy, and which protagonism can be expected from the University of Girona (UdG) and its Science and Technological Park (ParcUdG) when it comes to locally improve the creative economy.

The text was firstly intended to fully deal with the Girona's creative economy, but due to the existing lack of enough data and research on the matter, such subject was lately restricted to a chapter instead (chapter 5) – indeed the most important from the community point of view. In its current format the thesis does approach the Creative Economy, but rather in its interfaces with the sustainable human development (SHD), the university's departments and science/technology park (STP), the dematerialization of the economy, the communicational capital, and the artificial agents – machines that create economic value and wealth through creative autonomous processes.

Although the thesis is mainly a recall to the necessity of empowering real persons all over the economy, it also remarks the increasing role played by technical “devices” (such as mathematical paraphernalia and machines) as economic agents. For example, chapter 6 is actually a critical perspective on the use of hyperplanes by economics – not because there is something wrong with the use of mathematics, but simply as a try to avoid the objectification of human beings. The opposite, the effort to humanize machines (programming machines to socialize, communicate, make art, persuade, and sell), has been much more a technical challenge than a risk – whenever the artificial agents may be kept to serve society, never standing in a position to threaten or harm persons.

Then from this perspective, the thesis' objectives are:

- 1) to discuss the theoretical convergences/divergences between the creative economy and the sustainable human development.
- 2) to check on how the creative sectors/industries may be linked to a potential dematerialization of the economy – which is directly related to sustainability.
- 3) to search for a bond between the creative economy and the university's departments and science and technology park (STP).
- 4) to account for the potential role of communications in the creative economy, taken both as an intangible asset and as a creativity *medium* (e.g. artificial agents).
- 5) to research on the creative economy at Girona.

Such issues may be seen as facets of a same diamond or variations of the same topic, the creative economy. They are connected with the origin, structure, and dynamic trajectory of the creative economy, as well as with its definitions and (social/political) approaches. For instance, it is necessary to define the expression 'creative economy' and show what are its components, how they have been measured and impacting the society (economic growth *versus* human development), the way such impacts evolve through time (as spasms or in a resilient manner), and, particularly, how two of its elements (i.e. creativity and communications) may articulate any remarkable path by their own.

In order to deal with these affairs is convenient to register the articles that integrate the thesis, which is here submitted in the format of a compendium of articles – in accordance with the UdG Doctoral School's regulations (University of Girona, 2017). Therefore, the following articles come together to form the body of the thesis. The sequence of appearance obeys their date of publication, with one exception: chapter 3 is formed with a paper from 2015 and other from 2017.

Chapter 1

- Nobre, G. F. (2016) Creative Economy and Sustainable Human Development. *Revista Economía Creativa* 6, p. 85-106. ISSN 2395-8200. Latindex 36.

Chapter 2

- Nobre, G. F. (2016a). Creative industries and dematerialization of the economy: ideas on communications and public relations. In: Farias, L. A.; Lopes, V. S. C. 10^o ABRAPCORP: comunicação, economia criativa e organizações. Porto Alegre, ediPUCRS, p. 269-287. ISBN 978-85-397-0871-0.

Chapter 3

- Nobre, G. F. (2015) A economia criativa e o valor potencial da Escola de Comunicações e Artes. Revista Organicom 12(23), p. 180-190. ISSN 2238-2593. Latindex 33.

- Nobre, G. F.; Gil, P. G. (2017) Economia criativa e capital comunicacional. In: Farias, L. A.; Lopes, V. S. C.; Scroferneker, C. Comunicação, economia e indústrias criativas. Porto Alegre, ediPUCRS. ISBN 978-85-397-0981-6

Chapter 4

- Nobre, G. F.; Matuck, A. (2016) Communicative and artistic machines: some remarks on authorship, copyright, and liability. International Journal of Humanities and Applied Sciences 5(2), p. 145-149. ISSN 2277-4386.

- Matuck, A.; Nobre, G. F. (2016) Communicative and artistic machines: a survey of models and experiments on artificial agents. International Journal of Computer, Electrical, Automation, Control and Information Engineering 10(10), p. 1668-1672. eISSN 2010-3778.

Chapter 5

- Nobre, G. F. (2017) Creative economy at Girona, Spain: a potential, a hope, and investments to be. (accepted by Revista Economía Creativa, ISSN 2395-8200, Latindex 36).

Chapter 6

- Nobre, G. F. (2017a) Economy, economics, and sustainable human development: towards a 'hyperplaneless economics'. (accepted by APDR Congress 2017).

Chapter 1 relates the creative economy (CE) and the sustainable human development (SHD), asking whether the later may generate economic growth exclusively or, going beyond that, also entail social development. Since development is more complex than growth, one should take care when believing that few sectors of the traditional economy will necessarily promote qualitative improvements on the persons' lives – with no further justification other than the appeal of the term 'creativity'. In other words, the creative sectors and industries have been receiving a treatment to rather quantify their contribution to the Gross Domestic Product (GDP), leaving open the question on how the creative economy is really contributing “for people to enjoy long, healthy and creative lives”. In short, how to also assess the qualitative changes due to the creative economy.

Chapter 2 seeks to understand the interplay among creative economy and the dematerialization of the economy. Actually, how dematerialization (production side) and immaterialization (consumption side) can be engendered by the creative sectors/industries, and in which extent both may become synonymous for a greater material/energetic sustainability. In theory, societies more intensive in services, ICTs (information and communication technologies), and creative sectors would promote sustainability via dematerialization/immaterialization of the economy – saving natural resources and energy. However there are no evidences to sustain this without disputes, because of the rebound effect: sometimes the matter/energy saved at the present are re-applied to the system, provoking a future negative outcome that surpasses its initial benefits. The second chapter uses public relations (PR) as an example, a communicational service (hypothetically inductive to dematerialization) that could be put to serve rebound-generator companies – nullifying its beneficial effects.

Chapter 3 tries to connect the creative sectors with the departments of the University of São Paulo (USP), Brazil. The idea is simple: what departments have been responsible to supply society with its creative human capital? Interestingly the School of Communications and Arts (ECA) appears first, with departments linked to the cultural industries, heritage, entertainment, business (e.g. PR and publicity), tourism, P&D, etc. Such interface between the university and the creative economy is paramount, either the focus relying on the academic departments or over its science/technology park (STP). It

is important to know how to attract the creative class (Richard Florida's main approach), as well as to understand where and by whom such class is bred. Also, it is crucial to apprehending on how university may transfer technology and create new economic wealth – e.g. when its STP may incubate new companies, products, services, processes, and business models.

Chapter 4 introduces the way 'communication' has been modeled and programmed into machines, that evolved to become artificial social/economic agents. The first point here is that communication is treated as a material tool, ready to be shaped and used for practical purposes – other than an exclusive subjective human instance. Such expressive machines are of interest because they have been programmed to be both creative and autonomous, but mostly because they function as assets that generate other assets. That means the following: machines that communicate and produce economic tradeable goods/services do enact as an independent creative sector – so to say. Machines that design copyrightable/patentable material are in the forefront of the creative economy, and bring at least few questions about their role to foster dematerialization and immaterialization, economic growth and human development, rebound or sustainability – for instance. Not to mention their potential to jeopardize persons' jobs and even persons directly.

Chapter 5 is really about the creative economy at Girona, and brings two main assertions: first, Girona has insufficient studies and researches about its own creative sectors/industries (thought as a whole, not only as the subset "cultural industries" or else); and second, an even wider concept such as the 'experience economy' (that includes the creative economy) may be of interest for the region. Further, the fifth chapter suggests that Girona could also present itself as a managerial contractor for companies already functioning at the creative economy, for example at Barcelona. Although such Girona's managerial vocation was indirectly inferred from its history as the second province in importance at Catalonia, that would allow to position Girona both as a growing investor on its creative sectors/industries as well as a potential supplier for managerial services to the wider creative economy. The roles (to be) played by the University of Girona (UdG) and its Science and Technological Park (STP) in this context are also mentioned.

Chapter 6 is a warning: it reminds the prominence of the human beings at the economy. After reworking the concept of sustainable human development (SHD), the sixth chapter proposes to artificially split the term ‘economy’ into two: one, named also ‘economy’ and closely related to the real persons’ lives; and two, labeled ‘economics’ and restricted to as a technical proposition about the first – a tool used to talk/write about those persons. Albeit recognizing such a breakage as utopian, goes on to demonstrate the danger of considering/treating the ‘economy’ simply as ‘economics’ – which alienates the human beings, and does exactly the contrary that the SHD recommends. The invitation to withdraw the mathematical manipulations based on the Cartesian coordinates aims only to remember the following: humans are not numbers nor their lives can be translated into variables or graphics. Math is supposed to be used for things, not against persons. At the creative economy, the creativity owns its origin to real persons – the ones who push innovation, invention, and novelty in society. Therefore, is the creative class that begets value and wealth and engenders the future of the economy. Persons. Humans.

The creative economy/industries/sectors/class permeate all the chapters, configuring the very core of the thesis. Always departing from this common ground, it goes research its potential relationships with the sustainable human development, dematerialization and immaterialization, the university’s departments and science and technology park, the communicational capital (PR and communicative machines), etc. Since the original idea was having Girona as the main subject, it is now possible to envisage futures works interested in, for example: Girona’s sustainable human development, the impact of dematerialization and immaterialization at Girona, the contribution of UdG and ParcUdG to Girona’s creative economy, the role reserved to artificial intelligence (AI) at Girona’s economy, and so forth.

Also, any research faces obstacles and finds some difficulties. Here is worthy to mention a few. First, the ones related on how to define and measure both the creative economy and the sustainable human development. Concepts such as ‘creativity’ and ‘human development’ are complex, demanding strategies to surpass the traditional monopoly of the market-dollar approach. Second, it remains unclear whether dematerialization may trigger and deliver immaterialization (and vice-versa), or if Today’s rebound may evolve to rebound Tomorrow – and how to monitor that. Third,

the communication capital is an incipient concept that needs further investigation and stands now as a relative fragile academic construct – which is normal to any new field of study. Fourth, to see machines both as social and economic agents, beyond taking them simply as a tool or a media, is a challenge. The point is no longer when an industrial robot may replace manual human labor, but lies rather in the power of artificial intelligence to create new economic tradeable value autonomously (with none human intervention). Fifth, the lack of data for Girona’s creative economy was a source of worry, and has led to an intense exchange of communication with the City Hall. And sixth, the apology for the persons’ primacy on the economy has brought tension vis-à-vis the “rise of the machines” and “economics” – as a mathematical intense technical discourse.

Nonetheless, the research trajectory has equally introduced advantages. For instance: the comparison between the concepts of ‘creative economy’ and ‘sustainable human development’ has shown convergences and divergences, shedding light on how the former still needs to progress. The idea that the economy could dematerialize while keeping growth and development as targets is exciting, and should be kept in mind. The treatment given to communication is also promising: sometimes ‘communication’ is a creative sector for humans (e.g. public relations, advertising, journalism), sometimes it comes as genetic algorithms that enable creativity into machines, and sometimes is seen as a(n) (in)tangible capital – for companies mostly. Machines that evolve to become economic agents in themselves, producing valuable assets without human cooperation. Assets that generate assets. The chapter dedicated to Girona is special and suggests that Girona has a managerial vocation that could be used in parallel to its investments over the creative economy. Finally, the invitation to withdraw mathematics from economics is defiant and, even though utopian, brings the benefit of the reconsiderations.

3. Hypothesis:

- 1) the concepts of ‘creative economy’ and ‘sustainable human development’ have more convergences than divergences, and the former may be conducive to the later.
- 2) the creative industries do lead to a greater level of both dematerialization and immaterialization of the economy, directly contributing to sustainability.
- 3) the universities are (both through their departments and STP) the generators of the creative economy, have been aware of and with an articulated discourse on it.
- 4) the communicational capital is composed of both assets generated by human and those created by other assets – the automata economicus.
- 5) Girona already has a creative economy installed, which can be properly qualified and quantified.
- 6) the separation between ‘economy’ and ‘economics’ helps to bring the persons back to the center of the economy – a necessity according to the SHD.

4. Objectives:

- 1) to discuss the theoretical convergences/divergences between the creative economy and the sustainable human development.
- 2) to check on how the creative sectors/industries may be linked to a potential dematerialization of the economy – which is directly related to sustainability.
- 3) to search for a bond between the creative economy and the university's departments and science and technology park (STP).
- 4) to account for the potential role of communications in the creative economy, taken both as an intangible asset and as a creativity *medium* (e.g. artificial agents).
- 5) to research on the creative economy at Girona.

5. Methods

A method is “o caminho que se deve percorrer na busca do conhecimento” (Fonseca, 2003, p. 17). Before approaching the methods used by economists, some authors start by defining Economics (Paiva, Cunha, 2008, p. 15; Pinho, 1996, p. 62). Such field is often understood as the allocation of scarce resources given the available alternatives with the aim of maximizing the benefits; but the current thesis sees it rather as: “the wise and legitimate government of the house for the common benefit of the whole family. The meaning of the term has later been extended to the government of the great family which is the state” (Rousseau *apud* Baloglou cited at chapter 6, p. 149). This thesis conjugates diverse methods of research, given the chapters are composed of articles dealing with diverse aspects of the Creative Economy. From a general point of view, the thesis has a “verbal” approach to economics. According to Georgescu-Roegen, “(p)rotests against (the heavy mathematical armamentarium in economics, have been) made not only by “verbal” economists, such as Thorstein Veblen and Frank H. Knight, but also (by) Alfred Marshall, Knut Wicksell, and Lord Keynes”. (1979, p. 317). Given that, the main source of the research was bibliographical: the majority of the thesis’ info and data came from papers, reports, books, dissertations, thesis, studies, websites, and so on. A notable exception is the Chapter 5, which also used direct consultations with Girona City Hall’s personnel. All the papers assume an *ex post* analytical perspective, first departing from the observed phenomenon in a try to make, in a second moment, a theoretical sense out of it – a method that some authors name as “historical-deductive”. “Historical” because dealing with constituted events. For example, to Bresser-Pereira “(e)nquanto o método empírico-dedutivo é principalmente analítico, o método histórico é ao mesmo tempo analítico e dialético.” (2009, p. 170). Although the thesis’ chosen methods are highly descriptive (consisting of observation and description of the phenomena), Chapter 6 also presents a prescriptive bias (García Fernandez, 2011, p. 139) – when it introduces some “should be” line of arguments, suggesting policies to Girona’s managers. Such a chapter uses the critical method too, when it says Economics *should* bring real persons (rather than numbers and modeled agents) back to its science. In other words: this thesis is *realist* over *rationalist* because it believes there are real persons living real lives out-there – and that fact goes beyond what the economic models may rationally propose *a priori*. Therefore, the chosen methods here are supposed to deal with an open, dynamic, complex, evolutive, and

unpredictable set of beings and institutions – part of which cannot be stated as formulae. The referred Chapter 6 defends that math and stats may be used toward things, but shall not be used against persons. Nonetheless, the methods in this thesis are not blind to numbers, tables, graphics, and other quantitative instruments; only try to keep them playing a restricted and auxiliary role during the observation, description, and explaining processes. It is worthy to remember the human, qualitative (development), sustainable, and creative constituents of the title. Therefore, the chosen methods are not exclusively centered into the economic toolbox. The comparative method was also widely used, as for instance: when it compares the creative economy GDPs for US, UK, Spain, etc.; when it confronts the University of São Paulo with some Australian universities; when it seeks for convergences and divergences between the CE and the SHD; and so forth. The abductive method (Bresser-Pereira, 2009, p. 171) was tacitly evoked at least twice: at Chapter 3 where the communicational capital is proposed, and at Chapter 4 when the *automata economicus* is envisioned. Finally, it can be stated that the Chapter 5 was partially an exploratory research, given the virtual absence of data and studies over the creative economy at Girona.

References

- Bresser-Pereira, L. C. (2009) Os dois métodos e o núcleo duro da teoria econômica. *Revista de Economia Política*, vol. 29, no . 2 (114), pp. 163-190.
- Fonseca, P. C. D. (2003) O método como tema: controvérsias filosóficas, discussões econômicas. In: Corazza, G. (org.). *Métodos da Ciência Econômica*. Porto Alegre: Editora da UFRGS, p. 17-34.
- García Fernandez, R. (2011) A metodologia como argumento a favor de uma economia pluralista. In: Guilhoto, J.; Duarte, P. G.; Silber, S. (Org.). *O Brasil e a ciência econômica em debate*, Vol. 2, São Paulo, Saraiva, pp. 137-152.
- Georgescu-Roegen, N. (1979) Methods in Economics Science. *Journal of Economic Issues*, Vol. XIII, No . 2, pp. 317-328.
- Paiva, C. A. N.; Cunha, A. M. (2008) A ciência econômica: seu(s) objeto(s), método(s) e paradigmas. In: *Noções de Economia*. Brasília, Fundação Alexandre de Gusmão.
- Pinho, C. M. (1996) Metodologia da Ciência Econômica. In: Pinho, C. M.; Vasconcellos, M. A. S. *Manual de Economia*. São Paulo, Editora Saraiva.

6. Papers:

Chapter 1

- Nobre, G. F. (2016) Creative Economy and Sustainable Human Development. Revista Economía Creativa 6, p. 85-106. ISSN 2395-8200. Latindex 36.

Chapter 2

- Nobre, G. F. (2016a). Creative industries and dematerialization of the economy: ideas on communications and public relations. In: Farias, L. A.; Lopes, V. S. C. 10^o ABRAPCORP: comunicação, economia criativa e organizações. Porto Alegre, ediPUCRS, p. 269-287. ISBN 978-85-397-0871-0.

Chapter 3

- Nobre, G. F. (2015) A economia criativa e o valor potencial da Escola de Comunicações e Artes. Revista Organicom 12(23), p. 180-190. ISSN 2238-2593. Latindex 33.

- Nobre, G. F.; Gil, P. G. (2017) Economia criativa e capital comunicacional. In: Farias, L. A.; Lopes, V. S. C.; Scroferneker, C. Comunicação, economia e indústrias criativas. Porto Alegre, ediPUCRS. ISBN 978-85-397-0981-6

Chapter 4

- Nobre, G. F.; Matuck, A. (2016) Communicative and artistic machines: some remarks on authorship, copyright, and liability. International Journal of Humanities and Applied Sciences 5(2), p. 145-149. ISSN 2277-4386.

- Matuck, A.; Nobre, G. F. (2016) Communicative and artistic machines: a survey of models and experiments on artificial agents. International Journal of Computer, Electrical, Automation, Control and Information Engineering 10(10), p. 1668-1672. eISSN 2010-3778.

Chapter 5

- Nobre, G. F. (2017) Creative economy at Girona, Spain: a potential, a hope, and investments to be. (accepted by Revista Economía Creativa, ISSN 2395-8200, Latindex 36).

Chapter 6

- Nobre, G. F. (2017a) Economy, economics, and sustainable human development: towards a 'hyperplaneless economics'. (accepted by APDR Congress 2017).

Chapter 1

5.1.

Creative Economy and Sustainable Human Development

1. Nobre, G. F. (2016) Creative Economy and Sustainable Human Development. Revista Economía Creativa 6, p. 85-106. ISSN 2395-8200. Latindex 36.

Creative Economy and Sustainable Human Development

Guilherme Nobre¹

This text aims to analyze and compare the creative economy (CE) and the sustainable human development (SHD) so to establish some potential convergences and/or divergences. The point is to see if the creative economy promotes both economic growth and human development, or not, and in a positive scenario, how sustainably it does. The paper defines CE and SHD, and shows how the later constitutes its index - the human development index. Before tabling the potential convergences and divergences at the last section, the creative economy and the human development are put together in a quest for community. Although the already existing well-documented link between economic growth and the creative economy, the conclusion is that there are only inferences in its connection with the human development.

Keywords | Creative economy; Sustainable human development; Economic growth; Sustainability

¹ Candidato a Doctor en Ciencias Económicas en la *Universitat de Girona*. Investigador asociado en el *Instituto de Tecnología de la Comunicación de la Ciencia*.
fraguasnobre@gmail.com

Este texto pretende analizar y comparar la economía creativa (CE) con el desarrollo humano sostenible (DHS) de manera a establecer algunas potenciales convergencias y/o divergencias. El punto es ver si la economía creativa promueve tanto el crecimiento económico cuanto el desarrollo humano, o no, y en caso positivo, si lo hace con sostenibilidad. El artículo define CE y DHS, y muestra cómo el posterior constituye su índice - el índice de desarrollo humano. Antes de la presentación de las convergencias y divergencias potenciales en la última sección, la economía creativa y el desarrollo humano se ponen juntos para una búsqueda de su comunidad. Aunque el enlace entre el crecimiento económico y la economía creativa ya sea bien documentado, la conclusión es de que sólo hay inferencias para su relación con el desarrollo humano.

Palabras clave | Economía creativa; Desarrollo humano sostenible; Crecimiento económico; Sostenibilidad

Introduction

The creative economy looks specially promising due to its natural propensity to the dematerialization of production and immaterialization of consumption – see (Nobre, 2016). Its vocation to promote services and spread digitization does contribute, at least in theory, to a greater level of sustainability – since economic growth could happen with less-to-none environmental harming. But creative economy is also about development, meaning qualitative progress of/to society – either as an assumption that takes the form of the creative classes and cities, or either as the consequence of their existence and productive activities. In short, a development that is based on, pivoted around, and targeted towards (creative and talented) persons. This text aims to analyze and compare the creative economy and the sustainable human development, in order to establish some potential convergences and/or divergences. A query that may arise is: does creative economy promote both economic growth and human development, and, if does, in a sustainable way?

Sustainable human development

While economic growth is often measured by the increase of the Gross Domestic Product (GDP), generally presented as a monetary amount, the “basic objective of development is to create an enabling environment for people to enjoy long, healthy and creative lives” (UNDP, 1990, 9). It is interesting to note that the former is focused on things, whereas the latter on persons; that the former is based on monetary accountancy, whereas the latter is based on lives ‘enjoyment’; that the latter is restricted to the economic sphere, whereas the latter also has socio, political, and cultural dimensions; that the former highlights the quantitative gains, whereas the latter is quite sensitive to the qualitative improvements; that the former aims endless increases on monetary wealth, whereas the latter targets rather on the intra- and intergenerational fair distribution of the welfare; and that the former is driven by a ‘I can get no satisfaction’ spirit, whereas the latter seeks exactly the opposite.

Human development is a process of enlarging people's choices. (At) all levels of development, the three essential (choices) are for people to lead a long and healthy life, to acquire knowledge and to have access to resources needed for a decent standard of living. If these essential choices are not available, many other opportunities remain inaccessible. But human development does not end there. Additional choices, highly valued by many people, range from political, economic and social freedom to opportunities for being creative and productive, and enjoying personal self-respect and guaranteed human rights. Human development has two sides: the formation of human capabilities -such as improved health, knowledge and skills- and the use people make of their acquired capabilities -for leisure, productive purposes or being active in cultural, social and political affairs. (...) According to this concept of human development, income is clearly only one option that people would like to have, albeit an important one. But it is not the sum total of their lives. Development must, therefore, be more than just the expansion of income and wealth. Its focus must be people (UNDP, 1990, 10).

Since the contrast between economic growth and development became so sharp, the word 'human' was added to development as a form to emphasize such gap. Then, even if 'human development' sounds redundant in some extent, it also works to remember and warn that both (growth and development) belong to distinct realities. In spite of the fact that there is no development without economic growth, the problem is that their connection is not direct, nor free of contradiction. To put it differently, the "simple truth is that there is no automatic link between income growth and human progress" (UNDP, 1990, 10). An example is given by poorer countries that present a relatively better human development, and the contrary as well, when richer countries do register a relatively worse human progress (e.g. UNDP, 1990, 56-57). Nevertheless, the human development is dependent of the income/wealth created on the economic sphere; in such a way that the challenge is to find out how both can converge and merge – which brings sustainability into debate, or their ability to do so without putting in danger either the persons, the economy, or the nature; now or in the future.

There are four major elements in the concept of human development -productivity, equity, sustainability and empowerment (...). Through enhanced capabilities, the creativity and productivity of people must be increased so that they become effective agents of growth. Economic growth must be combined with equitable distribution of its benefits. Equitable opportunities must be available both to present and to future generations. And all people, women and men, must be empowered to participate in the design and implementation of key decisions that shape their lives (UNDP, 1995, 12).

Sustainability means both intergenerational and intra-generational fair coexistence through time (apologies for any redundancy). 'Fair' here is the most important concept, given it evokes justice, respect, rights, compassion, dignity, recognition, and limits – towards persons, beings, environments, resources, etc. Therefore, sustainability does not lay restricted to the distribution (of goods and wealth along the countries and eras) only, for it goes beyond to reach better and longer lives, more and diverse opportunities offer, and greater and far meaningful personal experiences – for instance. The question still remains whether this can happen with few-to-none changings over the current economic growth model, or what further changings on it would be necessary to really engender the so called 'sustainable human development'. In other words: what would be necessary to make economic growth and human development compatible, and increasingly convergent, in an everlasting way.

Agreement is fairly broad on some aspects of the human development concept:

- Development must put people at the centre of its concerns.
- The purpose of development is to enlarge all human choices, not just income, so the human development concept focuses on the entire society, not just the economy.
- Human development is concerned both with expanding human capabilities (through investment in people) and with ensuring the full use of these capabilities (through an enabling framework).

- Human development is erected on four essential pillars -productivity, equity, sustainability and empowerment. It regards economic growth as essential but emphasizes the need to pay attention to its quality and distribution and analyses at length its link with human lives. And it addresses sustainable choices from one generation to the next.
- The human development approach defines the ends of development -and analyses the options for achieving them (UNDP, 1995, 122).

But the core handicap to sustainability seems to reside on the lack of knowledge and control over environments and persons: first, new deposits and new species are still appearing every day, and although the planet is finite, there is no full knowledge about what it really contains; second, even when science knows enough to state that the human interference (e.g. extraction, production, discarding) is annihilating beings, resources, and persons, there is no power to bring such tendency to a halt. After all, it is quite contradictory as economics presupposes full-knowledge over resources as a pinnacle for its own definition, and full-control over allocation (given by prices) as the spine of its management. The economics' tentative inclusion of less-than-perfect or partial knowledge/behavior assumptions into its models is also not performing as expected, since extinction (of beings) and exhaustion (of resources) have still been reported. Not to mention the maintenance of poverty as the reality for millions of persons, or the global warming – to cite only those.

Is economic growth a meaningful goal? Or is human development the real objective? If it is human development, growth should be judged not by the abundance of commodities it produces, but by how it enriches people's lives. (...) This Report moves beyond the debate on whether economic policies are "pro-growth" or "antigrowth" by addressing the central issue of the quality of growth -whether it is genuinely serving human development in a country, in a region or in the world. Is the character of growth advancing people's human security, freedom and empowerment? Is it promoting equity -today and between generations? Does it respect nature and its life-supporting

functions? And is it leading to greater social cohesion and cooperation among people -not greater conflict and social disintegration? (UNDP, 1996, 43).

Perhaps the experts should use more (not less) economics: when the model says “extinction means asymptotic prices, therefore shut the system down”, then obey to the model. Or perhaps the authorities should use more (not less) the already existing regulation: when a Constitution says that “all and everyone is entitled to a decent life”, then and again obey to it. In fact, it is not clear on how economics (as a field of studies) or economic growth (as a set of productive arrangements) may ‘internalize’ so diverse aspects without a significant changing. For instance, can freedom and equity be translated to variables and therefore be drawn into a Cartesian coordinated graphic? Maybe they can. But in the case they cannot, it would be convenient to introduce an alternative – either for the theoretical models, either for the practical arrangements. The only thing that shall not be left aside for sure is the ‘sustainable human development’, no matter the cost to both economics and growth.

Qualifying the sustainable human development

The Gross Domestic Product (GDP) is quantified through the prices’ sum of all that is created in a period of time, say a year. The prices are used here, instead of value, because prices are the ‘monetary translation’ of value – being in fact the parameter registered into the markets and transactions. Actually, although in theory GDP presents the amount of the whole wealth generation, in fact it only accounts for those products and services that exist for the market. Therefore, GDP is only designed to catalogue measurable prices on formal markets and transactions; i.e. numbers for things. Inversely, the Sustainable Human Development (SHD) is qualified through indexes that, if not exempt of quantification, try to bring value back to the economic discussion – displacing currency as the main/unique criteria. More than that, SHD was thought to put persons (not things) in the center of the economy, in order to build comparable forms to acknowledge the complexity of their lives (way beyond markets and prices). Although nobody can prescind of such inventories, the truth is that SHD is about value for persons – rather than number for things.

The human development index was constructed to reflect the most important dimensions of human development. A composite index, the HDI contains three indicators: life expectancy, representing a long and healthy life; educational attainment, representing knowledge; and real GDP (in purchasing power parity dollars), representing a decent standard of living. The HDI shows how far a country has to travel to provide these essential choices to all its people. It is not a measure of wellbeing. Nor is it a measure of happiness. Instead, it is a measure of empowerment. It indicates that if people have these three basic choices, they may be able to gain access to other opportunities as well. The HDI, imperfect though it may be, is thus a viable alternative to GNP per capita(.) The HDI gives *only* a snapshot of the status of human development in selected areas and thus is not a comprehensive measure of human development (UNDP, 1995, 12).

The Human Development Index (HDI) is a tentative model to give visibility to very complex concepts such as choosing power, personal life quality, family viability, social dignity, political determinacy (to make any difference in politics), etc. As a first approach, the index combines longevity, schooling, and income. In other words, the quantity of time spent alive and, from it, dedicated to formal education, and also the quantity of money earned in a period of time. Such method seems to relate time spending with income earning: the available amount of time and the use one can do from it (e.g. studying), and the available amount of money. The use one can do from money may be, for example, investing in balanced nutrition and health care (to improve longevity), and in longer and better education (tutored by schools at first and by posterior independent readings). Anyway, there is a perhaps unintentional *vinculum* between 'who earns' and 'who pays for it' here; which brings the question: are they the same person or does the State (a non-person) play any distributive role? Yet the HDI's main purpose was simply to advance comparable realities from existing data.

The HDI has three components: life expectancy at birth; educational attainment' comprising adult literacy, with two thirds weight, and a combined primary, secondary and tertiary enrolment ratio, with one-third weight; and income. (...)

The HDI reduces all three basic indicators to a common measuring rod by measuring achievement in each indicator as the relative distance from a desirable goal. The maximum and minimum values for each variable are reduced to a scale between 0 and 1, with each country at some point on this scale. The HDI is constructed by (1) defining a country's measure of relative achievement in each of the three basic variables and (2) taking a simple average of the three indicators. The detailed method for constructing the HDI is explained in technical note 3. (UNDP, 1995, 18)

The major step of HDI was probably the proposition of a methodology for reducing the basic indicators "to a common measuring rod". Although the scientists have resisted the temptation to convert units of time into money (e.g. the cost for each year lived or studied (focus on the past) or for any extra year to be lived or studied (focus into the future), so to establish each one's ability to afford for it – via purchasing power parity), thus escaping the discussion about who should be hold responsible to cover any potential gap between personal spending and earnings (State, market, or citizens alone), the fact is that HDI has a long journey ahead. The grand defy still remaining the same: one, how to translate persons and lives onto quantifiable units; two, how to translate such diverse units into a common index; and three, how to avoid universal 'currency translation'. The tension between what can be only qualified *versus* what can be easier quantified is in the very heart of the matter. Ironically, it is not clear whether the subjective immateriality (e.g. human values) can peacefully be converted to the objective materiality (e.g. market prices), or not – nor the convenience of proposing such a thing.

Creative economy

It seems as some sectors of the economy do perform above the average in intriguing ways, for example: they grow more and faster than the others, they are more resilient to crisis, the education level of their workforce are higher, their paid wages are better, and so on. Such sectors also share something in common: the quality of the persons dedicated to them. It supposes that those persons are more talented, creative, open to novelties, and

prone to changes – to say few. Based on that, some scholars have proposed to unite them in a coherent group labeled as “creative economy” – as a matter for research and public policy. Albeit the effort to understand the phenomenon of creativity, the fact is that there has been no single definition for “creative economy”. As a set, the creative economy’s sectors may vary in types and quantities across countries, depending on the methodologies and frameworks used.

Moreover, creative work is encompassed in a long list of names. While this in a way reflects the diversity of the creative sector, it potentially adds to the confusion — policy makers often need concepts clearly defined (even if, as commonly seen, they may not act on the relevant information available). Consider these names: cultural industries, creative industries, leisure industries, entertainment industries, content industries, copyright protected industries, cultural economy, and creative economy. The names may differ slightly here and there, but they all have a ‘common area’ glued by creative work. The Inter-American Development Bank therefore proposed “a practical definition [named] the ‘Orange Economy,’ starting from the common area.” Whether this definition will gain traction remains to be seen (Kabanda, 2016, 8-9).

In spite of that, the multiple forms to approach the creative economy also permit to capture partaken traits, such as: creativity, arts and culture are productive endeavors; which generate goods and services that are strongly related to the intellectual property rights; and which encompass activities with a direct role in the value chain that transforms ideas into products (Restrepo; Márquez, 2013, 34-36). In other words, the creative economy deals both with tangible and intangible *itoputs* (inputs, throughputs, and outputs), with monetary and non-monetary transactions, with markets and anti-market environments, with formal and informal market niches, with traditional and disruptive forms of exchange (e.g. donation and volunteering), with quantifiable and solely-qualifiable activities, with resources-centered and persons-centered approaches, etc. But beyond that multiplicity, the creative economy is about gifted persons creating social wealth while self-expressing in holistically

meaningful ways: meaningful to the whole community, holistic because non-reducible, wealth understood in a very broad sense, and gifted due their talent, sensibility, creativity, empathy, compassion, and much more than just management skills and rationality.

The term "creative economy" was popularized in 2001 by the British writer and media manager John Howkins, who applied it to 15 industries extending from the arts to science and technology. According to Howkins' estimates, this creative economy was worth US\$2.2 trillion worldwide in 2000 and growing at an annual rate of 5 per cent. The notion is and remains a very broad one as it embraces not only cultural goods and services, but also toys and games and the entire domain of "research and development" (R&D). Therefore, while recognizing cultural activities and processes as the core of a powerful new economy, it is also concerned with manifestations of creativity in domains that would not be understood as "cultural". (...) The term Cultural industries traces its genealogy back to earlier work in the Frankfurt School in the 1930s and 1940s, which scathingly decried the commodification of art as providing an ideological legitimization of capitalist societies and the emergence of a popular culture industry. (...) Hence, by the 1980s the term cultural industries no longer carried pejorative connotations (, and) referred to forms of cultural production and consumption that have at their core a symbolic or expressive element (, such as) music, art, writing, fashion and design, and media industries, e.g. radio, publishing, film and television production. Its scope is not limited to technology-intensive production as a great deal of cultural production in developing countries is crafts-intensive. (...) The term creative industries is applied to a much wider productive set, including goods and services produced by the cultural industries and those that depend on innovation, including many types of research and software development. The phrase began to enter policy-making, such as the national cultural policy of Australia in the early 1990s, followed by the transition made by the influential Department for Culture,

Media and Sport of the United Kingdom from cultural to creative industries
at the end of the decade (UNESCO, 2013, 19-20).¹

A remarkable feature of the concept is that, in it, persons come literally first (given persons are the ones who are creative), and the economy comes after into the expression. Even though the term 'economy' stands for as the noun to be adjectivized by 'creative', the latter highlights the quality of the former. In short, it is the humanized economy. The creative economy is also supposed to acknowledge "inequality, environmental sustainability, nonmarket production and quality of life" (UNDP, 2010, 12) – for instance. Therefore, the creative economy surpasses the economics' approach to creativity – does not matter the complexity of the technical models and statements presented. Thus, the creative economy is about persons being creative and the impacts (personal, familiar, social, cultural, political, and economical) that may have in their lives. The vocable 'economy' should be taken then in a broader sense, as an art of accommodation between multiples elements that are, sometimes and somehow, contradictories. Otherwise, there would be a shortage of creativity on seeing the economy as confined to economics.

The outcomes (of an investment in the creative economy) and their corresponding indicators may be grouped into the four following sustainable development categories:

- Economic: An outcome of primary importance may be the boost to the local economy generated by the cultural industries, reflected in such indicators as the value of regional output, employment, business investment, skills development in the workforce and growth in tourism; in addition, outcomes relating to the distribution of the benefits of economic growth might be of concern, such as progress towards poverty alleviation.

¹ To access an extensive table with the different classification systems for the cultural and creative industries, see (UNESCO, 2013, 22).

- **Social:** Indicators relating to social outcomes revolve around the central notion of social cohesion and the contribution that the creative economy can make to promoting an intercultural dialogue, celebrating cultural identity, strengthening social capital and protecting human rights; education can also be seen as an indicator of outcomes laying the foundation for future social progress.
- **Cultural:** Advancement of community well-being through the active participation of citizens in artistic and cultural consumption, production and participation may be an important outcome from development of the creative economy; indicators in this group also relate to the sorts of intrinsic benefits that the arts can yield.
- **Environmental:** The indicators in this category highlight the important links between culture and the environment in the context of sustainable development; these outcomes reflect not only awareness-raising in the community, but also benefits to be derived from the close relationships between culture, traditional knowledge and the management of natural resources (UNESCO, 2013, 128).

Nonetheless the creativity is important and plays a major role here, it is just one aspect amid others. Paramount to the creative economy is the profile of the persons involved in its activities (who does and for whom), as well as the configuration of such dealings: what is done, how is done, and with what purpose and consequences. For example: consequences to the persons' lives and families, to the environments, to the community; extra monetary purposes such as happiness, peace of mind, feeling of belongingness, respect and decency, and freedom from stressful routines. In order to be creative the persons do need a complex and dynamic set of arrangements, which is partly inaccessible to economics. The handicap of the 'creative *economics*' resides perhaps into the monotone monetization²; whereas the advantage of the 'creative *economy*' comes with the recognition of

² "measuring the creative economy in economic terms alone provides only part of the picture, particularly in the human development perspective." (UNESCO, 2013, 84).

multiple forms for value expression and circulation. The creative economy transcends (to use a metaphor) selling Picasso's canvas for millions of dollars; it is much more about how to enable and multiply "Picassos" in all and every creative sector – making sure that the welfare created is fairly distributed into the community.

Shaped by a very uneven spatial, economic and organizational distribution, the creative economy is also characterized by inequality. While ideas and creativity are globally sourced, the dominant transnational corporations, usually those that control distribution, are still concentrated in the global North. The creative economy is also associated with large cities and/or dominant regions within countries, or even concentrated within cities where a prosperous creative industry sector may be a small enclave surrounded by poverty and social deprivation. (...) Unrealistic expectations should not be placed on the creative economy. It cannot solve issues of poverty or uneven development single-handedly. Yet, development of a creative economy can form an integral part of any attempt to redress inequality, provided that the process also brings about broader structural changes to ensure that creative workers are themselves not disadvantaged in relation to other workers (UNESCO, 2013, 30).

It is worth to note that there have been critics to the concept of creative economy as well. For example: its lack of a more well-defined subject (starting in the definition of creativity and on the election of it as a token for the field), the fact that the personnel turn-over on the creative sectors are greater than the average, the lack for comparable data between sectors and countries, the focus on the qualitative side impairing the economics' quantification needs – to cite a few. Moreover, it is not realistic to expect that the creative economy would be the answer for the problems originated elsewhere, by flawed models and activities. Of course, it is a promising field for public policy and research, but shall not be taken as a panacea.

Creative economy and human development

As the UNESCO had once said (2013, 11), at a “time when countries are striving to reach the Millennium Development Goals (...) we must recognize the importance and power of the cultural and creative sectors as engines of sustainable human development”. The development dimension of the creative economy (CE) and its linkage to the Millennium Development Goals (MDGs) was also analyzed by Kaur, who clearly related the creative economy vis-à-vis the poverty eradication, universal education, equality promotion, mortality reduction, health defense and improvement, environmental sustainability, and global partnership (2014, 23-24). Such interface between CE and MDGs brings the creative economy to the center of the sustainable human development debate, inviting to consider its plausibility, applicability, extension, and limitations.

The “creative economy” is an evolving concept based on creative assets potentially generating economic growth and development. It can foster income generation, job creation and export earnings while promoting social inclusion, cultural diversity and human development. It embraces economic, cultural and social aspects interacting with technology, intellectual property and tourism objectives. It is a set of knowledge-based economic activities with a development dimension and cross-cutting linkages at macro and micro levels to the overall economy. It is a feasible development option calling for innovative, multi-disciplinary policy responses and interministerial action. At the heart of the creative economy are the creative industries (UNCTAD, 2010, 10).

The creative industries that use these resources (creativity and culture) not only enable countries to tell their own stories and to project their own unique cultural identities to themselves and to the world but they also provide these countries with a source of economic growth, employment creation and increased participation in the global economy. At the same time, the creative economy promotes social inclusion, cultural diversity and human development (UNCTAD, 2010, 10).

The idea that the creative economy can foster development, human development, sustainable human development, is very promising indeed. It is also encouraging that such possibility does not mean any neglect towards the economic growth – in part because “economic growth is (...) a subset of human development models” (UNDP, 1995, 12). Or because, to state it differently: “economic growth is not sustainable without human development” (5), and “economic growth is essential for human development” (122). Therefore, the endeavor relies rather in trying to show how the creative economy melds with such schema of economic growth and human development. The connection between economic growth and the creative economy is less complicated, for example: “In 2013, cultural and creative industries worldwide generated revenues of US\$2,250b and employed 29 million people” (EY, 2015, 15); “The global market for traded creative goods and services totaled \$547 billion in 2012. (...) Growth rates stood at 8.6 per cent annually from 2003 to 2012” (UNCTAD, 2015,ii); and “If we were to include them (creative goods and services exports) within the classification system of the International Trade Centre (ITC), they would be the fifth most traded commodity on the planet” (Restrepo; Márquez, 2013, 17-18).

The first two editions of the Creative Economy Report touched, albeit lightly, on evidence that the creative economy is an important fountainhead of creativity and component of growth, and that it impacts non-economic human development goods. Notably, the 2010 Report found that “adequately nurtured, creativity fuels culture, infuses a human-centered development and constitutes the key ingredient for job creation, innovation and trade while contributing to social inclusion, cultural diversity and environmental sustainability”. This special edition of the Creative Economy Report argues that creativity and culture are processes or attributes that are intimately bound up in the imagining and generation of new ideas, products or ways of interpreting the world. All these have monetary and non-monetary benefits that can be recognized as instrumental to human development. Transformational change is thus understood within a broader framework of human development and is recognized as a

process that enhances the effective freedom of the people to pursue whatever they have reason to value (UNESCO, 2013, 16).

Unfortunately it is less evident how the creative economy couple with the sustainable human development – whenever taken apart from its traditional economic facet. Although intuitive, sometimes such a bond may suffer from plain demonstration and harder indicia. In spite of that, some authors do support that the “creative industries also contribute to sustainable development” (UNCTAD, 2010, 26). For example, UNESCO has presented “three non-economic ways in which creativity and culture contribute to development” (2013, 18), saying that there have been countries capable to conjugate “a coherent creative economy policy that is “in tune” with human development thinking” (54); whereas Acker; Gröne; Lefort; and Kropiunigg have put forward a correlation between the digitization of the creative industries and the human development index, stating that “the higher a country scores on the Digitization Index, the higher it is likely to rank in dimensions such as GDP per capita and the Better Life and Human Development indexes”³ (2015, 11). The main assertion to retain is that human development goes far beyond economic growth, and that “creativity and culture also have a non-monetary value in that they contribute to inclusive social development” (LAEDC, 2015, 10).

Convergences and divergences between CE and SHD

The concept of sustainable human development (SHD) has, at a first sight, a higher degree of complexity than the concept of creative economy (CE). The main reason is that the SHD contains both the creativity and economy, but not only. For instance, SHD is about sustainability (social, environmental, and economical), human rights (freedom, justice, and dignity), and development (quantitative growth and qualitative advances over each person’s live); whereas CE has been mostly studied as a set of more-or-less traditional sectors that, when considered together, looks superiorly promising than the average of the remaining sectors.

³ To access the graphics depicting such correlations, see (Acker; Gröne; Lefort; Kropiunigg, 2015, 12).

Put this way, the sustainable human development does include the creative economy – the later configuring just a subset of the former. Nevertheless, the creative economy conveys important features that help to strength the SHD concept, such as: the central role played by persons, the relevance of the qualitative personal traits, the focus on the value creation, the possibility of an extensive digitization, the higher intensity on services, the renewability of the creative goods, and so forth. The following table depicts some of the convergences and divergences that can be established between the SHD and CE.

Criteria	SHD	CE
Persons are	The reason for everything	The source of the creativity
The goal is to	Enlarge persons' lives	Promote the creative sectors
The strategy is to	Empower persons	Invest in these sectors
The drive is the	Human freedom / security / power	Human creativity / talent / skills
Standard	Long, healthy, and creative lives	Wealth produced / acquired
Quali x Quanti	Qualitative over quantitative	Quantitative over qualitative
Values	Fair intra/intergenerational welfare	(In)tangible assets maximization
Focus	Entire society, not just economy	Creative sectors / agents / areas
Elements	Productivity Equity Sustainability Empowerment	Productivity Decoupling ¹ Sustainability Debound ²
Approach	Index: longevity schooling income	GDP / Growth / Trade / Income
Methodology	Generation of a new composite unit	Units: matter, energy, and dollar
Technology	To fix persons' problems / needs	To dematerialize the economy
Assessment	Number of years and purchase power	Money transactions on markets
Remarkable	Aim the quality of growth	Immaterialize the consumption
Public spirit	Value for persons	Prices for goods and services

Table 1. Comparative estimation between SHD and CE

It can be inferred from the table that the 'creative economy' approach is narrower than the one on 'sustainable human development'. However, despite such explicit gap (given that CE is primarily centered on the relationship between creativity and economy), UNESCO has been associating the creative economy with employment, skills improvement, distribution of the benefits of economic growth, poverty alleviation, social cohesion, intercultural dialogue, social capital strengthening, peace and security promotion, human rights protection, education, citizens participation, community awareness-raising about sustainability, etc. (2013, 128-131). Surprisingly, the majority of those items (if not all) are closer to the concept of SHD. Such a fact discloses two supposedly antagonistic realities: one related to a more limited treatment of the economy, that sees it through the lens of the traditional market and agents; and other that faces the economy as an *oikos* for a more holistic development – not only growth. Therefore, the evidences allow the election of one or another: to approximate the creative economy and growth, or with the development theory instead.

Conclusion

The usual approach for the creative economy stresses the contribution of its sectors, industries, and classes to economic growth: jobs creation, GDP increasing in absolute and relative terms, and national and international trade promotion – for instance. Although some authors believe that the creative economy may couple sustainability and economic growth (Nobre, 2016), and the optimism shown by the United Nations (via UNESCO, UNCTAD, and UNDP) that it can also generate development, the truth is there is no general agreement, nor irrefutable proofs, on this matter. Despite its auspicious features, the creative economy stands still as a research open field when it comes to sustainable human development (SHD) inducement. Future researches may want to check on how the creative economy impacts the human development index's elements, for example, as well as on how it can be related to the Millennium Development Goals' components. To rescue the query made at the introduction, it seems possible to answer *partially* yes to both questions – based on intuition and good sense. However, some academics may find this inaccurate and unsatisfactory. Whether further measurements and indexes could bring any appeasement to the field, it has to be seen in the future.

References

- Acker, O., Gröne, F., Lefort, T., & Kropiunigg, L. (2015). *The digital future of creative Europe & The impact of digitalization and the Internet on the creative industries in Europe*. Booz & Company / PWC.
- EY. (2015). *Cultural times. The first global map of cultural and creative industries*. EY / CISAC.
- Kabanda, P. (2016). *Creative trade for human development*. Policy Research Working Paper 7684, World Bank Group.
- Kaur, S. (2014). *Independent Policy Study*. Creative Services Support Group. Available at: cssg.info/downloads/CSSG-Independent-Study.pdf. Accessed on: 17/08/2016
- LAEDC. (2015). *Otis Report on the creative economy*. Los Angeles, USA, OCAD / Los Angeles County Economic Development Corporation.
- Nobre, G. F. (2016). *Creative industries and dematerialization of the economy: ideas on xProceedings of 10^o ABRAPCORP*, Porto Alegre, Brazil, ediPUCRS. Available at: ebooks.pucrs.br/edipucrs/Ebooks/978-85-397-0871-0.pdf
- Restrepo, F. B., & Márquez, I. D. (2013). *The orange economy – an infinite opportunity*. Inter-American Development Bank.
- UNCTAD. (2010). *Creative Economy – a feasible development option*. Creative Economy Report. New York, USA, UNDP.
- UNCTAD. (2015). *Creative economy outlook and country profiles*. Trends in international trade in creative industries. United Nations.
- UNESCO. (2013). *Creative Economy Report – widening local development pathways*. Special Edition, New York, USA, UNDP.
- United Nations Development Programme (UNDP). (1990). *Human Development Report 1990. Concept and Measurement of Human Development*. Oxford/ New York, Oxford University Press.
- United Nations Development Programme (UNDP). (1995). *Human Development Report 1995*. Oxford/ New York, Oxford University Press.
- United Nations Development Programme (UNDP). (1996). *Human Development Report 1996*. Oxford/ New York, Oxford University Press.

Table footnotes

- 1 "increasing independence from natural resources to keep fostering growth and development" (Nobre, 2016, 270-271)
- 2 "how much one unit of relative dematerialization impacts over the absolute dematerialization" (Nobre, 2016, 273).

Intercalary remarks I

The title of Chapter 1 repeats the title of the thesis because it was intended to approach the main subject of the research. The method used was the analytical-comparative, since the goal was “to analyze and compare the creative economy and the sustainable human development” – seeking for potential convergences and divergences. It also compared the quantitative and the qualitative approaches in economics and analyzed the changing of its focus between numbers and persons. The Chapter 1 dealt extensively with the concept of sustainability, which is the core of the Chapter 2. Actually, the Chapter 2 wants to study the potential contribution of dematerialization and immaterialization to sustainability, and the role creative economy may play on that. The method here is highly deductive – since it was based in reading and abstract theorizing. For example: the *de(i)mmat* and *d(r)ebound* ratios were advanced as a result of the analysis, and still stand to future experimental testing. Communications are introduced as a creative economy component, showing how some universities have been developing such a link in Australia, USA, and Brazil. Moreover, Public Relations are treated as an industry, whose *itoputs* (inputs, throughputs, outputs) are presented in order to constitute tangible and intangible assets.

Chapter 2

5.2.

Creative industries and dematerialization of the economy: ideas on communications and public relations.

2. Nobre, G. F. (2016a). Creative industries and dematerialization of the economy: ideas on communications and public relations. In: Farias, L. A.; Lopes, V. S. C. 10º ABRAPCORP: comunicação, economia criativa e organizações. Porto Alegre, ediPUCRS, p. 269-287. ISBN 978-85-397-0871-0.

Nobre, G. F. (2016). Creative industries and dematerialization of the economy: ideas on communications and public relations. In: Farias, L. A.; Lopes, V. S. C. 10o ABRAPCORP: comunicação, economia criativa e organizações. Porto Alegre: ediPUCRS, p. 269-287. ISBN 978-85-397-0871-0

<http://ebooks.pucrs.br/edipucrs/Ebooks/978-85-397-0871-0.pdf>

Abstract

The paper aims to check the potential of creative industries to participate on the dematerialization of the economy. Firstly it relates the necessity for dematerialization with the degrowth debate. Secondly it defines dematerialization, immaterialization and decoupling. Then it introduces two ratios: one between relative versus absolute dematerialization at the present, other between rebound versus debound through time. After approaching the sectors of services and ICT as candidates for dematerializing the economy, the paper analyses the role that creative industries could play on this issue (e.g. communication, public relations, and music). It concludes with the spillover effect that such industries could have on the others (intersectors), including rebound.

Keywords

Creative industries; (De)(im)materialization of the economy; Public relations

© ediPUCRS, 2016

Intercalary remarks II

How universities have been internalizing the concept of creative economy and externalizing the creative class into society is resumed at Chapter 3. In the line advanced by Chapter 2, the idea is to check out the role to be played by universities into the creative economy scenario – with a special focus on the University of São Paulo (USP), Brazil. For example, the first paper relates the creative economy with the immaterial, intangible resources – among them the communications from the School of Communications and Arts (ECA). By its turn, the second paper deepens the bond between creative economy and the University of São Paulo – this time suggesting the university as the main incubator/nursery for the creative class. Then it goes on staging the concept of communicational capital, with instances at both levels: personal and institutional, immaterial and material, human and automated. Such an asset is also envisioned to help dematerialize the production and immaterialize the consumption – bringing sustainability again to the forefront. One example is the artificially intelligent machines capable to communicate, that may or may not have a physical body, but whose communicational abilities create economic value and do belong to the creative economy. The Chapter 3 works as a case study, given the treatment dispensed to USP's departments; but also employs the comparative method – since it compiles the most recent definitions for the expression “communicational capital”, in order to confront them with the result of a previous study.

Chapter 3

5.3.

A economia criativa e o valor potencial da Escola de Comunicações e Artes.

5.4.

Economia criativa e capital comunicacional.

3. Nobre, G. F. (2015) A economia criativa e o valor potencial da Escola de Comunicações e Artes. Revista Organicom 12(23), p. 180-190. ISSN 2238-2593. Latindex 33.

4. Nobre, G. F.; Gil, P. G. (2017) Economia criativa e capital comunicacional. In: Farias, L. A.; Lopes, V. S. C.; Scroferneker, C. Comunicação, economia e indústrias criativas. Porto Alegre, ediPUCRS. ISBN 978-85-397-0981-6



A economia criativa e o valor potencial da Escola de Comunicações e Artes

Creative economics and the potential value of the School of Communications and Arts

La economía creativa y el valor potencial de la Escuela de Comunicación y Artes



Guilherme Fráguas Nobre

- Pós-doutor pela Université Stendhal, França
- Pós-doutorando da Escola de Comunicações e Artes da Universidade de São Paulo (ECA-USP) em 2014-2015
- Doutor em Ciências da Comunicação pela ECA-USP
- Mestre em Desenvolvimento Econômico pela Universidade Federal do Paraná (UFPR)
- Graduado em Ciências Econômicas pela Universidade Federal de Minas Gerais (UFMG)
- Afiliação à Universidade de São Paulo e à Universidad de Girona, Catalunha, Espanha
- Visiting Scholar na McMaster University, Canadá
- Pesquisador associado do Instituto Ciência-Tecnologia da Comunicação
- E-mail: fraguasnobre@gmail.com



Resumo

O artigo é composto por oito seções, além da introdução e das considerações finais. A primeira seção apresenta a economia criativa. A segunda aborda a economia imaterial, já que a economia criativa é, igualmente, intangível e simbólica. Os setores da economia criativa são qualificados na terceira seção e quantificados na quarta seção. A quinta seção analisa a economia tradicional, que poderia evoluir para ser mais criativa de acordo com a sexta seção. A atual relação da ECA-USP com a economia criativa é assunto da sétima seção, ao passo que a oitava seção tem foco no futuro para sugerir caminhos possíveis e potencialmente promissores.

PALVRAS-CHAVE: ECONOMIA CRIATIVA • VALOR REAL E POTENCIAL • ESCOLA DE COMUNICAÇÕES E ARTES.

Abstract

The article consists of eight sections, including the introduction and the final conclusion. The first section presents the creative economics. The second one addresses the immaterial economics, since creative economics is likewise intangible and symbolic. The sectors of creative economics are identified in the third section and quantified in the fourth section. The fifth section analyzes the traditional economics, which could evolve to become the most creative one pursuant to the sixth section. The current relationship between the ECA-USP and creative economics is the subject-matter of the seventh section, while the eighth section focuses on the future to suggest possible and potentially promising paths.

KEYWORDS: CREATIVE ECONOMICS • REAL AND POTENTIAL VALUE • SCHOOL OF COMMUNICATIONS AND ARTS.

Resumen

El artículo está compuesto por ocho secciones, incluyendo la introducción y la conclusión. La primera sección presenta la economía creativa. La segunda sección discute la economía inmaterial, ya que la economía creativa también es intangible y simbólica. Los sectores de la economía creativa son calificados en la tercera sección, y cuantificados en la cuarta sección. La quinta sección analiza la economía tradicional, que podría evolucionar para ser más creativa de acuerdo con la sexta sección. La actual relación de la ECA-USP con la economía creativa es el tema de la séptima sección, mientras que la octava sección se centra en el futuro para sugerir caminos posibles y potencialmente prometedores.

PALABRAS CLAVES: ECONOMÍA CREATIVA • VALOR REAL Y POTENCIAL • ESCUELA DE COMUNICACIONES Y ARTES.



A economia criativa vem se tornando uma prioridade das políticas públicas em vários países, incluindo o Brasil – que instituiu formalmente sua Secretaria da Economia Criativa pelo Decreto 7743, de 1º de junho de 2012. Nascida e promovida em ambientes anglo-saxões (Austrália e Reino Unido), a terminologia expressa a crença de que o futuro do desenvolvimento econômico depende da criatividade, do talento e da inovação das pessoas, recursos intangíveis abundantes em alguns setores da economia.

Adicionalmente à qualificação e quantificação de tais setores, o objetivo deste artigo é pôr em evidência o valor da Escola de Comunicações e Artes da Universidade de São Paulo (ECA-USP) para a economia criativa brasileira e vice-versa. Se, por um lado, a ECA já está profundamente identificada e imbricada com os setores criativos relevantes para a nova economia, por outro lado restaria, ainda, muito a fazer para reposicioná-la (e às suas atividades) desde um ponto de vista econômico.

Para além desta introdução e das considerações finais, este artigo apresenta a seguinte estrutura: a primeira seção vai abordar a origem e os desafios da economia criativa, a segunda seção vai ressaltar seu caráter simbólico ou imaterial, a terceira e a quarta seções vão registrar os setores e as estatísticas para diferentes metodologias e países, a quinta seção vai contrapor-lhe a economia tradicional, a sexta seção vai imaginar formas para inovar a economia tradicional, e a sétima e a oitava seções vão mostrar o quanto a ECA já é criativa e (igualmente importante) o quanto 'econômica' ainda pode ser.

O artigo possui caráter teórico-exploratório e se baseia apenas em revisão bibliográfica. Um aprofundamento com estudo de casos e pesquisa empírica está, portanto, fora de seu escopo.

ECONOMIA CRIATIVA

Tem havido muito interesse pela importância econômica da criatividade, movimento deflagrado pela Austrália e realmente impulsionado pela Inglaterra (Oliveira et al., 2013, p. 13). A ideia é simples e poderosa: o futuro da riqueza e do desenvolvimento pertenceria às sociedades de indivíduos mais inteligentes, educados, informados, talentosos e criativos. Entretanto, o desafio tem sido duplo: por um lado, definir o conceito e categorizar seus componentes; por outro lado, dirimir imprecisões e responder às críticas.

Começemos pelas imprecisões. A despeito dos esforços em contrário (Caiado, 2011, p. 15), a economia criativa parece se confundir em alguma medida com a economia do conhecimento, a economia cultural, o capital humano, as indústrias culturais, as indústrias criativas etc. Existiria também uma conexão entre a criatividade e o conhecimento e a inovação, para citar apenas estes. Consequentemente, parte das críticas tem dito respeito à imprecisão das definições e à falta de consenso acerca de quais categorias comporiam esta economia (MinC, 2011, p. 21; Michelini e Méndez, 2013, p. 145).

Alguns autores têm afirmado que a criatividade é um fluxo (processo de transformação e combinação), ao passo que o conhecimento é um estoque (Domènech, 2010, p. 51). Outros, que o termo economia é mais amplo e engloba para além das indústrias – geralmente associadas à atividade fabril (MinC, 2011, p. 21-22). Mais importante, a economia criativa tem sido associada com o desenvolvimento social – e, portanto, com a inclusão, a justiça, a democracia e a cidadania (MinC, 2011, p. 34; Madeira, 2014, p. 197). A depender de como se entende separadamente os termos 'criatividade' e 'economia', haverá diferentes possibilidades de apresentação para as categorias componentes da assim chamada 'economia criativa'.

Logo, tem havido certa diversidade metodológica para quantificar a importância econômica dos setores criativos. Um enfoque maior pode recair sobre as indústrias culturais, ou sobre a propriedade intelectual, ou sobre as cadeias de produção/distribuição/



consumo correlatas e de apoio, ou até mesmo uma visão mais ampliada pode incluir o turismo e o esporte (Baró, 2009, p. 11). Seja como for, há que se perguntar: a 'economia criativa' é em si uma inovação ou apenas outro rótulo para reorganizar categorias preexistentes? Ainda que não estivéssemos frente a um fenômeno inédito, qual a utilidade de tal abordagem?

ECONOMIA IMATERIAL

A economia criativa tem sido observada a partir de um conjunto de *indústrias* (Newbiggin, 2010, p. 23), *setores* (MinC, 2011, p. 22), *áreas* (Firjan, 2014, p. 7), *segmentos* (Oliveira et al., 2013, p. 7) ou *atividades* (Caiado, 2011, p. 18) da economia tradicional já instalada. Por 'observada' entende-se mensurada por meio de transações comerciais formais que envolveram meios de pagamento, geralmente o dinheiro. Contudo, parte do apelo da economia criativa estaria justamente no que não pode ser medido, nem transacionado comercialmente, e que não possuiria expressão monetária.

Embora o termo 'economia criativa' tenha sido cunhado com fins mercadológicos tradicionais (cujo quadro de referência remete a empresas, empregos, impostos, competitividade, crescimento do PIB etc.), a variável 'criatividade' vai introduzir uma série de contrapontos e tensões. Por exemplo, entre: material *versus* imaterial, escassez *versus* abundância, preço *versus* valor, comércio *versus* intercâmbio, mercado *versus* esfera pública, consumo *versus* fruição, propriedade *versus* usufruto, competição *versus* cooperação, quantidade *versus* qualidade, instituições *versus* pessoas – mesmo se, em última instância, a meta tenha sido sempre a de traduzir o segundo termo em 'unidades' do primeiro termo, em cada um desses pares antagônicos.

Assim, ao mesmo tempo em que o foco dos governos tem sido o "valor econômico e (os) objetivos de mercado" (Caiado, 2013, p. 18), a economia criativa é também a "economia do intangível, do simbólico", caracterizada "pela sua abundância e não pela escassez" (MinC, 2011, p. 24), cujos produtos e serviços geram um tipo de valor que "não pode ser totalmente mensurável em termos monetários" (Oliveira et al., 2013, p. 12), e que eventualmente "não se submetem às leis de mercado" (MinC, 2011, p. 34). Baró (2009, p. 8) a define como um conceito holístico, num mundo cada vez mais dominado "por símbolos, textos, sons e imagens".

Dessa forma, a economia criativa deveria incluir (para além dos termos já referidos) a economia simbólica, a economia linguística (Bourdieu, 1977), a economia imaterial, a economia não-monetária, a economia solidária (Brasil, 2007), a economia cidadã, a economia da dívida (Mauss, 1923-1924) etc. Enumerar todas essas possibilidades tem um objetivo claro: ressaltar a grandeza do conceito, sua amplitude de alcance, sua riqueza fenomenológica. Dito de outro modo: se o real valor gerado pela criatividade pudesse encontrar seu preço (e nem sempre poderá), descobrir-se-ia que a contribuição da economia criativa é muito superior às atuais projeções.

SETORES DA ECONOMIA CRIATIVA

Baró (2009, p. 11) apresenta uma série de modelos alternativos para classificar as indústrias criativas, ou, como quer o Ministério da Cultura do Brasil (MinC), os setores da economia criativa. Por exemplo, o modelo do Reino Unido, o modelo de textos simbólicos, o modelo de círculos concêntricos, o modelo da Organização Mundial de Propriedade Intelectual (WIPO) e o modelo da Conferência das Nações Unidas para o Comércio e o Desenvolvimento (Unctad).

As classificações têm diferido em função da intensidade do uso da criatividade como insumo principal (setores fortemente criativos, setores relacionados aos setores muito intensivos – mas que em si seriam apenas medianamente criativos, e

setores de apoio ou pouco criativos), em função da submissão aos direitos de autor (o alcance efetivo da lei de *copyright*), em função da completude da cadeia mercadológica para os produtos e serviços criativos (envolvendo a criação, a produção, a distribuição, o consumo e a sustentabilidade no tempo de todas essas fases; ou, para usar a linguagem do *marketing*, o pré-fabrico, a produção, o produto, o preço, a praça, o ponto de venda, a promoção e o pós-venda) etc.

Por exemplo, o modelo da Unctad é bastante completo, incluindo: *design* (moda, joalheria, gráfico), publicações (livros e imprensa), artes visuais (pintura, escultura, fotografia), artes cênicas (teatro, dança, circo), audiovisual (cinema, televisão, rádio), novas mídias (*softwares, games*, meio digital), serviços (publicidade, arquitetura, P&D), espaços culturais (museus, sítios arqueológicos, bibliotecas), expressões culturais (artesanato, feiras, celebrações) (Baró, 2009, p. 18). Os países têm suprimido ou acrescentado setores, a exemplo do turismo, do esporte, do ensino, da engenharia (em conexão com a arquitetura).

Figure 1.1 Different classification systems for the cultural and creative industries¹

1. DCMS Model	2. Symbolic Texts Model	3. Concentric Circles Model
Advertising Architecture Art and antiques market Crafts Design Fashion Film and video Music Performing arts Publishing Software Television and radio Video and computer games	Core cultural industries Advertising Film Internet Music Publishing Television and radio Video and computer games Peripheral cultural industries Creative arts Borderline cultural industries Consumer electronics Fashion Software Sport	Core creative arts Literature Music Performing arts Visual arts Other core cultural industries Film Museums and libraries Wider cultural industries Heritage services Publishing Sound recording Television and radio Video and computer games Related industries Advertising Architecture Design Fashion
4. WIPO Copyright Model	5. UNESCO Institute for Statistics Model	6. Americans for the Arts Model
Core copyright industries Advertising Collecting societies Film and video Music Performing arts Publishing Software Television and radio Visual and graphic art Partial copyright industries Architecture Clothing, footwear Design Fashion Household goods Toys	Interdependent copyright industries Blank recording material Consumer electronics Musical instruments Paper Photocopiers, photographic equipment Industries in core cultural domains Museums, galleries, libraries Performing arts Festivals Visual arts, crafts Design Publishing Television, radio Film and video Photography Interactive media Industries in expanded cultural domains Musical instruments Sound equipment Architecture Advertising Printing equipment Software Audiovisual hardware	Advertising Architecture Arts schools and services Design Film Museums, zoos Music Performing arts Publishing Television and radio Visual arts

Fonte: Unesco (2013, p. 22).

O Ministério da Cultura do Brasil, em seu Plano da Secretaria da Economia Criativa de 2011, segue o modelo da Unesco (ver Figura 1.1), propondo adaptações à realidade do país. De modo geral há duas categorias: os setores criativos (bipartidos em nucleares e relacionados) e os setores transversais. Optou-se, aqui, por incluir o turismo, o esporte, o lazer e o entretenimento (setores criativos relacionados); além do patrimônio imaterial, a educação, a capacitação, a memória, os equipamentos e os materiais de apoio (setores transversais). Vale mencionar a inclusão das culturas indígenas e afro-brasileiras como componentes culturais da economia criativa (MinC, 2011, p. 27 e 139).



ECONOMIA CRIATIVA EM NÚMEROS

De acordo com as metodologias utilizadas para quantificar o fenômeno, dentro de uma abordagem mercadológica, temos os seguintes cenários: no Reino Unido, a economia criativa respondia por 5% do PIB e 8,3% do emprego (United Kingdom Government, 2015, p. 7); nos Estados Unidos, por 6,5% do PIB e 8,5% do emprego (Baró, 2009, p. 19); na Comunidade Europeia, por 4,2% do PIB e 3,3% do emprego (EY, 2014, p. 10); na Espanha, por 3,8% do PIB e 4,1% do emprego (Michelini; Méndez, 2013, p. 152); e no Brasil, por 2,6% do PIB e 1,8% do emprego (Firjan, 2014, p. 4), ou, quando se considera o setor informal, a 3% do emprego e 6% da massa salarial (Oliveira et al., 2013, p. 46).

Internamente, a economia criativa no Brasil está altamente concentrada nas regiões Sul e Sudeste, e também nos grandes centros urbanos – como São Paulo e Rio de Janeiro (Caiado, 2011, p. 29). Os segmentos que mais empregam seriam publicação e mídia impressa, novas mídias, serviços criativos e audiovisual (Oliveira et al., 2013, p. 28). De modo geral, os salários pagos na economia criativa são quase três vezes superiores aos da média geral dos trabalhadores da economia dita tradicional – fato explicado, em parte, pela maior escolaridade proporcional dos profissionais da economia criativa (Firjan, 2014, p. 5).

Setores como publicidade, arquitetura, *design* e moda empregam 47,38% da força de trabalho na economia criativa nacional, seguidos por P&D, TIC e biotecnologia, que empregam juntos 34,29%, e pelos setores editorial e audiovisual, com 11,36% dos empregados. Esses três grupos respondem por 93% do número de empregados do setor criativo brasileiro. Mas há sensíveis diferenças regionais: por exemplo, São Paulo emprega 23,1% dos trabalhadores criativos em publicidade, ao passo que o Rio de Janeiro concentra sua classe criativa em P&D, com 29,5% do total (Firjan, 2014, p. 12 e 17).

Vale notar que, ao que parece, tem-se limitado a economia criativa a uma reorganização nominal de setores que já existiam (e já operavam) na economia tradicional. Aparentemente, a 'economia criativa' é apenas um rótulo para um rearranjo de categorias mercadológicas preexistentes. Cria-se um novo nome e, a partir dos grupos já em funcionamento, selecionam-se setores para preencher a nova categoria. Essa nova forma de agrupar é, contudo, importante desde um ponto de vista de políticas públicas – tanto para entender melhor realidades semelhantes, quanto para fomentá-las com mais propriedade. Ou seja, há uma certa criatividade em propor uma nova expressão, mas a questão é: houve alguma inovação (algum aporte inédito)?

A ECONOMIA TRADICIONAL

O significado primordial da palavra economia é o de 'gestão da casa'. Começou como uma arte administrativa, uma sabedoria e um bom senso na harmonização dos recursos disponíveis na esfera privada do lar. A exemplo das outras áreas da administração, desenvolveu técnicas, promoveu-se a ciência, e hoje milita no campo tecnológico (o estudo das aplicações das ciências). Seu espectro de ação ultrapassou a casa da família, alcançando primeiro a cidade e depois a nação (entendida como conjunto de cidades) – da esfera privada (no singular) às esferas públicas (no plural).

A ideia é simples: inventariar tudo o que precisa ser feito, catalogar todos os recursos que estão disponíveis, hierarquizar as prioridades, estabelecer um plano de ação e manter um acompanhamento constante durante a execução – para garantir o correto cumprimento e possíveis ajustes de rota. A complicação surge porque os recursos são limitados em sua disponibilidade (existência, acessibilidade e direito de uso), porque sofrem concorrência (várias pessoas os querem), porque são obrigatoriamente combináveis (para obter um bolo é necessário misturar farinha, leite, manteiga, ovos etc.), porque são valorados assimetricamente (gostar ou não, gostar muito ou pouco) e porque são experienciados diferentemente.



A moeda foi concebida como um denominador comum universal, permitindo que qualquer recurso fosse trocado por qualquer outro (via seu intermédio); e o preço é uma expressão numérica do valor de cada recurso, isto é, sua tradução em unidades de moeda. Assim, na busca pelos recursos necessários para 'gerir a casa', todos devem ir ao mercado: um espaço público de convivência onde os recursos são feitos parcialmente disponíveis. Parcialmente, pois é preciso dar algo (geralmente moeda) para receber algo; mas, principalmente, porque a forma como esse 'algo' se nos apresenta implica informação, conhecimento e comunicação.

Imagine todas as pessoas em sua diversidade de gostos, necessidades e recursos indo ao mercado, em busca do que lhes falta para 'gerir sua casa', e suponha um ente supraindividual (o governo) contabilizando cada uma dessas transações monetárias: eis a economia tradicional. Mas a 'economia criativa' tem sido tratada, até o momento, como um subsetor dessa economia tradicional: novos nomes para velhas atividades. Por exemplo, o subsetor arquitetura, que já existia e era contabilizado, agora passa a fazer parte do novo rótulo 'economia criativa'; mas sua importância relativa na economia tradicional permanece a mesma, tanto do ponto de vista de preço (se não houve salto qualitativo a mudar os valores), quanto do ponto de vista monetário (o *quantum* de moeda transacionado sob esta categoria).

POR UMA ECONOMIA MAIS CRIATIVA

Mas a economia tradicional não tem sido muito criativa. Pode-se criticá-la pelo que tem feito (tradução de pessoas e seres em objetos, ou recursos manipuláveis; e tratamento da vida e da sociedade via fórmulas matemáticas – ambos inadequados e insatisfatórios); mas, principalmente, pelo que *não* tem feito. De modo geral, tem desconsiderado tudo que escapa à precificação, à monetização, à mercadização. Mesmo quando admite a importância econômica de algo que vinha desconsiderando ao longo da história (e.g. o meio ambiente), o faz apenas no sentido de reafirmar sua miopia: diz que é preciso precificar o fenômeno, monetizá-lo e internalizá-lo no mercado.

Haveria, todavia, pelo menos duas formas de tornar a economia mais criativa: a primeira é diversificando as categorias internas da própria economia, isto é, os preços, as moedas, os mercados, as transações, os recursos; a segunda é a diversificação da própria economia, numa abordagem que ao mesmo tempo resgata sua raiz primordial (de gestão da casa) e a ultrapassa (repensando quem gere o quê e com qual propósito, e acima de tudo redefinindo o que seria esta 'casa' – tendo em mente a tensão entre os pares real/virtual, público/privado, digital/analógico, mercado/comunidade). A 'economia criativa' precisaria, então, transcender o simples reagrupamento de setores ditos dinâmicos e competitivos segundo os critérios da economia tradicional.

Vejamos a diversificação interna. A tecnologia tem propiciado a inovação de recursos materiais (isto é, recursos historicamente inéditos, como um *smartphone* ou uma variedade de milho transgênico), mas principalmente de recursos imateriais (novas imagens, formas, novos sons, cheiros e sabores proporcionando novos sentimentos, pensamentos, conhecimentos, experiências). Para além das moedas oficiais, como dinheiro e cartão de crédito, tem crescido a oferta de meios de pagamento digitais ou alternativos, válidos e aceitos dentro e fora da internet, em comunidades e para propósitos específicos – indo do *bitcoin* à doação de trabalho (voluntariado).

Adicionalmente, o mercado como arena ou espaço tem se multiplicado em diversas esferas públicas – caso da internet – e tem igualmente evoluído para incluir intercâmbios variados (do escambo à doação pura e simples, por vezes contrapondo a fruição e o experienciamento ao consumo tradicional). Por outro lado, a composição dos preços tem sofrido enorme dinamismo: em parte devido à publicidade e ao marketing (que agregam valor simbólico aos recursos), em parte devido à reavaliação que tem origem na mudança cultural (as pessoas, hoje, dão mais valor ao tempo livre, ao entretenimento e à virtualidade – dentre outros aspectos).



Já a diversificação externa da economia implicaria inovar, e por inovação entende-se uma ruptura. Ou seja, seria preciso inovação para conceber uma 'economia criativa' diferente de tudo o que temos visto. Por exemplo: uma economia intensiva em valor deveria ter uma circulação proporcionalmente menor de moedas. Uma economia que privilegiasse a qualidade das vivências deveria ser menos recurso-intensiva, no sentido de recursos materiais. Uma economia mais cooperativa tenderia a ser menos competitiva e menos dependente de formas tradicionais de comércio. Em tese, uma economia de interesse público se afastaria do mercado e se aproximaria da política (a 'gestão da casa' comum). Uma economia que promovesse mais intercâmbios (conjunção) do que trocas (disjunção) haveria de ser mais comunicacionalmente intensiva: diálogos, debates e deliberações.

A ECA-USP E A ECONOMIA CRIATIVA

A Escola de Comunicações e Artes da Universidade de São Paulo (ECA-USP) está diretamente ligada à economia criativa. Em primeiro lugar, porque integra o setor de educação e capacitação; em segundo lugar, porque participa da P&D (pesquisa e desenvolvimento); e, em terceiro lugar, porque, via extensão, pode gerar diretamente produtos e serviços criativos de alto valor econômico. Em conexão com as áreas de atuação da Faculdade de Arquitetura e Urbanismo da Universidade de São Paulo (FAU-USP), a saber, arquitetura e *design*, a ECA teria um altíssimo nível de envolvimento com os setores criativos (tomando-se por base o fluxograma da Federação das Indústrias do Estado do Rio de Janeiro (Firjan, 2014, p. 9), caberia excetuar, aqui, a geração de *softwares*, *games*, robótica e biotecnologia – por não fazerem parte do portfólio nem da ECA nem da FAU, embora pertençam, sim, à economia criativa).

As áreas de atuação da ECA incluem (www.eca.usp.br): cenografia, direção teatral, interpretação teatral, teoria do teatro, escultura, gravura, multimídia e intermídia, pintura, canto e arte lírica, composição, instrumento, regência, artes cênicas, artes plásticas, música, jornalismo, editoração, publicidade e propaganda, relações públicas, biblioteconomia, turismo, audiovisual, e formação de ator. Junte-se a isso a arquitetura e o *design*, da FAU (www.fau.usp.br), e é possível ter uma dimensão da importância de ambas no contexto da economia criativa. Segundo estimativas da Firjan (2014, p. 12), apenas os setores de publicidade, arquitetura, *design*, música, artes cênicas, editorial, audiovisual, expressões culturais e patrimônio e artes responderiam, juntos, por aproximadamente 60% do emprego em todos os setores criativos do Brasil. Para Oliveira et al. (2013, p. 37), os setores de audiovisual, publicação e mídia impressa (imprensa e editoras), novas mídias (publicidade e internet), serviços criativos (arquitetura, ensino, P&D, recreação), artes performáticas, *design*, expressões culturais tradicionais e artes visuais são os que compõem a economia criativa no Brasil, em sua totalidade – gerando, em conjunto, 1,1% do PIB.

E como a ECA tem lidado com o tema? A economia criativa tem sido o assunto principal de várias pesquisas do Centro de Estudos Latino-Americanos sobre Comunicação e Cultura (Celacc), vinculado à ECA (Barbosa, 2009; Araújo, 2010; Schwab, 2011; Fugita, 2012; Almeida, 2012; Nomelini, 2013). O professor Gilson Schwartz tem, inclusive, oferecido cursos que abordam a economia criativa, como, por exemplo, "Economia do audiovisual internacional" (CTRO806) e "Introdução à iconomia" (CTRO716); e o professor Paulo Nassar promoveu, enquanto presidente da Associação Brasileira de Comunicação Empresarial (Aberje), um seminário de "Gestão cultural na economia criativa", em 2012. Alguns outros pesquisadores da ECA têm, igualmente, publicado sobre o assunto e temas conexos (Stangl, 2012; Kaufman, 2012; De Marchi, 2014). Um exemplo bem-sucedido da parceria ECA/FAU foi o projeto Arquiografia, finalista do Prêmio Brasil Criativo em sua versão de 2014.

POR UMA ECA MAIS ECONÔMICA¹

A partir de uma abordagem da economia criativa, existe uma afinidade natural entre as áreas da ECA e da FAU. Juntas, trabalham em setores tidos como os mais dinâmicos e promissores da economia. Mais, grande parte dos países desenvolvidos

¹ Nem toda perspectiva conceitualmente promissora é viável ou conveniente desde um ponto de vista prático, embora seja válida toda avaliação.



do mundo tem promovido políticas específicas para esses setores, por acreditarem que a próxima etapa do desenvolvimento econômico será intensiva em educação, talento, inovação e criatividade. Portanto, seria de esperar que ambas as instituições atentassem para essa aposta do poder público, se reposicionando sob o prisma de potencial de geração de renda e emprego qualificados que geram, e intensificando suas parcerias.

No cenário internacional, um interessante exemplo é o da Charles Sturt University (www.csu.edu.au), da Austrália, que apresenta sua "ECA" como Escola de Comunicação e Indústrias Criativas, e que chegou a oferecer uma graduação em indústrias criativas (agora descontinuada). A University of the Sunshine Coast, igualmente na Austrália, faz o mesmo; mas ainda hoje oferece um curso de graduação em indústrias criativas (www.usc.edu.au), com *majors* em publicidade criativa, escrita criativa, drama, *design* gráfico, *design* 3-D, *design* de e-mídia, marketing, estudos de mídia e ecrã, desenvolvimento de *serious games*. Vale notar a aproximação e convivência pacífica entre criatividade, negócios e indústria eletrônica. Já a Escola de Comunicação da Northwestern University, em Illinois (USA), tem como objetivo "se tornar a líder global em educação para a economia criativa", conjugando programas interdisciplinares, promovendo a inovação e a pesquisa multidisciplinar, educando líderes para a economia criativa e promovendo sua marca mais agressivamente (www.northwestern.edu).

Assim, uma 'ECA mais econômica'² significa uma escola com uma visão mais sintonizada com a relevância que a 'economia criativa' possui para o desenvolvimento nacional, sensível à importância que o tema já tem – mas que somente agora vem ganhando prioridade na agenda dos formuladores das políticas públicas. Tratar-se-ia menos de instituir cursos ou disciplinas com um enfoque mais gerencial, e mais em reorganizar a estrutura já existente (como vem fazendo a economia tradicional, ao reagrupar setores sob a denominação de economia criativa), além, é claro, de modificar sensivelmente o discurso institucional frente à sociedade. Uma mudança discursiva que, a exemplo do que se percebe alhures, possui um enorme poder para redefinir a própria identidade e o valor intrínseco atribuído.

CONSIDERAÇÕES FINAIS

Este artigo abordou a economia criativa a partir de um duplo prisma: como os governos a têm encarado, e como as escolas de comunicação a têm incorporado. No caso dos governos, têm-se multiplicado as secretarias e as políticas públicas especificamente pensadas para a área. No caso das escolas de comunicação, ainda parecem ser poucas em número e tímidas quanto à integração do assunto em sua orgânica. A despeito dessa abordagem incipiente, tudo indica que ambos os movimentos tendem a se aprofundar.

Se o desafio dos países tem sido a promoção dos setores criativos na nova economia, o desafio da Escola de Comunicações e Artes da USP passa por incorporar mais completamente os valores envolvidos na noção de 'economia criativa'. Especialmente uma mirada mais "econômica" sobre a criatividade. Um enfoque mais gerencial sobre a criatividade, ancorado em seu potencial de geração de riqueza e desenvolvimento, haveria de influenciar tanto a percepção que a ECA tem de si própria, quanto o discurso que dirige à sociedade.

A exemplo das naturais afinidades que a economia criativa sugere haver entre a ECA e a FAU, seria igualmente precioso estimular as sinergias entre os departamentos internos da Escola de Comunicações e Artes. Para citar apenas um setor, a indústria cinematográfica de Hollywood ilustra bem o potencial do trabalho conjunto de cineastas, escritores, músicos, *designers*, artistas, relações-públicas, publicitários etc., que, em colaboração com programadores de *software*, pessoal de

² Uma 'ECA mais econômica' também significa desenvolver pesquisas que tentem mensurar os impactos sociais e econômicos originados a partir de seus setores criativos. Uma revisão de técnicas utilizadas nesse sentido pode ser encontrada em United Kingdom Government (2011).



marketing e de negócios, criam enorme riqueza econômica. Isso talvez ajude a entender o porquê de alguns departamentos de comunicação estarem lotados dentro das escolas de negócios em certas universidades.

REFERÊNCIAS

- ALMEIDA, Ana Elisa Pereira de. *Cultura e sustentabilidade: um estudo do Plano da Secretaria da Economia Criativa*. Monografia (Pós-Graduação Lato Sensu) – Celacc/ECA-USP, 2012.
- ARAÚJO, Alexandra Pereira de. *A economia criativa e identidade cultural na América Latina*. Monografia (Pós-Graduação Lato Sensu) – Celacc/ECA-USP, 2010.
- BARBOSA, Adriana. *Feira Preta – por uma outra economia: “economia criativa”*. Monografia (Pós-Graduação Lato Sensu) – Celacc/ECA-USP, 2009.
- BARÓ, Ezequiel. *Les indústries creatives: estat de la reflexió i de l’avaluació del seu pes econòmic a escala internacional*. Barcelona: BCF Consultors, octubre 2009.
- BOURDIEU, Pierre. L’économie des échanges linguistiques. *Langue Française*, n. 34, p. 17-34, 1977.
- BRASIL. *Economia solidária: outra economia acontece*. Cartilha da Campanha Nacional de Mobilização Social. Brasília: MTE, Senaes, FBES, 2007.
- CAIADO, Aurílio Sérgio Costa (Coord.). *Economia criativa na cidade de São Paulo: diagnósticos e potencialidades*. São Paulo: Fundap 2011.
- DE MARCHI, Leonardo. Análise do Plano da Secretaria da Economia Criativa e as transformações na relação entre Estado e cultura no Brasil. *Intercom – Revista Brasileira de Ciências da Comunicação*, a. 37, n.1, São Paulo, jan./jun. 2014.
- DOMÈNECH, Rafael Boix. Xarxes de ciutats i localització de l’activitat industrial. In: ALBALATE DEL SOL, Daniel et al. *La indústria catalana després de la crisi*. Papers d’economia industrial 32. Generalitat de Catalunya, 2010. p. 47-69.
- EY. *Creating growth: measuring cultural and creative markets in the EU*. December 2014.
- FIRJAN. *Mapeamento da indústria criativa no Brasil*. Rio de Janeiro: Firjan, dez. 2014.
- FUGITA, Susan. *Turismo cultural: um estudo de caso sobre a economia criativa na Vila de Paranapiacaba*. Monografia (Pós-Graduação Lato Sensu) – Celacc/ECA-USP, 2012.
- KAUFMAN, Dora. A condição de “agente” do consumidor-internauta. In: FONSECA, Ana Carla et al. *Economia criativa: um conjunto de visões*. São Paulo: Fundação Telefônica, 2012.
- MADEIRA, Mariana Gonçalves. *Economia criativa – implicações e desafios para a política externa brasileira*. FUNAG, Brasília, 2014.
- MAUSS, Marcel. Essai sur le don: forme et raison de l’échange dans les sociétés archaïques. *Année Sociologique*, seconde série, tome 1, Paris, 1923-1924.



MICHELINI, J. J.; MÉNDEZ, R. Creative industries, spatial contrasts and urban governance in Madrid. *Revista de Geografia e Ordenamento do Território*, Centro de Estudos de Geografia e Ordenamento do Território, n. 3, p. 143-170, jun. 2013.

MINC – Ministério da Cultura. *Plano da Secretaria da Economia Criativa: políticas, diretrizes e ações – 2011 a 2014*. Brasília, DF, 2011.

NEWBIGIN, John. *The creative economy: an introductory guide*. Creative and Cultural Economy Series 1., London, UK: British Council, 2010.

NOMELINI, Mariana Destro. *II Mostra de Dança das Favelas: o avesso da economia criativa*. Monografia (Pós-Graduação Lato Sensu) – Celacc/ECA-USP, 2013.

OLIVEIRA, João Maria de et. al. *Panorama da economia criativa no Brasil*. Brasília / Rio de Janeiro: Ipea, 2013.

SCHWAB, Maria Eduarda de Moura Gonçalves. *Economia criativa e novos arranjos tecnológicos: análise de caso d'A Banda Mais Bonita da Cidade*. Monografia (Pós-Graduação Lato Sensu) – Celacc/ECA-USP, 2011.

STANGL, André. McLuhan e o link da Alegria Criativa. In: FONSECA, Ana Carla. et al. *Economia criativa: um conjunto de visões*. São Paulo, Fundação Telefônica, 2012.

UNESCO. *Creative Economy Report: widening local development pathways*. Special Edition, 2013.

UNITED KINGDOM GOVERNMENT. *The art of the possible: using secondary data to detect social and economic impacts from investments in culture and sport – a feasibility study*. DCMS/Arts Council/English Heritage/MLA/Sport England, UK, 2011.

_____. *Creative industries economic estimates*. London: Department for Culture, Media and Sport, January 2015.

Artigo recebido em 5.5.2015 e aprovado em 23.11.2015.

Nobre, G. F.; Gil, P. G. (2017) Economia criativa e capital comunicacional. In: Farias, L. A.; Lopes, V. S. C.; Scroferneker, C. Comunicação, economia e indústrias criativas. Porto Alegre, ediPUCRS. ISBN 978-85-397-0981-6.

<http://ebooks.pucrs.br/edipucrs/Ebooks/Pdf/978-85-397-0981-6.pdf>

Resumo

A economia criativa é parcialmente imaterial, a começar pela criatividade. A informação e a comunicação, também parcialmente intangíveis, são Componentes obrigatórios da economia criativa. Este texto mostra como três unidades da Universidade de São Paulo reúnem a quase totalidade do capital humano que, segundo Florida, forma a classe criativa. Mostra, também, como agentes de silício (hardware e software) tem evoluído para atuar autonomamente na economia criativa: maquinas artísticas, maquinas comunicacionais, maquinas capazes de descobertas científicas. Paralelamente, tenta entender e definir a expressão 'capital comunicacional', neste contexto de capital relacional praticável inclusive por máquinas.

Palavras-chave

Economia criativa; Capital comunicacional; Universidade de Sao Paulo; Escola de Comunicações e Artes; Escola Politécnica; Comunicadores artificiais; Artistas artificiais

© ediPUCRS, 2017

Intercalary remarks III

Chapter 4 introduces the communicative machines, presented as the vanguard of the creative economy – artificially intelligent assets that create other assets. Such machines have been programmed to become evolutive, autonomous, and creative (an artificial ‘creative capital’ or ‘creative class’). Beyond that, this so-called *automata economicus* (to contrast with the *homo economicus*) are designed to generate value and engender economic wealth virtually by their own – subverting the notions of capital and labor as separate issues. These machines, in part by-products from universities’ departments, have the potential to harm the concept of ‘sustainable human development’: firstly, the increasing automation and the consequent gains of productivity may accelerate the economic growth through an unsustainable use of natural resources (a phenomenon named Economic Singularity); secondly, a greater automation will displace human labor and also concentrate income towards machines owners’ hands. That is: more growth and worsen development, and more machines and fewer persons working.

The idea here is that rapid growth in computation and artificial intelligence will cross some boundary or Singularity after which economic growth will accelerate sharply as an ever-accelerating pace of improvements cascade through the economy. (NORDHAUS, 2015)

According to Nobre, Clemente, and Souza: “os custos sociais associados ao avanço da automação incluem uma expectativa de desemprego massivo e a queda da participação dos salários no PIB – numa clara transferência distributiva, dos trabalhadores, para os proprietários das máquinas artificialmente inteligentes” (2017, p. 7). Therefore the Chapter 4 is a prelude for the Chapter 6, which embraces a critical method over economics: in order to keep talking about human development and sustainability, it is mandatory to rethink economics’ priorities such as its subjects and tools.

References

- Nobre, G. F.; Clemente, A.; Souza, A. (2017) Transferindo custos: externalidades ambientais como estratégia distributiva. (forthcoming)
- Nordhaus, W. D. (2015) Are we approaching an economic singularity? Information technology and the future of economic growth. Yale University. Available at: <https://tinyurl.com/y7ue2mqq>

Chapter 4

5.5.

Communicative and artistic machines: some remarks on authorship, copyright, and liability.

5.6.

Communicative and artistic machines: a survey of models and experiments on artificial agents.

5. Nobre, G. F.; Matuck, A. (2016) Communicative and artistic machines: some remarks on authorship, copyright, and liability. *International Journal of Humanities and Applied Sciences* 5(2), p. 145-149. ISSN 2277-4386.

6. Matuck, A.; Nobre, G. F. (2016) Communicative and artistic machines: a survey of models and experiments on artificial agents. *International Journal of Computer, Electrical, Automation, Control and Information Engineering* 10(10), p. 1668-1672. eISSN 2010-3778.

Communicative and Artistic Machines: Some Remarks on Authorship, Copyright, and Liability

Guilherme F. Nobre, and Artur Matuck

Abstract—When the painter Harold Cohen died in the last 27th April some people questioned about the future for its robotic partner Aaron: who will take care of it now and, more important, to whom is to benefit from its production and selling? This paper aims to discuss exactly the extent in which machines can become independent/autonomous communicators and artists, both from a technical (software programming) and legal perspective. In this sense, if machines can be technically programmed to communicate, socialize, and produce art, the issue evolves to the legal outlook: do have machines a legal personhood? Can they be credited with authorship (copyright) and ownership (patents) – benefiting from an economic point of view? And finally what happens if a machine, for instance, misinforms somebody (in a communicative interaction) or infringes any copyrighted material? Here is presented such interplay between technology and law, and between expressive agents – either from silicon or carbon.

Keywords—Communicative machines, artistic machines, authorship, copyright, liability.

I. INTRODUCTION

Artificial Intelligent (AI) machines have been expressing themselves through communication and art. In one hand, artificial communicators are engaging in interactions (verbal, written, reading) with humans, generally with commercial interests and commissioned by businesses. In other hand, artificial artists are producing poems, narratives, canvas, drawings, sculptures, etc. – sometimes with financial reward coming from selling, but not always [1]. When such machines are enabled with artificial creativity and generative code [2], sometimes re-encoding themselves in a way to evolve to a totally different entity [3], they may produce copyrightable or patentable works. Beyond the problems related to whether a work produced by a machine could ever fulfill the legal requirements to apply/claim for a copyright/patent protection, there is a more tricky question: who or what is entitled to be paid.

Computers already exist that using current Ai systems can produce “original” songs, literature and improvements on their own internal programs. To whom should the intellectual property rights in these products belong? Products of computer programs are already attracting patent protection. In Virginia a program by D. Linden automatically designed a satellite

communications antenna so original Dr Linden obtained a patent on it. In North Carolina programs developed by Engineoud Software came up with improvements to a jet engine, which have formed the subject of two patent applications. [4, p.614]

This paper aims to approach issues covering AI machines’ authorship, co-authorship, ownership, copyright, patent, and liability – either to the potential benefits (rewards) or losses (harm, injury, debts) their works could engender. This is particularly important in a time when machines became independent/autonomous from people, at least in order to express themselves through communication and art; and also in order to produce works whose economic value could impact the human social wealth. Works such as the artistic ones [5], but also belonging to the scientific [6] and technical [7] spheres.

II. AUTHORSHIP

According to the law only a human person can be an author, at least in order to qualify for the benefits coming from a copyright or patent. The distinction between authorship and ownership is then paramount, given that it does not sound reasonable (to the current legislation) to financially reward a machine. But again, it seems appropriate to analyze in which extension a machine could be judged a perfectly autonomous agent, able to produce works that bear all the properties to be copyrighted or patented but one: non-human made. The first step would be to determine whether such machines are (or can become) perfectly independents from human intervention or, on the contrary, they remain attached in any degree to the first code input.

More and more robotics and Autonomous Intelligent Systems (AIS) systems are now able to create or invent. (...) Some of these systems are able to create works of authorship, software and some are even capable of inventing better versions of themselves. [8, p.8]

The idea is simple: in theory only a machine capable of evolving in a way to become a 100% non-copyrighted and non-patented agent, in itself, would qualify as to have an identity, an independent entity. Given the fact that a computer program is a form of linguistic encoding (symbols in syntactic arrangements), meaning that it is “a literary work in the form of a computer program” [9, p.21], in practice an intelligent machine could be seen as a work that produces another works. In the case a human person owns its copyright or patent, therefore she/he could claim also the ownership over the works it produces. Otherwise, a machine can be also encoded to evolve

Manuscript received Jun. 21, 2016.
Guilherme F. Nobre and Artur Matuck are with the School of Communications and Arts, University of São Paulo, São Paulo, SP 05508-020 Brazil

in a non-predictive manner, through learning and self-re-encoding¹, in a way to establish itself as a new entity (with the later code having zero reference to the former). In this case scenario, the works produced hold no link to any previous copyright or patent – and in theory a machine could be entitled as its author.

We have seen that it could be theoretically admissible to vest authorship to a computer program, at least in those jurisdictions that do not explicitly exclude this possibility, or where legislators established that the author should be a person. In particular, under Canadian legislation, copyright protection in favour of computer programs could be viable, at least in those cases where computer works are not distinguishable from human works, for example in the contentious case of A.I. However, to vest authorship to a computer program in terms of utilitarian analysis brings us to an even more obvious conclusion than that achieved when dealing with the creative requirement. If we give an incentive to a computer program, which as it is not human has no need of incentives in order to produce more works (unless it has been instructed to behave that way) who are we actually benefiting? The answer is nobody. [10, p.627]

Although the authorship can be theoretically granted to a machine, it does not solve the problem of the ownership – that implies financial benefits. The system of copyright and patent was based on incentive: in order to society to get more and better inventions and creative people, it would be necessary to reward the authors and inventors of such works and discoveries. But does that make sense when the author/inventor is a machine? Of course, in practice even a machine has bills to pay such as electricity, maintenance, the resources it uses as input to produce its works, etc. The point seems to remain, again, in the extent such machine would be dependent of humans to keep going on (like managing a trust in its behalf, for example) or to refrain it in doing so (enforcing legal liabilities, for instance).

III. CO-AUTHORSHIP

Although some countries keep denying any possibility for a machine to become an author (in U.S. “the definition of the term “authorship” implies that (...) it must owe its origin to a human being” [4, p.607]), the idea that a machine could be credited as a co-author jointly with a human person sounds less doubtful. The more the human presence is detectable and clear along the process, the more the current legislation may apply without deeper pressure or *ad hoc* adaptation. Remember: if there is any trait of human participation, the machine interplay goes back to be seen as an assistant tool – not an independent, perfectly autonomous entity.

Disagreeing with CONTU, the OTA authors suggested that interactive computer programs might legitimately be considered co-authors of the output they produce. But co-authors with whom? The programmer? The user? Both? And what about authorship in works whose production is predominantly automated and non-interactive? Who is the

author of those? Who owns the copyright in them? These were all wide open questions. [9, p.23]

If a machine can be entitled with co-authorship, the problem comes to: co-author with whom and to who’s benefit? In such an arrangement, no matter how intelligent the machine is or how impossible its productions would be without it, the focus will rely over the human part of the equation. Then, as long as the human co-author(s) is/are appointed and granted with the full copyright or patent, the co-authorship between persons and machines is expected to become more and more acceptable. As a consequence, the tendency is to keep considering that only “people conceive, not companies(, nor) animals (or) a computer.” [11, p.45-46]

In so far as (partial) human authorship is involved in the creation of works, the ownership of them will vary from country to country since rights ownership is not harmonized within the EU. It can either be the creator of the software who is deemed the owner of the rights; or it could be the owner of the software; or it could be both. It can also be the entity or person who invested financially in the software. [8, p.8]

Right now the legal systems are unable to allow payment(s) to machines as a matter of reward for their (co-)authorship in a work, at least as long as the machine is considered as the sole and final beneficiary of the reward. In theory a machine can be credited with authorship and co-authorship, and could also apply/claim² for a copyright or a patent (in very few countries and under very few legal systems, indeed), but nowhere a machine would attain a full legal personhood to get paid without any human custody or tutelage. Therefore, in practice there shall be always a(n) (in)direct person to earn/pay on/in behalf of a machine, and to make sure such agency will keep the human society’s interests first – never the machines’.

IV. OWNERSHIP

The ownership over copyrightable and patentable works’ financial earnings aims the maximization of the aggregate social wealth. The idea is to maximize the net positive effects coming from the balance between the public/private benefits and costs. It is a system made by humans and for humans and, therefore, unless a machine can fit in and reinforce such schema, there is no future for attributing copyright or patent ownership to machines. In other words: why should humanity renounce from the benefits produced by society in behalf of an exclusive advantage for machines?

The law as it is currently configured cannot vest ownership of the copyright in a procedurally generated work in the work’s author-in-fact, because the work’s author-in-fact—a generative software program—has no legal personhood. Intuition and the principle of transitivity both suggest that the programmer of generative software is the logical owner of the copyright in the works generated by his or her software. He or she is, after all, *the author of the author* of the works. [8, p.21]

¹ “An Ai system will through its learning (...) rewrite the basic program itself. It will be reacting (and) it learns from its previous mistakes, and will be “aware” that it must modify its behaviour and thus its program. It will in essence be rewriting the program as it develops.” [4, p.613]

² In the sense of being appointed as the author (copyright) or inventor (patent) in the application process.

Put differently, how any remuneration to a machine would ever make social (human) sense? Unless machines become so advanced to gather and to institute their own separated society and legal system (which is so far an utopia), they must comply with the human rules and interests. Actually, does not matter how intelligent, creative, independent, self-encoding, and autonomous machines can become, the point is that they are a product of human industry and shall be treated as a component into the human social and productive environment. As such, granting authorship or ownership to a machine could only make sense (for hypothetical sake only) as an intermediary process, that means, as a way to serve better the utmost human purpose – which is the maximization of the social wealth.

Indeed, patents have already been granted on inventions that were designed fully or in part by software. (Although the) patent statutes on their face do not allow for a computer to be listed as an inventor. [11, p.43-45]

Even if there is “no reason why a computer, (not) its inventor or owner, cannot satisfy the requirements for a successful application for a patent” [4, p.607], the benefits coming from such patent must belong to humans only, either in a more direct link (when a person is designated as the beneficiary) or in a more indirect way (when a legal entity such as a company is created to represent the interests of several persons). In both examples there would be always people “inside and behind” the machines, and the supreme goal should be kept invariably as the positive net effect those machines and their outcomes may have over the human³ social public good (when people can be found “ahead and around” those artificial systems).

V. COMMUNICATIVE MACHINES

The idea that computers can be seen either as a tool, a media, or a social actor was stated by [12], a researcher dedicated to study persuasive computers, and invites us to think about very complex machines – able to communicate and socialize. As for the former, communication may be thought both as models able to be programmable on machines and as an evolutionary outcome to whoever or whatever may be implicated with it. As for the later, machines will need communicative skills in order to interact and socialize with people – machines that are capable of independent/autonomous self-expression. Then, communication could be artificially engendered as well as naturally emerged – does not matter if to humans or machines.

In computer sciences, communication has been understood as synonymous with interaction, relationship, dialogue, conversation. In such a framework, it is sometimes difficult to perceive the difference between communication and argumentation, rhetoric, persuasion, bargaining and recommendation. (...) Certain authors have been working with computer simulations of communication emergence and evolution. Sometimes they use a software simulation, at other times they prefer physically embodied devices. In any case, the computer-robot simulation research shows that

³ The adjective ‘human’ is necessary since there are artificial agents *societies* been developed and studied, as well as there are initiatives on programming *sociability* on machines.

communication arises spontaneously and evolves to become an effective tool to solve particular social tasks. The most remarkable is that the systems were not at all equipped with a specific drive for communication, this had to be learnt. This process can be called evolutionary robotics(.) [13, p.2]

Conversely, ‘artificial communication’ is the name for the result of any technical procedure that has actually modeled, programmed, or enabled communication into any agent, whereas ‘artificial communicator’ would be the label for such agent whenever it is a machine. In theory, it is possible to think on technical procedures to (re-)implement communicational abilities on humans – usually in the field of health recovery. For example: brain implants to regain motor and talk capabilities (e.g. like those lost in accidents or never attained by birth), technological devices to warrant communication to handicapped persons (e.g. Stephen Hawking’s communicational devices), and so forth. So, ‘artificial communication’ is not restricted to machines only. However, on the other hand, ‘artificial communicators’ are indeed confined to machines.

I have been looking for embodied artificial agents which are capable of persuading people (through communication) about political issues. These very special political artifacts must do politics by themselves, so they are supposed to be autonomous artifact politics. As a matter of fact, they are intended to be politician artifacts, for example: e-politician, e-citizen, e-deputy, e-candidate, e-elect, e-campaign assistant. In sum, autonomous, intelligent, proactive, adaptive, evolving, creative, communicative systems that can reason, argue, bargain and debate about political subjects in order to persuade people are becoming more and more realistic. We can go further and imagine androids and humanoids as politician artifacts, performing emotions, humor, politeness, flattery and becoming more natural, human-like and life-like. [13, p.3]

Such artificial communicators are already among us, communicating and socializing in many interested ways – although with a varied degree of success. Verbal interaction software such as Siri, Cortana, Now, and Echo, or online shopping assistant chat-bots (written interaction), or even ‘silent’ algorithm-based reading robots that continuously scan the web⁴, etc.; they all work to promote their companies’ businesses. In short, they intend and are commissioned to communicate for commercial reasons. But a question related to the authorship and ownership of those ‘artificial communicators’ arises: who is to be held legally responsible and liable for the communication/socialization they produce, if and when something goes wrong?

VI. LIABILITY

Machines that communicate and socialize with humans are responsible (or at least co-responsible) for their conduct, and therefore are also legally liable – right? Well, not quite so. As machines do not have legal personhood, in practice they in

⁴ According to [14, p.674-681] “Copyright ignores robots. (...) The rule is surprising. Robotic readers get a free pass under the copyright laws. Copyright is for humans only.”

themselves do not exist for law. But it does not mean that there would be no control over them, if something wrong or bad happens. In such a case, the people who benefit from such machines are supposed to be found responsible for them, and liable. The humans who keep the machines under their custody do have legal personhood and shall respond for any problem – simply because machines “cannot be held liable for copyright infringement” [11, p.34], or for any other.

The (human) programmer might be an author, the (human) user might be an author, but not the program that connects them. (...) Annmarie Bridy added that our copyright system “cannot vest ownership of the copyright” in a computer that “has no legal personhood.” (...) Robot readers can’t infringe, and we won’t let robots be authors, either. Copyright is not the only field of law to flirt with the idea that what happens in silicon stays in silicon. [14, p.667-673]

But what happens if an ‘artificial communicator’ misinform, lie [15], mistreat, or engage in a discussion with a person; or even by misfortune make a comment that is taken as offensive, inappropriate, or inconvenient? Sometimes a pinch of humor may have such non-intended effect (for computational humor see [16]). As any person may know, to communicate is risky, and to socialize is highly demanding. The research on programming machines with ethics is not new (see for example [17]), and that should include communicational ethics as well (Grice’s maxims and Habermas’ ideal speech rules applied to machines can be found at [13]).

Here we are simply creating personality to determine authorship issues presented by the autonomous production of computer generated works. However if we are to grant authorship to such machine personalities then we must consider responsibility. In the same way as a company can be sued, a machine could be sued but how would it meet any financial obligations imposed? [4, p.618]

Unfortunately or not, machines cannot be prosecuted – even if they deserved. As a way to convey persuasion (which is a type of communication), machines have been capable of flattery [18], politeness [19], apologizing [20], and so on. Nonetheless the efforts to enable persuasive machines with ethics [21], sometimes the communication fails – or worse. Once more, one ‘carbon unit’ (a person) must be found responsible for her/his ‘silicon counterpart’ (a machine). Similar to finding a person to benefit from the works done by the intelligent/autonomous machine, it will be necessary appointing a prosecutable legal person (people or company) to stand on behalf of such machine whenever it may commit an infraction or a crime. Here, what happens in silicon ought to be brought to carbon.

VII. CONCLUSION

As a product of human industry, machines should be ever kept under somebody’s custody and tutelage – either in a direct (a person) or indirect way (a company). In this sense, AI machines’ works may comply with the utmost goal of human society: to help to maximize the aggregate positive net effect (advantages minus disadvantages) over the public wellness and

wealth. In doing so, machines could be credited with (co-)authorship and ownership, no problem, as long as their human counterparts can be identified and easily reachable by justice.

Our current patent laws do not seem particularly well-suited to handling the proliferation of computer-generated publications and inventions that may soon be headed toward the Patent Office and, thereafter, to the courts. [11, p.51]

Machines capable of self-expression through communication and art are not different. Artistic works can entail advantages (e.g. selling, aesthetic) and disadvantages (e.g. copyright infringement, disturbance of the senses). The same can be said about the artificial communicators: whose activities may promote businesses, increase selling, help to gain market share, foster some people’s interests (advantages); but also may have deleterious previewed-or-not consequences, such as misinformation, interaction discomfort, cognitive dissonance, discussion engagement, feeling of bullying, etc. (disadvantages). And, no matter how independent/autonomous an AI machine can be, both the artificial communicator and the artificial artist must have a human counterpart to stand on/in their behalf – for the better and for the worse, legally speaking.

REFERENCES

- [1] A. Matuck, and G. F. Nobre, “Communicative and artistic machines: a survey of models and experiments on artificial agents”, *ICELMACC*, Paris (FR), 2016. (*forthcoming*)
- [2] M. A. Boden, “State of the art: computer models of creativity”, *The Psychologist*, vol. 13, no. 2, pp. 72-77, 2000.
- [3] E. Nivel, and K. R. Thórisson, “Self-programming: operationalizing autonomy”, *2nd Conference on Artificial General Intelligence*, Arlington, VA (USA), 2009.
- [4] C. R. Davies, “An evolutionary step in intellectual property rights – artificial intelligence and intellectual property”, *Computer Law & Security Review*, vol. 27, pp. 601-619, 2011.
- [5] J. Strycker, “Artificial intelligence and the arts”, *Createquity*, 2012. Available at: <http://createquity.com/2012/10/artificial-intelligence-and-the-arts/>
- [6] S. Dzeroski, P. Langley, and L. Todorovski, “Computational discovery of communicable scientific knowledge”. S. Dzeroski, and L. Todorovski (Eds.), *Computational Discovery*, LNAI 4660, pp. 1–14, 2007.
- [7] M. Carlson, “The robotic reporter – automated journalism and the redefinition of labor, compositional forms, and journalistic authority”, *Digital Journalism*, vol. 3, pp. 416-431, 2015.
- [8] M.d.C. Buning, “Is the EU exposed on the copyright of robot creations?”, *Robotics Law Journal*, vol. 1, no. 3, pp. 8-9, 2015.
- [9] A. Bridy, “Coding creativity: copyright and the artificial intelligent author”, *Stanford Technology Law Review*, vol. 5, pp. 1-28, 2012.
- [10] M. Perry, and T. Margoni, “From music tracks to Google maps: who owns computer-generated works?”, *Computer Law & Security Review*, vol. 26, pp. 621-629, 2010.
- [11] B. Hattenbach, and J. Glucoff, “Patents in an era of infinite monkeys and artificial intelligence”, *Stanford Technology Law Review*, vol. 32, pp. 32-51, 2015.
- [12] B. J. Fogg, “Persuasive Computers: Perspectives and research directions”, *CHI98 Conference of the ACM/SIGCHI*, New York: ACM Press, 1998.
- [13] G. F. Nobre, “Political communicative agents”, *PISTA*, Orlando, FL, 2008.
- [14] J. Grimmelmann, “Copyright for literate robots”, *Iowa Law Review*, vol. 101, pp. 657-681, 2016.
- [15] C. Castelfranchi, C. “Artificial liars: why computers will (necessarily) deceive us and each other”, *Ethics and Information Technology*, vol. 2, no. 2, pp. 113-119, 2000.

- [16] O. Stock, et al. "Computational humour", HUMAINE D8a Report on Basic Cues and Open Research Topics in Communication and Emotions, 2004.
- [17] G. Veruggio (coord.), *EURON roboethics roadmap*. Robotic School, Genova (IT), 2006.
- [18] B. J. Fogg, and C. Nass, "Silicon sycophants: the effects of computers that flatter", *International Journal of Human-Computer Studies*, vol. 46, no. 5, pp. 551-561, 1997.
- [19] E. André, and M. Rehm, "Emotions and politeness", HUMAINE D8a Report on Basic Cues and Open Research Topics in Communication and Emotions, 2004.
- [20] C. Bieber, "Polite computers win users' hearts and minds", *New Scientist*, vol. 2456, 2004.
- [21] M. Guerini, O. Stock, E. Bevacqua, and C. Peters, "Some ethical issues for persuasive interfaces - ECAs for persuasion", *HUMAINE WP6 Workshop*, Paris, 2005.

Guilherme Fráguas Nobre is Brazilian. BA Economics, Federal University of Minas Gerais [UFMG] Brazil, 1996; MA Economics, Federal University of Paraná [UFPR] Brazil, 1998; PhD Communications, University of São Paulo [USP] Brazil, 2002; PD Communications, Université Stendhal [Grenoble III] France, 2006; Visiting scholar in Communications, McMaster University, Canada, 2010; is post-doctorant in Communications at University of São Paulo [USP] Brazil.

Artur Matuck is Brazilian. BA Communications, University of São Paulo [USP] Brazil, 1974; MA Communications, University of Iowa, USA, 1980; MFA Visual Arts, University of California at San Diego, USA, 1981; PhD Visual Arts, University of São Paulo, 1989; Associate Professor at Department of Public Relations, Advertising and Tourism, School of Communications and Arts, USP and at Graduate Interfaculty Program in Aesthetics and Art History, USP; Coordinator and Researcher at Colabor Center for Digital Languages, USP.

Communicative and Artistic Machines: A Survey of Models and Experiments on Artificial Agents

Artur Matuck, Guilherme F. Nobre

Abstract—Machines can be either tool, media, or social agents. Advances in technology have been delivering machines capable of autonomous expression, both through communication and art. This paper deals with models (theoretical approach) and experiments (applied approach) related to artificial agents. On one hand it traces how social sciences' scholars have worked with topics such as text automatization, man-machine writing cooperation, and communication. On the other hand it covers how computer sciences' scholars have built communicative and artistic machines, including the programming of creativity. The aim is to present a brief survey on artificially intelligent communicators and artificially creative writers, and provide the basis to understand the meta-authorship and also to new and further man-machine co-authorship.

Keywords—Artificial communication, artificial creativity, artificial writers, meta-authorship, robotic art.

I. E-AUTHORING¹

IT is possible to trace a history of systemic or meta-writing in the long tradition of 'Ars Combinatoria'. The investigation would necessarily imply a reflection on the articulation of language and thought through different cultural histories. The medieval philosopher Ramon Lull, a Christian acquainted with Jewish and Islamic traditions, is regarded as the first to conceive of an autonomous generative system. Lull produced, in the 13th century, a series of concentric movable wheels considered to be the first textual machines. Giordano Bruno, read Lull in the 16th century, and both were read by Leibniz, inspiring his "Dissertatio of Ars Combinatoria". The literary procedures correlated with 'Ars Combinatoria' also form a line of experiments worth being reviewed. The prose work of Raymond Roussel, the procedures of surrealists and dadaists, the portmanteau words of James Joyce, the movement of Brazilian concrete poetry, the potential literature of the French group Oulipo, the recreated neologisms of Brazilian novelist Guimarães Rosa, the cut-ups of William Burroughs - all demonstrate the richness of the combinatory tool for thought and language experimentation. In the 20th century, Paul Klee and Kandinsky have developed a complex visual vocabulary that would underlie their quite programmed works and teaching strategies. The pedagogical notebooks of Paul Klee represent a complete guide to the use of complex combinatory principles to create visual art.

In the past decades, all those historical visual and textual

A. Matuck is full-professor at University of São Paulo, São Paulo City, Brazil (phone: +55-11-2648-0341; e-mail: arturmatuck@gmail.com).

G. F. Nobre, is post-doctorant at University of São Paulo, São Paulo City, Brazil (e-mail: fraguasnobre@gmail.com).

¹ This section is an excerpt from [1].

procedures have been reconceived as elements of an evolutive process, since the emergence of the computer as a semiotic machine able to recombine signs through mathematical algorithms. Those contemporary systems have been providing unheard-of forms of person-computer interaction and co-authorship. The creation, recreation, and recombination of words, phrases, paragraphs, and texts through the continuous development of computer-generated writing entail a new writing methodology and a new research area. It proposes a creative dialogue between the manifested linguistic structures and the possible modifications that computational systems can introduce through algorithms specially designed to work as electronic authors. Those human-machine creative systems have engendered relevant information for scientific and philosophical investigations into the nature of human and machinic perception, expression and intelligence.

II. META-AUTHORSHIP

The concept of meta-authorship has been worked by [2] over the last 10 years. The idea involves two main factors: one technological, other sociological. The first factor implies the information and communication technologies (ICT) as a platform for mediated interaction - which stands for the 'meta' part of the equation. The media functions not only as a material intermediary between human agents, but it mostly intervenes through the creative process as well. That explains why some artists have evolved to become 'designers of media systems'. The second factor has to do with the cooperation between agents (the sociological link), who use the media to interact in order to produce texts, images, and sounds. So artists intentionally submit themselves and their potential work to two sources of interferences: other artists (as co-authors) and the media. Interestingly, sometimes the media become the artists' counterpart. For example, when Artificial Intelligence (IA) is able to perform the referred cooperation - with machines and software enacting as effective artistic co-authors. In this case, the media play all the three functions: a tool, an interactive platform, and a social agent. Such an event raises questions over the copyright and creativity of the masterpiece, for instance. Anyway, this cooperation stands for the 'authorship' part of the equation.

The constant transformation of communication media have been requiring new strategies, new planning methodologies for creative production. In consequence, a whole new concept of creative expression has emerged: the designing and scripting of media-based procedures intended for artistic re-invention, a process called meta-authorship. Following this tendency, some authors,

writers, artists, besides providing new content, have also been performing as designers of media systems. [2]

The point of this paper is partly to discuss how machines can autonomously express themselves by communicating and making art with human partners. That evokes a *continuum* in the history of e-authoring, with contemporary *automata* being capable of writing texts, painting canvas, composing music, and so on. Of course, before bringing examples of real experiments that deliver such performances, it is necessary to register some theoretical models from two types: the ones generated into the communication schools, and the ones originated by the computer scientists. Whenever the latter can surely help to understand the process of meta-writing, there is a hope that the former could shed some light into the meta-authorship dynamics. In any case, those experiments will provide the basis for an original theoretical proposition for historical research, for re-apprehending works of different time periods, and also for the conception of a pedagogical project intended to orient creativity in visual arts, communications and literature.

III. META-WRITING

The concept of meta-writing is based in a review of the concept of authorship as exercised in recent works specially those combining art and technology. Authorship is seen as a process with, at least, two levels of articulation. The first, called meta-text, acts as a generator, determining the second, the text itself. As the text unfolds it actualizes the meta-text, as an interpreter actualizes a musical score. This understanding of a bisected authorship introduces a new methodology for creative expression. At first, the author establishes a meta discourse, a kind of media partition that plans and directs the operational interfaces between creators, materials, processes, tools, and programs. Those pre-determined principles of procedural, conceptual, technological and computational order guide the writing of the text, that is, the construction of the final work. The meta-text has therefore the function of orienting performative acts of aesthetic expression, dictating procedures for organizing information and/or generative processes. The directives of the meta-text, however, do not necessarily impose restrictions. The proposed creative strategies may suggest, orient or modify the creative fluxes, but they only partially determine the final content of an artwork, since performative processes are always subject to the contingency of actual situations. It is foreseeable that during the process of producing a text, of performing a meta-text, the praxis would act retroactively, causing the meta-text to be reelaborated. In this case, the feedback enriches the original meta-text that can absorb new procedural strategies, otherwise unimaginable. At the same time, the meta-text itself could be instituted as an autonomous text, with its own aesthetics, language and graphic style. The gradual insertion of this media language into our aesthetic universe may bring new visions to our concept of an artwork or text. The genesis of every work, as well as its further reverberations, may be seen as extensions of the work itself bringing new venues for theory, history, education and criticism.

IV. COMMUNICATION MODELS

Departing from the Communication Schools, the models of communication are usually classified on linear models (Shannon and Weaver, Lasswell), circular models (De Fleur, Osgood and Schramm, Dance, Maleztk), and reticular models (Newcomb, Gerbner, Westley and McLean). The Linear Models treat communication as an unidirectional linear process between sender and receiver (who is passive). The Circular Models see communication as a potentially mediated relation between sender and receiver, introducing the possibility of mutual influence. The reticular models approach communication also as a result of psychological and social aspects that flow through complex webs/nets of relationship in order to generate opinions, attitudes and actions [3]. Further advances have proposed the semiotic model (Saussure, Peirce, Eco) and the socio-semiotic model. The semiotic model states the multidimensionality of the code, whereas the socio-semiotic model works with the multidimensionality of the agents' backgrounds (when the meaning of a 'code' may depend on one's evolving cultural record). [4].

The way authors categorize models vary in function of how they approach the studied phenomena, but mostly the issues are linked to the following attributes: if the contact between agents is direct or mediated (and how media can bias it); the degree in which the code is controllable and predictable (within agents and another environments); the immanent power embedded into the code (the impact it can have over people and the world); how free agents are before, during, and after communicating (being under linguistic coercion is different from peer submission); how free from (cultural, semiotic, sociological, economic, political) influences such process can be; its degree of interactivity and its openness to active and effective participation; how interaction between agents goes on (e.g. exchange, marketing, negotiation, game); the agents' intentions and aims behind the stage (e.g. to seek for understanding, to set an opinion, to change a behavior, to reach an agreement, to make a deal); how to integrate humans (individual, group, and mass levels) with technology (media, internet, robots) and Justice (social justice, economic justice, political justice); and so forth.

V. ARTIFICIAL COMMUNICATION

Before even trying to model communication, some computer scientists do need to grasp the phenomenon in itself. That means they start looking for what it is to communicate and where it comes from. In short, how to model and program both the origin and evolution of communication. For instance, [5] uses a mediated interaction game between human agents to understand how (sign) communication systems emerged, whereas [6] works rather with artificial embodied and situated agents that might develop interaction and communication through cooperation. Some authors are interested in the role of sensorimotor, cognitive, neural and social factors for "the emergence and establishment of communication" between artificial agents [7, p.2397]. Again the simulated agents are able "to build, through interaction, a functional representation

of the environment and use it to communicate” [7, p.2398]. Others have been calling attention to the (social) robots that could spontaneously generate communication systems from the simple information exchange about “food location” – including deceptive communication between “unrelated robots” [8]. Finally, [9] has presented the complexity of the communication patterns originated from the experiment from [8]: with robots acting alone or as a group, and employing cooperation, exploitation, or deception strategies.

In the “synthetic ethology²” artificial creatures can only develop communication through their descendancy – showing how such capacity defines a higher (evolutionary) fitness, since “creatures must communicate in order to breed and carry on their genetic line” [10, p.68]. In the same direction, [11] dealt with simulated organisms referred to as the ‘simorgs’: there was a breeding cycle to every pair of randomly matched simorgs, and “the mutation rate was a 0.01 probability of one mutated allele per birth” [11, p.4]. After 50 breeding cycles the authors have found that simorgs associated with C+L-evolved the most structured communication conventions³. This work was based on [12], whose 5,000 breeding cycles experiment (for simorgs) has indicated that communication led to “fitness increases approximately 26 times faster” than the option, and that under “communication and learning the rate of fitness increase (was) nearly 100-fold” [12, p.161].

VI. MODELED COMMUNICATION

Reference [13] introduces a robot capable of learning human communicative behavior, a robot seen as a “social being”. In such experiment, the robot interacts with humans to acquire intentionality (the use of X to obtain Y) and can empathetically understand “the communicative intentions of other people’s behavior” [13, p.47]. Here communication is the by-product of the dynamically (sustained across time) mutual behavioral convergence, which implies a robot programmed with a “value system” and a “learning mechanism”. The machine needs to “understand other people’s intentions” in order to react accordingly, and eventually to reinforce some actions in detriment of others. Then feedback, joint attention, empathy, and learning are the building block to produce a communicative behavior.

Communication is the act of sending and receiving physical signals from which the receiver derives the sender’s intention to manifest something in the environment (or in the memory) so as to change the receiver’s behavioral disposition [...]. Communication enables us to predict and control other people’s behavior to some degree for efficient cooperation and competition with others. [13, p.48]

Reference [14] also presents a robot that can “learn to communicate with (human) users from scratch through verbal and behavioral interaction” [14, p.38]. This machine also has “beliefs” (a system to ‘translate’ and react to utterances),

² The study of the (human or animal) *ethos*: character formation and evolution, and behavior.

³ C+L- stands for Communication (permitted) and Learning (not permitted).

learning capabilities (that generate new beliefs to new experiences), and a sharing coordination (to align mutual utterances and actions). Again the acquisition of communication is done through interaction, feedback, and adjustment. For example, “LCORE⁴ enables the robot to understand [...] utterances of users, respond to them with [...] questions and/or actions, generate [...] utterances, and answer questions” [14, p.39]. Robot goes dynamically linking the user’s utterances (verbal and/or behavioral) with its owns, rearranging the beliefs accordingly to the (un)successes. The development of such mutual utterance negotiation and convergence is taken by communication – which is not modeled nor programmed directly, but arises as a system’s by-product.

VII. ARTIFICIAL CREATIVITY

Reference [15] is mandatory when it comes to computer creativity. After defining the three forms of creativity (combinatorial, exploratory, and transformational), she mentions programs that can “design Palladian villas, Prairie houses [...], baroque fugues, modern jazz, drawings of acrobats, story-plots, 3-D silicon chips, or chemical molecules” [15, p.74]. A particularly interesting approach is done by [16], who writes about the possibility of copyright for artificially intelligent authors and their creative production. [17] want creative machines that can invent (while pursuing scientific discoveries) and eventually persuade [17, p.7]. Reference [18] have presented examples of computer programs that rediscovered “a variety of concepts and conjectures in number theory” and “a number of numeric laws from the history of physics and chemistry”, working also with “equation discovery”. One of such programs was Bacon, “which rediscovered Kepler’s third law (and) the ideal gas law” [19, p.37], as well as the Ohm’s law, Snell’s law, and Black’s law [33]. As [20] points out, AI systems have helped to discover new knowledge in scientific fields such as, for example, reaction pathways in catalytic chemistry, quantitative laws of metallic behavior, quantitative conjectures in graph theory, and temporal laws of ecological behavior.

Reference [15] also registers the programs based on genetic algorithms (GA), which enables it to alter its own rules at random. As she says: the “solutions that result from the newly altered rules will be unpredictable”, given that the “program’s ability to perform its tasks gradually evolves” [15, p.75]. A program that can alter its own rules leads to think on self-programming machines. Reference [21] for instance approaches the “problem of programming without a programmer or performing complicated tasks without human will or intervention”. Reference [22] aims at machines “able to adapt to unforeseen situations in open-ended environments”, whose adaptation would “be performed automatically, i.e. with no further intervention by programmers after [the] machine enters service” [22, p.1]. Such ability is related to the property of an automation “to rebuild itself” [23, p.195] or the opposite. Reference [24] deals with “machines that act as

⁴ The adopted machine communication learning method.

autonomous modular robots and are capable of physical self-reproduction” [24, p.163], whereas [25] seeks for the potential to build “POEtic machines” – a robot that can grow from the scratch [25, p.68-9]. The opposite of a machine that can (re)build itself is one which is “capable of self-destruction”. Reference [26] studies the “artificial death” for robots, software, and systems. Moreover, they try to understand a machine able to suicide or self-sacrifice.

VIII. ARTIFICIAL ARTISTS

Aaron, the continuously designed and redesigned software created by Harold Cohen, could be seen as an e-author (see www.aaronshome.com). Since he was a young painter in England, Harold Cohen was concerned about representation and meaning, even though he was not a representational painter. In 1968, he was invited to come to the University of California at San Diego where he was introduced to the art of programming. There, he continued to investigate how marks acquire meaning, but now through a new medium. Provided with simple rules, the computer would draw endlessly. Aaron becomes the name of an electronically constructed author and Harold Cohen was acknowledged as the meta-artist. In spite of that, Cohen has been consistently rejecting any claim of machine creativity – because he suggests that “the human mind takes a different route to creativity, a route that privileges the relational, rather than the computational” [27].

Margaret Boden [...] distinguishes between two broad categories of computer art—interactive and standing alone. In *interactive art*, some or all of the creativity is attributed to the programmer or the human participants. By contrast, the stand-alone types of programs can be credited with creativity: One is *generative art*, or G-art, in which performance may be a stand-alone matter, wherein the computer generates the result all by itself. “The pre-eminent case of G-art in the visual arts is AARON, whose programmer tweaks no knobs while it is running. In music, perhaps the best-known example is the work of the composer David Cope” [...]. Another type of “creative” programs is *evolutionary art*, in which the computer produces novel results by capitalizing on the evolutionary principle of random variation and selective retention. [27].

Reference [28, p.186] works with genetic algorithms in (visual and musical) artistic domains, such as the computer automatically generation of pictures, textures, 3D shapes, jazz solos, and so on. [29] cites the Simon Fraser University’s Metacreation Project, in part dedicated to develop “artificially creative musical systems” such as Algorave (an event where people dance to music generated from algorithms), MuMe@ISEA (a concert of software autonomy in music), and Deus Ex Machina (creative software for musical metacreation) – and asks: “what if computers themselves become advanced enough to design the software that is used to create paintings, sculptures, symphonies or stories?”. Reference [30] made reference to papers covering “artificial creativity” on visual arts, music, poetry, punning riddles, narratives, and cooking. For them, we “cannot expect the world’s creative people alone

to supply artefacts (such as a joke for a speech, a recipe for a party, or a painting for a present) for such a huge demand, so autonomously creative software will be necessary”. For instance, [31] have developed “an artificial [creative] chef that produces novel salad recipes with limited human assistance” [31, p.38]. Finally, [32] bring an example of a creative robotic performance. To further examples, see [33].

IX. ARTIFICIAL WRITERS

The meaning of the term ‘meta-artists’ could also be extended to include artists who design not only systems but electronically-defined ‘authors’, that is, computational systems or software that attain quasi-autonomy in making their design decisions, or that may even be designed to evolve in complexity as they learn through experience in their signal-processing endeavors. Some human agents, acting as meta-authors, have conceived and actualized virtual entities that could be seen as e-authors. They are the end product of a process of programming and design of computer systems that attain semi-autonomy in the structuring of complex signs. An interesting trait on such systems comes from the fact that a computer program is in itself an encoded string of symbols, meaning the following: a program is a ‘text’ that can generate another ‘texts’. Such symbolic lexicon and syntax are in the very basis of what we call intelligent or creative machines and, contrary to what one may think, do not always specify all intermediate processes or even determine all the final results. In short, the artificial writers are not programmed to deliver a predictable piece of text; they are rather programmed to ‘invent’ in some extension. Anyway, either more autonomous or with human cooperation, here there are some examples of artificial writing.

Reference [34] discusses eight poetry generators, computer programs that either manipulate (human) user inputs, internet texts, or that generate autonomous content – sometimes in a participatory, instable, unpredictable way. Reference [35] studies a machine able to generate “short, dream-like narratives that are uncannily similar to those found in the corpus” – based on human transcripts. Reference [36] introduces a program that tells stories – intriguing, with a hint of mystery, and in a correct English. Reference [37] develops a “semantic reasoner” to improve the performance of the five tested automatic story generators – calling attention on how the entertainment industry uses it to generate automatic scripts and reports writing. Literary machines are analyzed both by [38] and by [39]. The former state: “writing is no longer merely a human activity (...), but also the outcome of a software system”, and evoke a project “to build an Internet robot that could automatically generate books (...) and upload them as e-books to Amazon’s Kindle Bookstore” [38, p.2,7]. The later traces the historical trajectory of the combinatorial machines, artificial poetry, computer text generation, and collaborative writing; and says: computers and networks are able to “generate an output that can neither be predicted nor kept under control by writers or by readers” [39, p.4]. Finally, [40] brings the automated journalism: “algorithmic processes

that convert data into narrative news texts with limited to no human intervention". To more examples, see [41].

X. CONCLUSION

The artificial life will only make sense if it can sustainably communicate with mankind. Robots do need our approval in order to be labeled as intelligent and creative. Whenever their existence and behavior become disruptive to mankind, either as expressive or communicative devices, then they would be no longer welcome. In spite of any necessity or attractiveness attached to machines, our (material and symbolic) interaction with them must at last be sustainable. However, such coexistence sustainability point of equilibrium with the referred 'artificial social agents' remains, unfortunately, an unknown field in itself – still open to ethical debate.

REFERENCES

- [1] A. Matuck. *Meta-authorship as a creative model: theory, history, and praxis*. Research project present to University of Berkeley, 2013.
- [2] A. Matuck, A. Ferreira Jr, I. Brasil, R. Stuan, "Media design as a creative language, the artists as meta-artists". In: *21st International Symposium on Electronic Art (ISEA)*, Vancouver (CA), 2015.
- [3] J. M. Aguado, *Modelos básicos para el estudio de la comunicación colectiva*. Universidad de Murcia, 2004. Available at: <http://www.um.es/tic/Txtguia/TCtema9.pdf>
- [4] M. Rodrigo, "Modelos de la comunicación". In: *Portal de la Comunicación*. Barcelona, UAB, 1995. Available at: http://www.oficinappc.ucl.ac.cr/HA2073/Modelos_Comunicación_Humana.pdf
- [5] B. Galantucci, "An experimental study of the emergence of human communication systems". In: *Cognitive Science* 29, 2005, pp. 737-767.
- [6] S. Nolfi, "Emergence of communication in embodied agents: co-adapting communicative and non-communicative behaviors". In: *Connection Science*, vol. 17, Iss. 3-4, 2005, pp. 231-248.
- [7] D. Marocco, A. Cangelosi, S. Nolfi, "The role of social and cognitive factors in the emergence of communication: experiments in evolutionary robotics". In: *Philosophical Transactions of the Royal Society London* 361, 2003, pp. 2397-2421.
- [8] D. Floreano, S. Mitri, S. Magnenat, "Evolutionary conditions for the emergence of communication in robots". In: *Current Biology* 17, 2007, pp. 514-519.
- [9] H. Lipson, "Evolutionary robotics: emergence of communication". In: *Current Biology*, vol. 17, n. 9, 2007, pp. 330-332.
- [10] H. A. Yanco, *Robot communication: issues and implementations*. Master Thesis. MIT, Massachusetts (USA), 1994.
- [11] J. Noble, D. Cliff, "On simulating the evolution of communication". In: P. Maes (Eds.) *From animals to animats 4*. 4th International Conference on Simulation of Adaptive Behavior, Cambridge (USA), 1996.
- [12] B. J. MacLennan, G. M. Burghardt, "Synthetic ethology and the evolution of cooperative communication". In: *Adaptive Behavior*, 2 (2), 1993, pp. 161-188.
- [13] H. Kozima, H. Yano, "A robot that learns to communicate with human caregivers". In: *First International Workshop on Epigenetic Robotics*, 2001, pp. 47-52.
- [14] N. Iwahashi, K. Sugiura, R. Taguchi, T. Nagai, T. Taniguchi, "Robots that learn to communicate: a developmental approach to personally and physically situated human-robot conversations". In: *AAAI Fall Symposium on Dialog with Robots*, Arlington (USA), 2010, pp. 38-43.
- [15] M. A. Boden, "State of the art: computer models of creativity". In: *The Psychologist*, v. 13, e. 2, 2000, pp. 72-77.
- [16] A. Bridy, "Coding creativity: copyright and the artificially intelligent author". In: *Law Review* 5, Stanford, 2012.
- [17] A. Pease, S. Colton, A. Smaill, J. Lee, "Lakatos and machine creativity". In: *European Conference on Artificial Intelligence (ECAI 2002)*, Lyon, France, 2002.
- [18] S. Dzeroski, P. Langley, L. Todorovski, "Computational discovery of communicable scientific knowledge". In: S. Dzeroski, L. Todorovski (Eds.), *Computational Discovery*, LNAI 4660, 2007, pp. 1-14.
- [19] W. Bridewell, P. Langley, "Two kinds of knowledge in scientific discovery". In: *Topics in Cognitive Science* 2, 2010, pp. 36-52
- [20] P. Langley, *Computational discovery of scientific models: guiding search with knowledge and data*. Inaugural Lecture at the University of Auckland, NZ, 2013.
- [21] J-P. Moulin, *Self programming machines (I)*, 2000. Available at: <http://www.self-programming-machines.org/pdf/sfbt4.pdf>
- [22] E. Nivel, K. R. Thórisson, "Self-programming: operationalizing autonomy". In: *2nd Conference on Artificial General Intelligence*, Arlington, VA (USA), 2009.
- [23] J-P. Moulin, "Modifiable automata self-modifying automata". In: *Acta Biotheoretica*, v. 40, n. 2-3, 1992, pp. 195-204.
- [24] V. Zykov, E. Mytilinaios, B. Adams, H. Lipson, "Robotics: self-reproducing machines". In: *Nature* 435, 2005, pp. 163-164.
- [25] C. Lucas, "Self-organization and human robots". In: *International Journal of Advanced Robotic Systems* 2 (1), 2005, pp. 64-70.
- [26] C. J. Reynolds, A. Cassinelli, "Machine self-sacrifice". In: *Eighth International Conference of Computer Ethics*, Corfu, Greece, 2009.
- [27] L. Sundararajan, "Mind, machine, and creativity: an artist's perspective". In: *The Journal of Creative Behavior*, Volume 48, Issue 2, 2014, pp. 136-151.
- [28] A. Moroni, F. V. Zuben, J. Manzolli, "ArtTbiration: human-machine interaction in artistic domains". In: *Leonardo*, Vol. 35, N. 2, 2002, pp. 185-188.
- [29] J. Strycker, "Artificial intelligence and the arts". In: *Createquity*, 2012. Available at: <http://createquity.com/2012/10/artificial-intelligence-and-the-arts/>
- [30] S. Colton, G. A. Wiggins, "Computational creativity: the final frontier?" In: *European Conference on Artificial Intelligence*, Montpellier (France), 2012.
- [31] E. Cromwell, J. Galeota-Sprung, R. Ramanujan, "Computational creativity in the culinary arts". In: *28th International Florida Artificial Intelligence Research Society Conference*, 2013, pp. 38-42.
- [32] P. Gemeinboeck, R. Saunders, "Creative machine performance: computational creativity and robotic art". In: *Fourth International Conference on Computational Creativity*, 2013, pp. 215-219.
- [33] M. A. Boden, "Computer models of creativity". In: *AI Magazine*, V. 30, N. 3, 2009, pp. 23-34.
- [34] H. Dupej, *Next generation literary machines: the "dynamics network aesthetic" of contemporary poetry generators*. PhD Thesis, University of Calgary, 2012.
- [35] S. E. Voisen, *Computational generation of dream-like narrative: reflections on the uncanny dream machine*. Master Thesis, University of California, 2010.
- [36] S. Bringsjord, D. A. Ferrucci, "Artificial intelligence and literary creativity: inside the mind of Brutus, a storytelling machine". In: *Computational Linguistics*, v. 26, n. 4, 2000, pp. 642-647.
- [37] A. Jaya, *A pragmatic approach towards automatic story generation and reasoning*. PhD Thesis, University Chennai, 2010.
- [38] C. U. Andersen, S. B. Pold, "Post-digital books and disruptive literary machines". In: *Formules* 18, 2014, pp. 164-183.
- [39] J. Schäfer, "Literary machines made in Germany. German protocybertexts from the baroque era to the present". In: M. Eskelinen, R. Koskimaa, (eds.) *Ergodic Histories*. Cybertext yearbook 2006, University of Jyväskylä, Finland, 2006.
- [40] M. Carlson, "The robotic reporter – automated journalism and the redefinition of labor, compositional forms, and journalistic authority". In: *Digital Journalism*, v. 3, Iss. 3, 2015, pp. 416-431.
- [41] M. Eskelinen, R. Koskimaa (eds.) *CyberText Yearbook*. University of Juvaskylä, Finland. Available at: <http://cybertext.hum.jyu.fi/>

Artur Matuck is Brazilian. Associate Professor at Department of Public Relations, Advertising and Tourism, School of Communications and Arts, USP and at Graduate Interfaculty Program in Aesthetics and Art History, USP; Coordinator and Researcher at Colabor Center for Digital Languages, USP. Email: arturmatuck@gmail.com

Guilherme Fráguas Nobre is Brazilian. PhD Communications, University of São Paulo [USP] Brazil, 2002; PD Communications, Université Stendhal [Grenoble III] France, 2006; Visiting scholar in Communications, McMaster University, Canada, 2010; is post-doctorant in Communications at University of São Paulo [USP] Brazil. Email: fraguasnobre@gmail.com

Intercalary remarks IV

Chapter 5 has the opportunity to access the creative economy at Girona, enabling a comparison between a real community vis-à-vis the theory on the ‘creative economy’ registered mostly at Chapters 1, 2, and 3. Therefore, it uses the following methods: descriptive, analytical, comparative, and critical. Furthermore, it also recalls the vinculum between the universities and the creative economy – bringing in both the University of Girona and its Science and Technology Park (ParcUdG). It is shown the similarities of patterns among the University of São Paulo and the University of Girona: both are poorly aware of their importance for the matter, having supported few researches on the subject so far. When compared with the Australian counterparts, or even with the treatment dispensed by the United Kingdom Government, is clear how much work has still to be done both in Brazil and Spain. From a normative or prescriptive point of view, Chapter 5 offers some suggestions to Girona’s policymakers – concretely to re-evaluate the local vocation to management.

Chapter 5

5.7.

Creative economy at Girona, Spain: a potential, a hope, and investments to be.

7. Nobre, G. F. (2017) Creative economy at Girona, Spain: a potential, a hope, and investments to be. (accepted by Revista Economía Creativa, ISSN 2395-8200, Latindex 36).

CREATIVE ECONOMY AT GIRONA, SPAIN: A POTENTIAL, A HOPE, AND INVESTMENTS TO BE

Guilherme Fráguas Nobre

University of Girona (Spain) / Federal University of ABC (Brazil)

Abstract

Some key players have been considering the ‘creative economy’ (or the ‘knowledge economy’, ‘creative industries’, etc.) as a viable driver for Girona to escape from the traditional socioeconomic model based on agriculture, hard industry, and low-tech services. Although the rhetoric from the local and regional heads of the government seems to adhere to such an opinion, the facts reveal a strong concentration of such activities in the Province of Barcelona instead. Actually, a study over the data available to Girona shows its economy deep-seated at services mostly intensive on managerial competencies. Therefore, it is suggested that Girona also approaches the ‘creative economy’ from a managerial perspective, embracing the wider concept of ‘experience economy’ – in the sense given by the Scandinavian countries.

Keywords: creative economy, Girona, creative sectors, creative industries.

Introduction

Girona has creative sectors and industries as any other provincial capital with artists, museums, historical sites, theatres, architects, designers, sports events, fairs, touristic attractions, restaurants amid the best in the world (e.g. El Celler de Can Roca and El Buli), an university ambience, a technology park, and much more that is usually included as component of the creative economy¹ (see Unesco, 2013, p. 22). However, the lack of studies, researches, and data about Girona’s own creative economy is a matter that the recent local government has been trying to fix. Therefore, there is a gap between what a person can infer Girona has (as creative economy) and in what a person

¹ “Actualment, l’economia creativa i cultural es presenta com un concepte holístic que integra les interaccions que hi ha entre cultura, economia i tecnologia, tot estimulant la inclusió social, la diversitat cultural i el desenvolupament humà. (...) Es tracta d’un grup heterogeni d’activitats basades en el coneixement que difonen bens tangibles i serveis intel·lectuals i/o artístics amb un alt contingut creatiu, però també amb valor econòmic i de mercat.” (Ajuntament de Girona, 2015a, p. 2-3) “Actually the cultural and creative economy is a holistic concept that integrates the existing interactions between culture, economy, and technology while promoting social inclusion, cultural diversity, and human development. (...) It is a heterogeneous group of knowledge-based activities that spread both tangible goods and intellectual/artistic services with a high creative content, but also with economic and market value”. (free translation)

can base itself in order to justify such position – because, again, data are scarce². Nonetheless such relative absence of measurements and analysis, the last two City Hall administrations have been investing into the creative economy as a viable development driver for Girona. Therefore, this paper faces an apparent paradox: to reunite the available material covering the creative economy at Girona, while dealing with the fact that what is available is much more a set of perceptions, policies to be implemented, political speeches, and social hope. Thus, this paper aligns itself with the efforts of those who seek to better understand and study the creative economy of Girona, which already exists as a phenomenon, but whose analysis and research are only in their beginning. As a contribution to the debate, the paper suggests that Girona should invest both directly in the creative sectors and industries, as well as indirectly via its managerial potential which can be eventually applied to support the creative sectors and industries whether at the local level or attracted from Barcelona.

Creative economy dimension³

The creative economy represents 6,1% of the world's Gross Domestic Product (2.700 billion of dollars), while the exports of creative goods and services reached 3,4% of the total worldwide (424 billion of dollars) (Area Metropolitana de Barcelona, 2011, p. 71). In Europe, both the creative and cultural industries generated 3,3% of the GDP, and have employed 3% of the working force (6,7 million of persons) (Azqueta, 2014, p.

² “Es difícil hacer cálculos sobre cómo y en que medida la economía (de Girona) va transformándose hacia una economía creativa (ya que) disponemos de pocos indicadores estadísticos que estén adaptados a los conceptos como creatividad, industria cultural, innovación (...). Los indicios sobre su transformación hacia una economía creativa podrían considerarse más cualitativos que cuantitativos (...)”. (Ajuntament de Girona, personal communication, March 23th, 2017) “It is hard to make calculations on how and in which extent Girona's economy evolves towards the creative economy since we have few statistical indicators adapted to concepts such as creativity, cultural industry, innovation (...). The indicia about its transformation into a creative economy may be considered more qualitative than quantitative (...)” (free translation)

³ Sometimes data do not reflect the US crisis of 2008, whose impacts in Spain only recently have lessened.

1). Differently, EY (2014, p. 10) says that “creative and cultural industries (CCI) contributed with 4,2% of Europe’s GDP”. In Spain, the creative and cultural sectors provide with 3,9% of the country’s GDP – average between 2000-2008 (Barcelona Treball, 2013, p. 17). The region of Catalonia has been close to such mark, with 3,1% of GDP, 6,6% of the working force, and 6.6% of the companies as well (Generalitat de Catalunya, 2014, p. 58-59). If one takes the industries based on experiences (that aggregate creative and cultural industries, tourism, and sports), they account for 16% of the GDP and 19% of the employment (Generalitat de Catalunya, 2013, p. 17). The capital Barcelona concentrates 46,8% of all creative jobs in Catalonia and has a creative sector that employs 11,3% of the city’s working force and involves 10,9% of the companies. (Ajuntament de Barcelona, 2015, p. 10).

Girona refers to the province and capital city of a province. Although some authors have tried to consider Girona as a part of a macro-region, as a component of a Pyrenees’ “technological triangle” that includes Spain and France (Ulrich, 2012), or as an axe of the hyper-territory GI-BAR-TAR (Girona, Barcelona, Tarragona) (Gausa, 2010, p. 64-65), the truth is that there is an economic concentration on Barcelona since “the province (of Barcelona) contains 86.5% of the region’s culture and creative industries workers” (OECD, 2010, p. 100). Girona holds about 6,2% of the Catalonia’s employment in culture and creative industries followed by Tarragona with 4,6% and Lleida with 2,8% (idem, p. 101). Nonetheless, Girona is considered the second cultural city of Catalonia where the creative industries are supposed to become “el motor dinamitzador de l’activitat cultural de la ciutat, (...) i una contribució a l’activació de l’economia creant ocupació”⁴ (Bòlit Emprèn, 2013, p. 3).

⁴ “the dynamical engine for the city cultural activity, (...) and a contribution to activate the economy while creating jobs”. (free translation)

Girona's economy

The City of Girona's economy is primarily based on services (49,96%), commerce (38,57%), and equipment (6,52%) – three sectors that altogether represented 95,05% of the activity types for the year 2015. Here were taken the number of the elements in each activity (Ajuntament de Girona, 2016). Inside equipment, the most representative categories are public administration (18,01%), religious equipment (16,62%), technical services (6,65%), Bressol schools (6,65%), sanitary equipment (5,82%), university centers (5,26%), sports complexes and other equipment (4,90%), civic and social centers (4,44%), and other educational equipment (3,32) – which represent 71,67% of the total for equipment. The most relevant categories for commerce are other types of retail (25,48%), food and beverage (18,03%), bars (16,96%), restaurants (9,37%), home articles (4,22%) – with 74,06% of the total for commerce. Finally, the main elements of the services are: other services (41,18%), personal and corporate services (14,35%), sanitary services (12,58%), lodging (7,99%), construction and living (7,95%), fiscal and economic services (7,19%) – totalizing 91,24% for services.

Macromagnituds i impostos	Girona	Gironès	Catalunya
Producte interior brut (base 2010). 2014			
PIB (milions d'euros)	3.277,4	5.092,7	206.776,3
PIB per habitant (milers d'euros)	34,4	28,1	27,8
PIB per habitant (índex Catalunya=100)	123,6	101,1	100,0
Valor afegit brut (base 2010). Per sectors. Milions d'euros. 2014			
Agricultura	0,7	49,9	1.947,7
Indústria	335,9	786,1	37.533,7
Construcció	126,7	243,9	8.882,4
Serveis	2.558,3	3.615,4	142.273,3
Total	3.021,6	4.695,2	190.637,2
Valor afegit brut (base 2010). Indústria. Per branques. Milions d'euros. 2014			
Indústries extractives, energia, aigua i residus	51,9	89,1	5.611,0
Alimentació, tèxtil, fusta, arts gràfiques, química i cautxú	220,0	510,7	18.947,2
Metal·lúrgia, maquinària, material elèctric i de transport	64,0	186,3	12.975,5
Total	335,9	786,1	37.533,7
Valor afegit brut (base 2010). Serveis. Per branques. Milions d'euros. 2014			
Comerç	409,4	756,6	30.649,8
Transport, informació i comunicacions	212,2	275,0	17.458,5
Hostaleria	144,2	214,9	11.034,9
Act. financeres i assegurances	175,4	214,4	7.670,9
Act. immobiliàries, tècniques i administratives	616,7	919,7	40.401,9
Administració pública i altres serveis	1.000,4	1.234,8	35.057,3
Total	2.558,3	3.615,4	142.273,3

(IDESCAT, 2016)

When measured by the Gross Domestic Product (GDP) in dollars, the sector of services represents 78,06% of Girona's economy, followed by the sector of industry with 10,25% of the total. The main components of services are public administration and other services (30,52%), realtor/technical/administrative activities (18,82%), commerce (12,49%), transport/I&C (6,47%), finance/insurance (5,35%), and hotels (4,40%) – making 78,05% of the total. The internal distribution for industry is food/textile/wood/chemical/graphic/cork (6,71%), extractive/energy/water/waste industries (1,58%), and metal/machinery/electric/transport material (1,95%). However, there is a way to deepen the analysis of the Girona's economy, showing a more comprehensive internal partition for each sector.

Dades en milions d'euros

PRIMARI	{	Agricultura, ramaderia, silvicultura i pesca (A)	10,5	0,4%				
		Indústries extractives (B)	2,4	0,1%				
SECUNDARI	{	Indústria alimentària, tèxtil i paperera	Productes alimentaris i begudes (10 - 12)	307,7	11,0%			
			Tèxtil, confecció, cuir i calçat (13-15)	1,5	0,1%			
			Fusta i suro, papers i arts gràfiques (16-18)	8,9	0,3%			
	{	Indústria química	Químiques i farmacèutiques (19 - 21)	9,0	0,3%			
			Cautxú, plàstic i altres minerals no metàl·lics (22 i 23)	25,8	0,9%			
	{	Indústria del metall	Metal·lúrgia i altres productes metàl·lics (24 i 25)	29,0	1,0%			
			Electrònica (26 i 27)	39,1	1,4%			
			Maquinària i equips (28)	11,9	0,4%			
Indústria automobilística (29 i 30)			3,4	0,1%				
		Altres manufactureres (31 - 33)	11,1	0,4%				
		Energia i aigua (D+E)	60,1	2,2%				
CONSTRUCCIÓ (F)	{	Immobles (41)	54,2	1,9%				
		Enginyeria civil (42)	16,6	0,6%				
		Activitats especialitzades (43)	30,8	1,1%				
SERVEIS	{	Vehicles de motor (G) (45)	Reparació (452)	8,7	0,3%			
			Venda vehicles (451, 453 i 454)	167,2	6,0%			
	{	Comerç	Comerç a l'engròs			Productes d'equipament (465 i 466)	20,2	0,7%
					Productes de consum (462 - 464)	348,4	12,5%	
					Altres tipus de comerç a l'engròs (461, 467 i 469)	575,5	20,6%	
	{	Comerç al detall			Productes d'equipament (474)	7,3	0,3%	
					Productes de consum (472, 475 i 477)	177,6	6,4%	
					Altres tipus de comerç al detall (471, 473, 476, 478 i 479)	50,8	1,8%	
			Transport i emmagatzematge (H)	73,1	2,6%			
			Hostaleria (I)	138,9	5,0%			
			Serveis a les empreses i serveis personals (J - U)			Activitats financeres i d'assegurances (K)	12,4	0,4%
					Activitats immobiliàries (L) (68)	62,2	2,2%	
					Activitats professionals, científiques i tècniques (M)	175,9	6,3%	
					Altres serveis (J), (N) - (U)	350,6	12,6%	
TOTAL ECONOMIA			2.790,6					

(Perfil de la Ciutat, 2016, p. 157)

From there, it is clear that the Girona's economy is widely based on services (78,6%) and industry (14,5%) with the major participation from other types of

wholesale commerce (22,4%), retail/wholesale consumption products (19,2%), other services (11,8%), food/beverages (10,5%), and professional/scientific/technical activities (6,1%) – that sum up together 70%. One may note a difference between the numbers presented by IDESCAT and Perfil de la Ciutat: at IDESCAT the GDP is \$3.277.400 euros, whereas the value depicted at Perfil de la Ciutat is \$2.790.677 euros. Going beyond that, a generic category labeled as “other types of” does really few to shed light on the economy’s structure. For example, at the Ajuntament de Girona’s appraisal, other “types of retail” accounted for 25,48% of the category commerce, while “other services” represented 41,18% of the category services⁵. At the IDESCAT analysis, the “public administration and other services” responded for 30,52% of the services sector; whereas at the Perfil de la Ciutat “other types of wholesale commerce” and “other services” expressed 22,4% and 11,8% of the sector services – respectively. A manner to contour such generality may be given by the KPMG annual report Girona100.

5. Altres Serveis i Construcció 9. Altres comerços

Clínica Girona, SA	Xarxa Farmacèutica, SL
Construcciones Rubau, SA	Agri-Energia, SL
Eurofirms ETT, SL	Cavip, SA
Transportes Calsina y Carré, SL	Dyneff España, SLU
Pannini España, SA	Hamelin Brands, SL
	Media Markt Girona video-TV-HiFi-Elektro-Computer-Foto, SA
	Saima Productos y Servicios, SL
	Vera Continental, SL
	Vicens i Batllori, SL

(KPMG, 2016, p. 71)

Although the objective of a KPMG’s analysis is to consider only the first 100 companies by volume of revenues, it can give a clue over the “other types of” internal composition. For instance, at its Table 4 are introduced the amounts of business (%)

⁵ The City Hall was contacted to disaggregate the constituents of the 41,18% other services, but it did not.

performed either by familiar or non-familiar companies (KPMG, 2016, p. 26). The familiar units are concentrated on meat industry (34,15%), food/beverage/tobacco distribution (21, 49%), and *other* manufactory industry (16,09%); whereas the non-familiar are rooted on the *other* commerce (35,14%), non-meat food industry (24,06%), and *other* manufactory industry (22,62%). At its Annex 2 the KPMG report names the companies individually (2006, p. 71-72). Given that Girona's economy is highly concentrated on services and commerce, now it is possible to figure out who actually composes the "other type of" category. At "other services" it brings one health clinic, one human capital firm, and two transport/logistics companies. At the "other commerce" it portrays, one chain of pharmacies, one energy group, one bulk cereal and flour dealer, one fuel distributor, one paper/cardboard industry, one trader for cosmetic / dietetic / odontology / parapharmacy products, one consumer-goods hypermarket, and two suppliers of products for agriculture / livestock.

Creative economy at Girona

In "El Decàleg de Girona 2010" the seventh commitment was made over the city's image branding, which planned to invest in the intangible asset "Giron@: societat creativa" (Cambra de Comerç de Girona, 2010, p. 15). It is worthy to note the suggested link between creativity and internet (or technology) given by the symbol @. The main ideas stated into the Decàleg were the exhaustion of the current economic development model; the need for a qualitative shift and a new model; a qualitative shift based on trust, innovation, connectivity, knowledge, networking, cooperation, and cultural change. For it, the creativity "esdevé un factor de competitivitat de primer nivell"⁶

⁶ "becomes a first level competitive factor". (free translation)

(idem, 2010, p. 182). However, the Decàleg was referring to the knowledge economy and bringing no mention to the expression ‘creative economy’⁷.

Under Mayor Carles Puigdemont (2011-2015), the Plan for the Government of the Girona has named its fifth section as “Ciutat Creativa I Educadora”⁸, that aimed “Potenciar una ciutat creativa I educadora”⁹. The referred section proposed 39 objectives, amongst which “Potenciar els creadors gironins”¹⁰ and the “Pla d’excel·lència en l’ús de les TIC”¹¹ (Ajuntament de Girona, 2011, p. 16). Girona has also been classified as a ‘creative city’ by Panal and Yáñez (2012, p. 102), a typology applied for them to another 45 cities in Spain. The other two typologies were ‘artistic cities’ and ‘entertaining cities’. In their words, creative cities are the ones that stand out due to the “importancia del sector audiovisual y del entretenimiento, sobre todo, en las fases de creación, producción y fabricación. Se trataría de los típicos cluster industriales centradas en estos sectores y actividades”¹² (idem, 2012, p. 91). According to Ganau, Paül, and Rierapp (2012, p. 410), in Girona 7,2% of the companies belong to the creative economy, even though only 4,7% of the workers have been labeled creative. To those authors, Girona is the third more important hub for creative economy in Catalonia and it follows just after Barcelona city and Barcelona metropolitan region.

⁷ “Girona: creative society”. (free translation)

⁸ “creative and educational city”. (free translation)

⁹ “to potentiate a creative and educational city”. (free translation)

¹⁰ “to potentiate the Girona’s creatives”. (free translation)

¹¹ “plan of excellence on the ICT’s use”. (free translation)

¹² “importance of the audiovisual and entertainment sectors, especially in the phases of creation, production, and manufacturing. These would be the typical industrial clusters centered on those sectors and activities”. (free translation)

Figura 4. Distribución empresas creativas por *vegueries* (Catalunya 2009). Valores relativos en %

	Población	Empresas	Trabajadores	Empresas Creativas	Trabajad. Creativos
Barcelona ciudad	21,7	30,6	33,1	47,7	53,5
Resto Reg. Met. Barcelona	44,9	35,6	36,9	29,1	30,7
Camp de Tarragona	8,2	7,7	7,3	5,5	4,5
Girona	9,8	10,5	9,0	7,2	4,7
Catalunya Central	6,9	6,3	5,7	4,5	3,2
Lleida	4,8	5,6	5,1	4,1	2,6
Terres de l'Ebre	2,6	2,4	2,0	1,4	0,7
Alt Pirineu i Aran	1,0	1,3	0,9	0,6	0,2
Catalunya	100,0	100,0	100,0	100,0	100,0

Ganau, Paül, and Rierapp (2012, p. 410)

As stated in Méndez et alii (2012, p. 24), Girona comes in the 26th position on the ranking for the “Especialización en economía creative de las principales áreas urbanas, 2009”¹³. Conforming to the Perfil de la Ciutat (2016, p. 116), Girona is the municipality that concentrates the highest percentage (60%) of workers in the sectors of technology and in the sectors based on knowledge, and this way ahead of the average in Catalunya (41,4%). In line with the IERMB, beyond Barcelona only three ‘cities’ present an equilibrium to Catalunya: Girona-Costa Brava, Reus-Tarragona, and Lleida. Those metropolises are here named “knowledge platforms”, since they can organize “les pròpies ciutats i els territoris propers, beneficiant-se tant de les externalitats subministrades per aquests territoris dels voltants -el paisatge, la qualitat del medi ambient, les infraestructures- com de la proximitat al nucli de Barcelona”¹⁴ (2012, p. 294).

A Girona, les indústries creatives (...) (p)er tipus d’activitat, tenen un major pes els Serveis d’Arquitectura i enginyeria (19,2%), les de Recerca i

¹³ “Main urban areas’ specialization in creative economy”. (free translation)

¹⁴ “their own cities and territories, benefiting from both the externalities provided by such territories (landscape, environment quality, infrastructures) and the proximity to Barcelona”. (free translation)

desenvolupament (17,6%)¹⁵, les de Serveis de tecnologies de la informació (14,4%) i les Activitats professionals i tècniques (disseny, fotografia).

(Ajuntament de Girona, 2015a, p. 8) “At Girona the creative industries by type are concentrated in Architecture and Engineer services (19,2%), Research and development (17,6%), Information technologies services (14,4%), and Professional and technical activities (design, photography)” (free translation)

More recently, Girona Emprèn has proposed that “(l)a cultura i la creativitat són motors econòmics del territori gironí”¹⁶ (2014). Also, the current City Hall has just presented a project where the cultural and creative industries are taken as “a motor econòmic de futur”¹⁷. The Mayor Mrs. Marta Madrenas said that the project will incorporate both the traditional and the new cultures, such as multimedia, videogames, and series. One of the actions previewed is the launching of the mark “Girona Crea”¹⁸. (Ajuntament de Girona, 2016a). This year the Provincial Government of Girona has applied for European Regional Development investment lines through 5 PECT, which stands for Specialization and Territorial Competitiveness Projects. One of them aims the cultural and creative sector, as follows:

¹⁵ “En el cas de l’afiliació al Règim General (...) les activitats creatives han augmentat els seus efectius en un 4,2% mentre el total d’afiliats s’ha reduït un 3,5%. (P)erò, la xifra és enganyosa donat que una part importantíssima de l’increment dels afiliats es produeix per l’augment de l’afiliació sota l’epígraf de Recerca i desenvolupament. Augment forçat per l’obligació, a partir de 2011, de regular la situació laboral i incloure en el RGSS les persones que participen en programes de formació vinculats a estudis universitaris o de FP (becaris)” (Ajuntament de Girona, 2015a, p. 9) “Regarding the affiliation to the General Regime (...) the creative activities have increased its workforce by 4.2%, while the total number of affiliations have decreased by 3.5%. (B)ut such data is misleading because a significant part of the increase in affiliations is due by the increase in the research and development category. Such increase was forced by the obligation, since 2011, to regulate the working situation (and to include it at the RGSS) of people participating in training programs linked to universities or in FP (scholarship holders).” (free translation)

¹⁶ “the culture and the creativity are the economic engines for the territory of Girona” (free translation)

¹⁷ “an economic engine for the future”. (free translation)

¹⁸ “Girona creates” (free translation)

Els àmbits, imports i objectius dels 5 PECT són els següents: (...) Indústries culturals i creatives de Girona i el seu entorn territorial. (...) Desenvolupament d'un projecte estratègic del sector de les indústries culturals i creatives amb l'objectiu que sigui un motor dinamitzador de l'activitat cultural del territori, una eina de coordinació i foment de les arts, que contribueixi a l'activació de l'economia i generi ocupació de qualitat. El projecte comporta: -Establir vincles entre disciplines i camps de treball, entre les empreses i centres de R+D+i, i crear xarxes de treball col•laboratiu. -Proporcionar espais i eines innovadores per facilitar la innovació i la competitivitat, i serveis especialitzats en les ICC. - Visibilitzar el sector, augmentar el públic consumidor de productes culturals, impulsar noves experiències de consum cultural, fomentar l'exhibició i estimular la demanda cultural. -Promocionar l'esperit emprenedor, situar el coneixement i la innovació com a eix prioritari per a la projecció del territori. - Establir vincles amb noves formes de mecenatge i patrocini, oferir sortides i crear oportunitats de treball en relació amb els estudis en arts de la ciutat de Girona i comarques.¹⁹ (Diputació de Girona, 2016)

One of the candidates who ran for Mayor in 2011, Pia Bosch, had the intent to transform Girona into Catalunya's Silicon Valley. At that time, Mrs. Bosch believed that "la ciutat té suficients atractius per convertir-se en un iman per al talent i sortir de la

¹⁹ "The scope, issues, and objectives of the 5 PECT are the following: (...) Cultural and creative industries of Girona and its surrounding territory. (...) Development of a strategic project for the sector of cultural and creative industries with the aim that it remains as a dynamical engine of the cultural activity in the territory, a tool of coordination and promotion of the arts, contributing to the activation of the economy and creating jobs with quality. The project entails: To establish links between disciplines and fields of work between companies and R&D centers and to create networks of collaborative work. -To provide spaces and innovative tools to facilitate innovation and competitiveness, and specialized services in the CCI. -To make the sector visible, increasing the public that consumes cultural products, to promote new experiences of cultural consumption, enhancing exhibitions and stimulating the cultural demand. -To promote entrepreneurship, placing knowledge and innovation as a priority for the projection of the territory. -To establish links with new forms of patronage and sponsorship, offering tours and creating job opportunities related to art studies about the city of Girona and counties." (free translation)

crisi recolzant-se en la innovació”²⁰ (Diari de Girona, 2011) In fact there are other examples that compare Girona with the Silicon Valley, such as: Mr. Salvador Sunyer wanted to convert Girona into de Silicon Valley of the Arts (Diari de Girona, 2013); Mr. Artur Mas, the former Provincial Governor, considered Catalunya as the world’s food industry Silicon Valley (Agencia INCAT, 2014); and Mr. Carles Puigdemont, now as Catalonia’s Governor, has seen potential for Catalunya both to compete and cooperate with the USA Silicon Valley (Aldia, 2016).

Girona has also tried some practical initiatives to exert the creative economy such as creative tourism (Ajuntament de Girona, 2014; Creative Tourism Girona, 2016); sports training hub for cycling (The Guardian, 2015) and also other sports such as running and tennis (Ajuntament de Girona, 2015); a supportive platform, training kits for creative professionals, and networking rounds to connect companies and local artists (Bòlit Emprèn, 2013); an international mapping festival, whose ambition is to “(s)trenghen Girona’s position as a creative city and encourage the transfer of knowledge between the technology and cultural sectors” (Ajuntament de Girona, 2014a, p. 3); an specialized neighborhood, Sant Narcís, a ‘cluster’ to ceramics, painting, design, fashion, and “qualsevol camp de les anomenades indústries creatives”²¹ (Sais, 2014, p. 23); a Gastronomic Week; a Film Festival; an annual Flowers Festival (Girona Temps de Flors); etc. Actually, Girona is proud to be known as the City of the Festivals (Ajuntament de Girona, 2016b).

The University of Girona and the Sci-Tech Park

The role played by universities in the creative economy was studied by Florida et alii (2006). The authors stated that the participation of universities goes through their

²⁰ “the city has enough attractiveness to convert itself into a magnet for talent and to recover from its crises thanks to innovation”. (free translation)

²¹ “almost any field of the so-called creative industries”. (free translation)

“ability to transfer research to industry, generate new inventions and patents, and spin-off its technology in the form of startup companies” (idem, p. 2). Starting with the 3T Florida’s theory, which puts talent, technology, and tolerance at the very heart of the creative economy such a study advances an University-Creativity Index (UCI) that “combines a measure of student concentration with the percent of a region’s workforce in the creative class.” (ibidem, p. 32). At the conclusion, it mentions that:

Our findings suggest that the role of the university goes far beyond the “engine of innovation” perspective. Universities contribute much more than simply pumping out commercial technology or generating startup companies. In fact, we believe that the university’s role in the first T, technology, while important, has been overemphasized to date, and that experts and policy-makers have somewhat neglected the university’s even more powerful roles in the two other Ts – in generating, attracting and mobilizing talent and in establishing a tolerant social climate. (...) But university invention does not necessarily translate into regional high-tech industry and economic growth. (...) In order to be an effective contributor to regional creativity, innovation and economic growth, the university must be integrated into the region’s broader creative ecosystem. On their own, there is only a limited amount that universities can do. In this sense, universities are necessary but insufficient conditions for regional innovation and growth. (Florida et alii, 2006, p. 35)

On the other hand, the role played by science and technology parks (STP) on the creative economy has been also researched. For instance, UNESCO has promoted an international workshop fully dedicated to the theme on 2013 at Korea, whose keynote lecturer stated: “In the creative economy, the main player leading sustainable economic

growth with job creation is science and technology parks (S&T Parks) in technopolises, making direct contributions to fostering national and regional competitiveness” (Oh, 2013, p. 8). In the words of Weddle (2013), “(c)all it what you will — a science park, a research park, a technology park, or a technopole. (They offer) a variety of support services to knowledge-based companies and (make) significant contributions to regional economies”. Notwithstanding, such a link between STP and the creative economy is not exempt of tensions or potential exclusion:

Creative industries enhance their potentialities for innovation, when they are embedded in networks of different enterprises, scientific institutions etc., which is often realized in Science and Technology Parks. (...) However, there are still shortcomings indicating a lack of economic expertise, for instance concerning the communication between creative industries executives and investors, the investment readiness, the deficient use of venture capital, and others, which are limiting the future potential of creative industries especially with regard to Science and Technology Parks. (...) However, in some German cities, like Munich, the positive role of Science and Technology Parks concerning their spatial and functional impact on the development of creative industries could be replaced by other factors, such as a vital urban structure within the inner city, characterized by a sound mixture of enterprises from different branches, which are spatially linked and therefore could benefit from networks, co-operation and mutual exchange. (Gruehn, 2014, p. 7-8)

The link between University of Girona (UdG) and the creative economy is generally done via its UNESCO Chair in Cultural Policies and Cooperation (www.catedraunesco.com) and its Campus Euromediterraneo de Turismo y Agua (e-

MTA). For example, both the honorary director and the director of the UNESCO Chair have been involved with such theme in some extent: Mr. Alfons Martinell is faculty in the Master on Creative Economy at University Rey Juan Carlos (www.mastereconomiacreativa.es), while Mrs. Gemma Carbó has “creative economy and cultural diversity” as a topic of her course “Artistic Projects as Socio-educative Resources” (3101G05046/2016). The UdG’s Institute for Research in Tourism, whose sixth line of research is “(c)reatividad, diversidad cultural y turismo”, has creative industries as one of its targets (Universitat de Girona, 2016). Another (in)direct tie may be provided through the UdG’s Science and Technology Park, ParcUdG.

With a name slightly different, the Scientific and Technological Park (www.parcudg.com) has as its objectives: the attraction, creation, and development of highly innovative companies; technology/knowledge-based spinoffs or startups; R&D intense entities to promote technologic transfer; innovation supportive structure; and the bridging and bonding promotion between such agents and the other ‘glocal’ players (ParcUdG, 2011, p. 5). As explained at the Catalonia’s STP Association website, the UdG’s Park “contributes to regenerating the business fabric through the creation of knowledge and technology based enterprises. In short, it is a park that combines support for the traditional economy with a commitment to the new economy.” (XPCAT, 2016). Generally speaking, the UdG’s STP has five specializations: food industry (e.g. meat), industrial technologies (e.g. machines, textiles, ceramics), biotechnology (medicine and food), TIC-Media (e.g. multimedia center, intelligent systems, tourism, cultural sector), and water (ParcUdG, 2011, p. 8).

Creative economy + Girona

The use of UdG's Library website to search for references that include simultaneously "creative economy" and Girona has returned no results whatsoever. Such search is not restricted to the Library's or UdG's database but is rather global. In theory, any existing book, report, paper, or else on the subject should appear here no matter whether publication location is inside or outside of Spain. Per contra, a search for the Spanish translation ("economía creativa" + Girona) has conferred two single returns. Both references are related to a congress held at UdG, although they were associated with a more general topic indeed – one for Catalonia (Ganau, Paül, Rierapp, 2012), other for Madrid (Michelini, Méndez del Valle, 2012). The search for "creative industry" (single and plural) and Girona was equally fruitless, with zero references returned. The same repeated to the Spanish variations: "industria creativa" + Girona, "industrias creativas" + Girona. This absence does not mean that Girona (city/province) has never appeared in the context of the creative economy/industry studies. This only indicates that none of those studies have either taken Girona as their main case object or used explicitly the concept of 'creative economy' and so perhaps employing different but analog concepts / expressions.

Despite the possibility to link both the University of Girona and the creative economy²², a search over the thesis database at www.tdx.cat (Catalonia's internet-based database for thesis) brings no result whatsoever for UdG. It seems as, at least at a doctoral level, there has been an absence of such subject on research. This also happens when one searches the whole database, meaning the expression "creative economy" seems to be also absent at the other provincial universities. However, when the search is

²² Since the creative economy also includes the cultural sectors and is a wider concept, this paper has no longer searched for the "cultural economy" or "cultural industry". Actually, sometimes the cultural sectors are taken as a metonymy for the creative economy – which is inaccurate.

done in Spanish²³, looking for “economía creativa”, three findings are presented. The first deal with the “Mediatic management of culture”, from the University of Múrcia (which is out of Catalonia). The second working with the 22@ Barcelona, a sci-tech hub at the provincial capital, from the Polytechnic University of Catalonia; and the third, approaching the informational development at Buenos Aires, from the Open University of Catalonia. None of them were carried out at an Economics department or at any Business School, and both theses were sustained at 2016. They were rather related to Education, Urbanism, and Sociology. Nonetheless, when one searches for “creative industry” instead, the database returns two references: the first, directly focused on the concentration of creatives industries in Europe (Serra, 2016), from the Autonomic University of Barcelona; and the second, analyzing the influence of culture over employees’ creativity (Torner, 2016), from the Ramon Llull University. Now both were done at an Economic department or Business School, having been equally sustained at 2016. Finally, the search for its Spanish version (“industria creativa”) shows 6 results out of which only two are really new. The first is about the post-media resistance for art and politics (Department of Design); and the second covers the Chinese Boxes (Department of Painting) – both from the University of Barcelona.

Critical analysis

Some authors have introduced analysis that may help to understand the current delay of Girona over the creative economy. For example, a study of the Cambra de Comerç de Girona (2010, p. 35) argues that the companies at Girona have both a smaller dimension and an average-or-lower technological intensity; that their resistance to innovation comes from a distrust of technology, a lack of better human capital, and

²³ The translation for the Catalan language is identical to the Spanish version, with the same results.

an aversion to cooperation. Moreover, Girona is found to lie behind on critical prerequisites to more dynamic economies, such as the number of patents application/granted and technology pervasiveness. For instance:

The opposite characteristic excels in Girona, province in the autonomous region Catalonia. Catalonia reaches nearly the same level of patent efforts, which is more than the double of Spain's patent applications per millions of habitants. The difference to the Basque example is the technologically poorer region of Girona. The assumption of the outsourcing of research and development centers from Barcelona to the adjacent province of Girona seems to be illusive. With only 25.397 patent applications per million inhabitants Girona maneuvers on the same comparatively low level like Spain does. (...) Girona reaches with only 68 index points the third position. Even though the expenditure on R&D is above Spanish national average for about 21%, it is the only strong technological indicator in the Catalan city. The weak point is the patent applications. Especially in the high-tech, bio-tech and ICT sector, Girona is not competitive. Most of the patent applications are coming from the human necessities or the transporting sector. This fact in combination with the research and development spending can suggest a still existing agricultural characteristic. (Ulrich, 2012, p. 51,52,59).

.....

El 5,0% dels treballadors afiliats a la Seguretat Social (SS) a Girona el juny de 2015 ho estan sota uns epígrafs d'activitat que, segons les definicions exposades anteriorment, es poden considerar dins el grup de les indústries creatives. Aquest percentatge és relativament baix si es compara amb

Barcelona, on el pes d'aquestes activitats representa l'11,6%. Al conjunt de Catalunya inclouen el 7,9% dels afiliats(.) El percentatge de Girona també és dels més baixos en relació a algunes de les ciutats catalanes de més de 70.000 habitants(.) (Ajuntament de Girona, 2015a, p. 6)²⁴

Also, the OECD (2010:57) shows how Girona, “with a more agricultural and lower-technology industries, (is) slightly below the Spanish average” regarding the productivity (GDP per worker in 2000 real prices). By their turn, Sellens, Chao, and Vilà (2013) have concluded that Girona lack of entrepreneurial capacity; has low educational and training stocks; lack of formal and collaborative innovation structures and practices; presents low ICT's uses; innovates weakly; lack of a strong local market (since the most competitive companies do export); has a competitive advantage very low due to costs; etc. Altogether, perhaps that explains why “the knowledge workers -as P. Drucker would call them- are more appeased to stay in Barcelona rather than living in Girona” (Ulrich, 2012, p. 27).

Experience Economy

Likewise the *cultural* industries, domains, sectors, and activities can be taken as components of the creative economy (Unesco, 2013, p. 22); the *creative* industries, domains, sectors, and activities may also be treated as elements of a larger concept – the experience economy. The experience economy is “closely [related] to the creative industries and culture by defining the core of the experience economy as industries that

²⁴ “5.0% of workers affiliated to the Social Security (SS) at Girona (June 2015) are under some label of activity that, according to the definitions set out above, may be considered within the group of the creative industries. This percentage is relatively low if compared to Barcelona, where the weight of these activities represented 11.6%. Catalonia as a whole includes 7.9% of such affiliates (.) The percentage of Girona is also one of the lowest in relation to some of the Catalan towns with more than 70,000 inhabitants.” (free translation)

offer experiences as their primary products” (Bille, 2012, p. 96). Rigorously speaking, creativity²⁵ is not a synonym nor a *sine-qua-non* condition for an “experience”.

Actually, there have been critics to the use of such an umbrella concept (i.e. creativity *and* experience) whenever conjugated with economy, as in creative economy *or* experience economy. In any case, this specific Scandinavian approach for the concept of ‘experience economy’, since it aggregates three streams in one, may be of interest to the case of Girona.

Reading the Danish and Scandinavian books and reports published about the experience economy, it becomes clear that the Scandinavian use of the concept of experience economy seems to have derived from a mix of three different approaches and theories. Firstly, is Pine and Gilmore’s book *The Experience Economy* (1999); secondly, the focus on creative industries in the United Kingdom with the first mappings of creative industries (DCMS 1998, 2001); and thirdly, Richard Florida’s book *The Rise of the Creative Class* (2002). These three approaches together seem to represent the core of the experience economy wave that has spread in Denmark and several other countries, particularly in the Scandinavia. Each of the three approaches has something to do with experiences and creativity, but otherwise, they have little in common. (Bille, 2012, p. 97)

Although Girona has been named a ‘creative city’, a ‘knowledge platform’, or a ‘creative economy hub’, the fact is that Girona remains still attached to a more traditional model of the economy despite thriving at services that are mainly intensive in

²⁵ “la creativitat no és un atribut de cap “sector” econòmic en particular, però sí que es poden definir uns sectors bàsicament creatius que es defineixen com a indústries creatives.” (Ajuntament de Girona, 2015a:3) “the creativity is not an attribute of any economic “sector” in particular, but you surely can define some sectors as basically creative that are defined as creative industries”. (free translation)

managerial competence²⁶. If one base itself over the KPMG's report, Girona seems to be better positioned at the *management* of activities that involve some level of knowledge / education / skills (e.g. healthcare and human capital supply), but not exactly at the core of the *creativity-based wealth creation*. Girona has been, then, a natural environment for managers²⁷ – and, although already functioning as a cultural reference for Catalonians, it needs more investments to become a competitive incubator for the creative class (whose activities are most akin to the trinomial 'Silicon Valley', 'Hollywood', and 'Ministry of Culture' – to put it simply). It is positive to recognize the local / regional vocation so to invest more appropriately the public funds, avoiding pitfalls and low-returns when dedicated to policy making / implementation.

Bille and Lorenzen (2008) have reached a tentative demarcation of the experience economy by defining three groups of experience industries by differentiating between creativity at the production side and experiences on the consumption side: (1) Creative experience industries (industries that have experience as the primary goal and where artistic creativity is essential to its production). For example, theater, music, visual arts, literature, film, computer games, etc. (2) Experience industries (industries that have experience as the primary goal, but where artistic creativity is not essential). For example, museums, libraries, cultural heritage sites, natural and green areas, restaurants, the pornography industry, spectator sports, etc. (3) Creative industries (industries where artistic creativity is essential but which do not have experience as a primary goal: they are not intended directly for the consumer

²⁶ The majority of the companies are small or medium, and family owned and managed: “at Girona's counties 82% of the companies are familiar” (El Gerió, 2015, free translation), or 80,9% (Guinjoan, Murillo, Pons; 2004, p. 22).

²⁷ (Cambra de Comerç de Girona, 2011; Puig, 2012).

market but instead provide services to business (B2B) which are built into or around mixed products). For example, design, architecture, advertising, etc. (Bille, 2012, p. 100)

Such Scandinavian approach is relevant because it “links the experience economy closely with cultural activities, and to the expectation of economic return and economic development” (idem, p. 93). Pivoted in its managerial competitive advantage²⁸, Girona may attract both Barcelona’s creative class, businesses, and companies; marketing itself as a good place to live, to raise children, to have companies hosted and managed (although the real market remaining in Barcelona), but mostly the perfect environment to have ‘experiences’ – personal, familiar, and corporate. Therefore, Girona recognizes that Barcelona is *hors concours* as a milieu to *creative economy generation*, and starts presenting itself also as an appealing support to the *experience economy management*. Such perspective is integrative (not excluding), putting Girona at the center of the creative economy: not exclusively to generate it, but to manage it as well.

²⁸ “La familia gironina es, y ha sido tradicionalmente, no sólo una unidad familiar (social), sino también, una unidad económica. Y por tanto, sus miembros tienen una clara y temprana formación y actividad administrativa y económica. Esto es debido a que: 1. La economía familiar ha sido clave en el desarrollo económico en Cataluña y Girona. 2. El turismo ha sido clave en desarrollo de España, Cataluña y Girona. Múltiples familias son, a su vez, pequeñas empresas hoteleras, restaurantes, bares. 3. La industria agro alimentaria es igualmente clave. Una parte importante de las familias tienen pequeñas explotaciones de producción agroalimentaria catalana. La idea es que, este contexto, evidencia la existencia de una gran tradición de las familias gironinas como unidades económicas encargadas de la administración y producción de bienes y servicios. Esto comporta que los integrantes de las familias gironinas han desarrollado capacidades y habilidades, que los hacen claramente competitivos a la hora de asumir la gestión de la economía creativa.” (J. G. E. Marulanda, personal communication, March 28th, 2017) “The gironin family is, and has traditionally been, not only a familial (social) unit, but also an economic unit. Therefore, its members have a clear and early formation on the administrative and economic activity. This is because: 1. Familial economy has been key to the economic development in Catalonia and Girona. 2. Tourism has been key to the development of Spain, Catalonia and Girona. Multiple families are small companies such as hotels, restaurants, bars. 3. The agro-food industry is equally key. An important part of the families has small farms linked to the Catalan agro-food production. In this context, it shows the existence of a great tradition of the gironin families as economic units in charge of the administration and production of goods and services. This means that the members of the gironin families have developed abilities and skills that make them clearly competitive when it comes to managing the creative economy.” (free translation)

Table 2. Three ways to create market value in the experience economy.

	Level of analysis	Primarily relevant to industries such as:
Focused value creation in the experience industries 'DCMS tradition'	Industries	Primarily commercial experience industries: <ul style="list-style-type: none"> • Photography • Computer games • Printed media • Music industry • Amusement parks • Restaurants • Pornography industry • Design • Architecture • Fashion • Advertising
Broad value creation 'in association with experience industries 'Pine and Gilmore tradition'	The individual company or the individual products or services	Mixed products Primarily B2B industries: <ul style="list-style-type: none"> • Design • Advertising
Experiences as urban and regional development 'Richard Florida and the creative class'	Geographical area	Location specific experiences as: <ul style="list-style-type: none"> • Theatres • Concerts • Events and festivals • Museums • Heritage sites • Natural and green spaces • Spectator sports

(Bille, 2012, p. 103)

Reverté et alii (2016) have applied the Richard Florida's theory to touristic cities from the Spanish Mediterranean system (see the following Fig. 1. 'Indicadores de creatividad'), where Girona is implied as a provincial capital. However, Girona was never named – neither as a city or as a province. But such indicators do form part of the experience economy. A list with several other indicators that could contribute to analyze the experience economy at Catalonia's cities is present by AQR-IREA (2007, p. 6-9).

Fig. 1. Indicadores de creatividad

Tipo	ID. Indicad.	Indicador	Antecedentes	Descripción proxy seleccionado	Fuente	Criterio
Tolerancia	TO.1	Homosexualidad	US_Florida (2004), Dublin_Murphy y Redmon (2009), Sweden_Ström y Nelson (2010), Spain_Pesquera <i>et al.</i> (2010)	Población con pareja del mismo sexo / total población	Censo INE 2011	Más mejor
	TO.2	Diversidad cultural	US_Florida (2004), Dublin_Murphy y Redmon (2009), Sweden_Ström y Nelson (2010), Spain_Pesquera <i>et al.</i> (2010), Sweden y UK_Clifton <i>et al.</i> (2012), The Nordics_Andersen <i>et al.</i> (2010),	Población nacida en el extranjero / total población	Censo INE 2011	Más mejor
	TO.3	Actividades artísticas	US_Florida (2004), Sweden_Ström y Nelson (2010), Spain_Pesquera <i>et al.</i> (2010), Sweden y UK_Clifton <i>et al.</i> (2012), The Nordics_Andersen <i>et al.</i> (2010)	Artistas, escritores y profesiones similares / población activa	Censo INE 2011	Más mejor
	TO.4	Diversidad de género en el empleo		Ratio de hombres/mujeres que ocupan cargos de dirección o gerencia	Censo INE 2011	Menos mejor
	TO.5	Parejas de hecho		Población que vive con pareja de hecho / total población	Censo INE 2011	Más mejor
	TO.6	Hogares monoparentales		Población que vive en hogares monoparentales / total población	Censo INE 2011	Más mejor
Tecnología	TE.1.	Innovación en patentes	US_Florida (2004), UE_Florida y Tinagli (2004), China_Li y Florida (2006), Sweden_Ström y Nelson (2010), Spain_Pesquera <i>et al.</i> (2010)	Patentes concedidas / total población	OEPM 2011	Más mejor
	TE.2.	Innovación en modelos de utilidad		Modelos de utilidad concedidos / total población	OEPM 2011	Más mejor
	TE.3.	Tecnología	Sweden y UK_Clifton <i>et al.</i> (2012), Sweden_Ström y Nelson (2010); The Nordics_Andersen <i>et al.</i> (2010); US_Florida (2004)	Población en actividades de alta y media-alta tecnología (no incluye I+D) / población activa	Censo INE 2011	Más mejor
	TE.4.	I+D	UE_Florida y Tinagli (2004), Spain_Pesquera <i>et al.</i> (2010), The Nordics_Andersen <i>et al.</i> (2010)	Población en actividades de I+D / población activa	Censo INE 2011	Más mejor
Talento	TA.1.	Capital humano (titulados universitarios)	US_Florida (2004), UE_Florida y Tinagli (2004), Sweden_Ström y Nelson (2010), Spain_Pesquera <i>et al.</i> (2010), Sweden y UK_Clifton <i>et al.</i> (2012), The Nordics_Andersen <i>et al.</i> (2010)	Población con estudios universitarios / total población	Censo INE 2011	Más mejor
	TA.2.	Doctores		Población con estudios de doctorado finalizados / población	Censo INE 2011	Más mejor
	TA.3.	Atracción de capital humano		Porcentaje de población extranjera llegada en los últimos 5 años con estudios superiores / total extranjeros	Censo INE 2011	Más mejor
	TA.4.	Emprendeduría		Emprendedores (empresarios y profesionales que emplean personal) / Población activa	Censo INE 2011	Más mejor
	TA.5.	Clase creativa	UE_Florida y Tinagli (2004), Spain_Pesquera <i>et al.</i> (2010), Sweden y UK_Clifton <i>et al.</i> (2012), The Nordics_Andersen <i>et al.</i> (2010)	Población en actividades de clase creativa (CNAE) / población activa	Censo INE 2011	Más mejor
	TA.6.	Atracción de clase creativa		Extranjeros creativos llegados a España en los últimos 5 años/extranjeros	Censo INE 2011	Más mejor

(Reverté et alii, 2016, p. 11-12)

Conclusion

Although creative sectors and industries exist in Girona, the academic and technical quantification / qualification of the phenomena are still to be done. Therefore, it is also necessary to invest in research and studies that approach the “creative economy of Girona” – a mandatory step to subsidize the public policy plans and actions. In such ground (relative absence of knowledge production in the field) Girona is with the majority since the attention is usually directed to the main cities such as London, Paris, New York, and Barcelona. Then, such absence is a transient condition rather than a structural problem and can be faced and fixed.

The finding that Girona is specialized in services intensive in managerial competencies may be conducive to a broader strategy. Instead of only investing in a more creative economy generation, also presenting itself as a potential partner for all the existing players in the experience economy (with a special focus on Barcelona) – a wider concept through the Scandinavian point of view. In sum, Girona has the vocation to become a management contractor servicing the cultural sectors, creative industries, creative class, and the whole experience economy even if the market may view them as being primarily located in Barcelona.

As soon as the policy-makers realize that Girona does have a competitive advantage in management, they can continue to pursue the vein of the ‘creative economy’, ‘knowledge economy’, ‘new economy’ – doing so centered on how to *better manage* such social project. For example, offering the city/province as a high-quality environment to live; close to the major hub for the creative economy (Province of Barcelona), but away enough to present lower levels of prices, traffic, pollution, violence, stress, etc.; emphasizing the benefits of raising family’s children in a smaller city; the proximity of mountain and beaches, plenty of bucolic places to visit in daily

escapades; etc. Thus, Girona could attract part of the creative class that works in Barcelona, not necessarily to relocate their businesses, but rather as to have them living here with their families – note that telework does part of the creative economy. Such managerial way to envisage Girona is realistic, given the local/regional competences and placement.

The ParcUdG could act accordingly to such vision as offering working stations so the executives/employees could work for their Barcelona's companies without commuting every day; opening for any person to use its premises to do business related to the experience economy, including the possibility to formalize such businesses through the Parc's legal entity (paying local taxes); developing a hosting system for remote-located CCI firms (e.g. a Barcelona's technology company that exists formally in, and effectively is run at Girona); receiving the University of Girona's students so they can be entrepreneurs also through the Parc's legal entity; creating an observatory for 'value generation' at the ParcUdG (in a more detailed way than APTE (2010, p. 7) did for Catalonia); cooperating with the cultural industry entities (such as Bòlit) as their managerial partner, in order to maximize their market potential; functioning as the local/regional observatory for the CCI; and so forth. Such managerial turning could also be an option to fight back the financial crisis in which the ParcUdG currently finds itself on (EuropaPress, 2016).

References

- Agencia INCAT (2014). "Podríamos decir que la cocina catalana es hoy el Silicon Valley de la cocina mundial". Retrieved from: <http://tinyurl.com/z4fpen4> Access: 26/12/2016
- Ajuntament de Barcelona. (2015) Barcelona em xifres 2015. Principals indicadors econòmics de l'àrea de Barcelona. <http://tinyurl.com/jfl85et> Retrieved from: Access: 12/03/2017
- Ajuntament de Girona (2016) Activitats econòmiques, per tipus. L'Observatori. Retrieved from: <http://tinyurl.com/grllhdk> Access: 28/12/2016.
- Ajuntament de Girona. (2016a) L'Ajuntament de Girona aposta per la indústria cultural i creativa com a motor econòmic de future. Retrieved from: <http://tinyurl.com/ht37kz9> Access: 26/12/2016.
- Ajuntament de Girona. (2016b) Girona Ciutat de Festivals. Retrieved from: <http://tinyurl.com/zzeuf44> Access: 29/12/2016
- Ajuntament de Girona. (2015) Girona, Destinació de Turisme Esportiu. Retrieved from: <http://tinyurl.com/zfpnkms> Access: 27/01/2017
- Ajuntament de Girona. (2015a) Indústries culturals i creatives a Girona. Àrea de Promoció i Ocupació, Observatori de l'Economia i l'Ocupació.
- Ajuntament de Girona. (2014) El turisme creatiu i industrial, a debat a 'A Girona Emprèn parlem de...'. Retrieved from: <http://tinyurl.com/gqco3z4> Access: 26/12/2016.
- Ajuntament de Girona. (2014a) Girona International Mapping Festival. Retrieved from: <http://tinyurl.com/zhrmaer> Access: 26/12/2016.
- Ajuntament de Girona (2011) Superar la crisi, la nostra prioritat. Pla de Govern 2011-2015. v: <http://tinyurl.com/h3qf64w> Access: 29/12/2016.
- Aldia. (2016) Puigdemont veu potencial TIC a Catalunya per competir i col·laborar amb Silicon Valley. Retrieved from: <http://tinyurl.com/hqdvurn> Access: 26/12/2016.
- APTE. (2010) Principales estadísticas de las actividades de los Parques Científicos y Tecnológicos en 2010. Campanillas, Málaga (Spain).
- AQR-IREA. (2007) Sistema d'indicadors estratègics de seguiment municipal: memòria final. Grup de Recerca AQR, Institut de Recerca em Economia Aplicada (IREA), Universitat de Barcelona.
- Area Metropolitana de Barcelona. (2011) Per Afrontar la Crisi: la metropoli de Barcelona. Anuari Metropolita de Barcelona, IERMB.
- Azqueta, C. (2014) Les empreses culturals en clau creativa. In: *DeCultura 11*, Desembre.
- Barcelona Treball. (2013) Indústries Culturals. Informe Sectorial 2013. Amb la col·laboració de: Associació Professional de la Gestió Cultural de Catalunya.
- Bille, T. (2012) The Scandinavian approach to the experience economy – does it make sense? *International Journal of Cultural Policy* 18(1), pp. 93-110.
- Bòlit Emprèn. (2013) Accions de suport a les arts visuals i a les indústries creatives de Girona i comarques. Memòria digital del projecte. Retrieved from: <http://tinyurl.com/haspgu9> Access: 26/12/2016.
- Cambra de Comerç de Girona. (2010) Girona 2010. Les comarques gironines davant el repte de la nova economia global. Girona, 2010.
- Cambra de Comerç de Girona (2011) *Cent anys d'economia a les Comarques Gironines*, Girona, 447p.
- IDESCAT. (2016) Macromagnituds i impostos. Retrieved from: <http://tinyurl.com/gwg3gwk> Access: 28/12/2016.

- Creative Tourism Girona. (2016) Què Fem. Retrieved from: <http://tinyurl.com/zy6jmcpc> Access: 26/12/2016.
- Diari de Girona. (2013) Sunyer explica com convertir Girona en el ‘Silicon Valley de les arts’ sense costos. Retrieved from: <http://tinyurl.com/jqj9gmo> Access: 26/12/2016.
- Diari de Girona. (2011) Bosch vol convertir Girona en el Silicon Valley de Catalunya. Retrieved from: <http://tinyurl.com/gmt9wrw> Access: 29/12/2016.
- Diputació de Girona. (2016) La Diputació presenta cinc PECT a la convocatòria dels FEDER de la Generalitat. Retrieved from: <http://tinyurl.com/hbyr7zm> Access: 27/12/2016.
- El Geriò, (2015) La meitat de les empreses familiars gironines no planifiquen el seu relleu generacional. Retrieved from: <http://tinyurl.com/j4uwu6m> Access: 12/03/2017
- EuropaPress. (2016) El Parc Científic i Tecnològic de la UdG pide un mes para renegociar su deuda. Retrieved from: <http://tinyurl.com/gv84qku> Access: 03/01/2017.
- EY. (2014) Creating growth. Measuring cultural and creative markets in the EU. Retrieved from: <http://tinyurl.com/j36hscz> Access: 02/01/2017.
- Florida, R.; Gates, G.; Knudsen, B; Stolarick, K. (2006) *The university and the creative economy*. Fairfax / Pittsburgh / Los Angeles: George Mason University / Carnegie Mellon / UCLA.
- Ganau, J.; Paül, D.; Rierapp, P. (2012) La distribución de la economía creativa y del conocimiento en catalunya. Dinámicas en los espacios metropolitanos y no metropolitanos. In: *Crisis económica e impactos territoriales - V Jornadas de Geografía Económica AGE*, Univ. de Girona 2012.
- Gausa, M. (2010) Catalunya: hiperterritoris / multiciutats / geourbanitats: nous models en xarxa. In: Fundació CatDem. *La Catalunya en Xarxa*. Catarroja: Editorial Afers.
- Generalitat de Catalunya. (2014) La DGCEC y los sectores culturales en Cataluña. Dirección general de creación y empresas culturales, Instituto Catalán de las Empresas Culturales.
- Generalitat de Catalunya. (2013) RIS3CAT – Anàlisi dels àmbits sectorials líders I de les capacitats en tecnologies facilitadores transversals. Barcelona.
- Girona Emprèn. (2014) Girona, municipi cooperatiu. Sessió d’ experiència de projectes culturals i creatius. Girona, 8 Juliol de 2014.
- Gruehn, D. (2014) Creative industries in germany – recent development and the role of science and technology parks. *World Technopolis Review* 3(1), pp.30-38.
- Guinjoan, M.; Murillo, C.; Pons, J. (2004) L’ empresa familiar a Catalunya – Quantificació i característiques. Generalitat de Catalunya / CIDEM.
- IERMB. (2012) Per afrontar la crisi: la metropoli de Barcelona. Anuari metropolita de Barcelona, Area Metropolitana de Barcelona, Bellaterra, Spain, 359p.
- KPMG. (2016) Girona 100, SA – Anàlisi del comptes de 2014 i projecció macroeconòmicai empresarial 2016. Girona, Spain.
- Méndez, R.; Michelini, J. J.; Prada, J.; Tébar, J. (2012) Economía creativa y desarrollo urbano en España: una aproximación a sus lógicas espaciales. *Eure* 38(113), pp. 5-32.
- Michelini, J. J.; Méndez del Valle, R. (2012) Economía y estrategias de promoción en la región metropolitana de Madrid. In: *Crisis económica e impactos territoriales - V Jornadas de Geografía Económica AGE*, Univ. de Girona 2012.

- OECD. (2010) Reviews of regional innovation: Catalonia, Spain. Retrieved from: <http://tinyurl.com/jujxntf> Access: 01/01/2017.
- Oh, D-S. (2013) R&BD 3.0: science and technology parks in the creative economy. In: UNESCO-WTA International Training Workshop. Daejeon, Korea, September 24-27th.
- Panal, G. G.; Yáñez, C. N. (2012) Industrias culturales en ciudades españolas. Un primer acercamiento. *Revista de Estudios Regionales* 94, pp. 71-103.
- ParcUdG. (2011) La contribución del Parc Científic i Tecnològic de la Universitat de Girona al Libro Verde. Retrieved from: <http://tinyurl.com/j8bm66v> Access: 30/12/2016.
- Perfil de la Ciutat. (2016) Girona. Retrieved from: <http://tinyurl.com/h5gy5kn> Access: 27/12/2016.
- Puig, O. (2012) Cap a una economia de serveis. *Revista de Girona* 274, p. 48-52.
- Reverté, F. G. et allí. (2016) La localización de la clase creativa en ciudades turísticas. Un análisis a escala local del sistema urbano Mediterráneo español. *Investigaciones Turísticas* 11, p. 1-29.
- Sais, C. (2014) Sant Narcís, el barri artístic. *Girona Cultura* 5. Retrieved from: <http://tinyurl.com/hgm86yy> Access: 26/12/2016
- Sellens, J. T.; Chao, A. D.; Vilà, M. P. C. (2013) L'Empresa gironina a l'economia del coneixement: noves fonts de productivitat i competitivitat? Observatori de Tecnologies de la Informació i la Comunicació de Girona (OTIC), Universitat de Girona.
- Serra, D. S. (2016) Determinants of the concentration of creative industries in Europe: a comparison between Spain, Italy, France, United Kingdom and Portugal. PhD thesis, Universitat Autònoma de Barcelona.
- The Guardian. (2015) Why Girona makes the perfect base for cyclist Dan Craven. Retrieved from: <http://tinyurl.com/hqkk7nm> Access: 29/12/2016.
- Torner, F. M. (2016) Employee creativity and culture. Evidence from an examination of culture's influence on perceived employee's creativity in Spanish organizations. PhD thesis, Universitat Ramon Llull.
- Triay, S. E. (2010) De fàbrica d'Espanya a motor d'Europa: la Catalunya creativa. In: Fundació CatDem. La Catalunya en Xarxa. Catarroja: Editorial Afers.
- Ulrich, P. (2012) Economic development and crosslinking of knowledge in the Pyrenees: a case study on structural change in a “technological triangle” based on the creativity theory by Richard Florida. Master Thesis, University of Frankfurt.
- Unesco. (2013) Creative economy report – widening local development pathways. Special Edition. Retrieved from: <http://tinyurl.com/ljufl28> Access: 12/01/2017
- Universitat de Girona. (2016) Campus Euromediterraneo de Turismo y Agua. Instituto de Investigación en Turismo. Retrieved from: <http://tinyurl.com/hsauhr6> Access: 27/12/2016.
- Vilà, P. C.; Pagès, J. L. (2008) Science and technology parks: creating new environments favourable to innovation. *Paradigmes* 0, May, 141-149.
- Weddle, R. (2013) All inclusive: how areas of innovation are challenging and changing the model for research and science parks. Site Selection Magazine, July.
- XPCAT. (2016) Parc Científic i Tecnològic de la Universitat de Girona. Retrieved from: <http://tinyurl.com/gw72lk5> Access: 30/12/2016.

Intercalary remarks V

Chapter 6 is about bringing persons back to economics, whose subject is defended as being to fix persons' needs (not as maximizing mathematical functions). The method here has a critical vein, for it sustains the abandonment of the Cartesian hyperplanes in the economic science. It is a logical sequence from Chapter 1, where the Sustainable Human Development was primarily focused on persons; and from Chapter 2, where the creative class was still composed of persons only. However, it contrasts with the Chapter 3, given over there machines are also introduced as a type of 'creative capital' or 'creative class'. Such utopian *hyperplaneless* economics would mean a return to the Political Economy, with communication and deliberation gaining prominence over math and stats. Finally, it sees economics rather as a social science – that must be equally attuned with the social sustainability, political sustainability, environmental sustainability, as well as with the economic growth. And that applies to Girona too, a city and a province with increasing interest into the creative economy.

Chapter 6

5.8.

Economy, economics, and sustainable human development: towards a ‘hyperplaneless economics’.

8. Nobre, G. F. (2017a) Economy, economics, and sustainable human development: towards a ‘hyperplaneless economics’. (accepted by APDR Congress 2017).

Economy, Economics, and Sustainable Human Development: towards a ‘hyperplaneless economics’.

Abstract

The paper contrasts the concepts of *economy* and *economics*, in order to approximate the ‘old economy’ with the sustainable human development. After defining economics as an artificial discourse, it claims that the ‘economy’ is rather person-centered, family-driven, and welfare-aimed. In order to show the limitation of economics, the article proposes to eliminate the Cartesian coordinates (x, y, z) from economics, naming it as “hyperplaneless economics”. Such theoretical exercise would, hypothetically, transform economics into political economy. Doing so, the concept of ‘economy’ exhibits convergences with the ‘sustainable human development’: it focuses on persons, the quality of their lives, the permanence of their family (*oikos*) through time, and the ways (*nomos*) they use to secure that.

Keywords: economy, economics, sustainable human development, Cartesian coordinates.

Resumen

El trabajo contrasta los conceptos de *economy* y *economics*, con el fin de aproximar la 'vieja economía' con el desarrollo humano sostenible. Después de definir *economics* como un discurso artificial, afirma que la economía (*economy*) está centrada en las personas, es impulsada por las familias, y sigue más dirigida para su bienestar. Para mostrar la limitación de la *economics*, el artículo propone eliminar las coordenadas cartesianas (x, y, z) de la técnica económica, nombrando a eso "economía sin hiperplanos". Tal ejercicio teórico podría, hipotéticamente, transformar la *economics* en economía política. De hecho, el concepto de "economía" exhibe convergencias con el de "desarrollo humano sostenible": se centra en las personas, en la calidad de sus vidas, en la permanencia de sus familias (*oikos*) a través del tiempo, y en las formas (*nomos*) que utilizan para asegurarse de eso.

Palabras-clave: economía, *economics*, desarrollo humano sostenible, coordenadas cartesianas.

1. Introduction

The utmost challenge for economists is bringing back persons to the center of their science. Such persons-centered science would favor beings over things and the social aspects over the technical ones. The better way to promote a return to the old economy (an apologia against the dictatorship of numbers, graphics, and tables) is suggesting an economics science without hyperplanes: i.e. a hyperplaneless economics. The hypothetical absence of the possibility for constituting variables able to be related, correlated, and drawn as hyperplanes, may sound radical to some – but it is a necessary exercise. This paper contrasts, then, economy and economics: the economy is seen as a sacred space (*oikos*) where the family rules (*nomos*); whereas economics is only an artificial discourse created to talk about the first. A charming artificial tool, indeed, but whose link with the real lives of real persons is unreasonably overestimated. Such a simple step would also bring the economists back to politics, where ideas are supposed to gain support by merit, not by authority. Thus, returning math to the department of mathematics, and data to the department of statistics, would leave economics with words only. This is a utopia, of course, but it highlights how such ‘political economy’ (PE) converges to the concept of ‘sustainable human development’ (SHD). In theory, both would lack from undisputable hard-data and undeniable measurements, but in practice, both do elect persons and their families as the lords to be served by the institutions (e.g. governments, markets, universities). From the current economics’ point of view, PE and SHD are unsatisfactory sciences; but again, in practice, they are both humanly sensitive and environmentally necessary.

2. Back to the *oikonomia*

“The economy are persons”²⁹ says Triodos Bank. “Economics became mathematics” said once Dr. Magno de Carvalho, an emeritus professor at Federal University of Minas Gerais, Brazil. From both statements, one can note: economy and economics are diverse things, and persons should not be treated as numbers. First, economy is what happens in the real world with real persons; whereas economics is only a set of technical approaches (theoretical and applied) that try to understand, explain, model, and shape the former. Second, mathematics and statistics are artificial tools created by persons to serve them, never the opposite.

Perhaps the central point here shall be stated as: persons and institutions are different, and the former exists by and for the later. This simple truth will put institutions (such as economics, mathematics, statistics, governments, parties, banks, companies, market, public sphere, media, etc.) to serve persons, never the contrary. It is worth to mention that even the word “people” has been avoided to replace “persons”, since it has also evolved as to an institution: when one says persons, that means identifiable human beings such as fathers, mothers, brothers, sisters, and children; but when one says people, the collective dilutes any singularity, any individuality, and the human beings on themselves may disappear.

That said, it is possible to argue that “growth” belongs to the economics, and that the idea of “development” belongs instead to the economy. Following this reasoning, “economic growth” would be a pleonasm while the expression “economic development” would be an oxymoron – because development is rather linked to the economy. Consequently, it will be more appropriate to use “economy development” instead, so to remember the ‘persons’ factor. Of course, the language is tricky: both words and meanings can be (and generally are) applied to things (economics) and beings (economy). To complicate even more, the word “economic” is taken as coming from both of them, indistinctly. Nonetheless, for didactical sake they will be kept separated here. But before advancing any longer, it would be useful to understand the word “economy”, its etymology.

The word “Oikonomia” comes from “Oikos” and “nemein.” The root of the verb “νέμειν (nemein)” is nem (νεμ-) and the verb “nemein” which very frequently appears in Homer means “to deal out, to dispense.” (...) According to J.J. Rousseau (1712–1778), the second word means decreeing of rules legislation: “The word economy comes from οἶκος, house, and from νόμος, law, and denotes ordinarily nothing but the wise and legitimate government of the house for the common benefit of the whole family. The meaning of the term has later been extended to the government of the great family which is the state.” This term means Household Management – the ordering, administration, and care of domestic affairs within a household; husbandry which implies thrift, orderly arrangement, and frugality, and is, in a word, “economical.” Here, in the primary sense of the root, *oikonomos* (οικονόμος) means house manager, housekeeper, or house steward; *oikonomein* (οικονομεῖν) means “to manage a household” or “do household duties,” and *oikonomia* (οικονομία) refers to the task or art or science of household management. According to Aristotle, the second word has the meaning of arrangement, and consequently, their harmonization for their better result (...). (Baloglou, 2012, p. 11)

In the very beginning, economy was supposed to mean “domestic economy”: the activities performed (nomos) by the head of the family to benefit all the members of that house (oikos). Actually, *oikos* is also the Greek word for family: “Let these words be compared with those which we are accustomed to translate by family — the Latin familia, the Greek οἶκος (*oikos*)” (Coulanges, 2001, p. 87). Even in such private sphere, there is an identifiable person who is responsible to provide the welfare to the other persons – that constitute the public for the common good. But “public” here is not a transcendent concept or a depersonalized institution: the public is simply another way to refer to the mother, to the children, to the grandparents, and so on; all of them are persons with faces, names, identities, and individualities. Is a different way to say *us* and *our*. At this point, economics was identical to management.

²⁹ “La economía son personas”. (www.triodos.es/es/conozca-triodos-bank/la-economia-son-personas/)

But in the moment that families multiply in order to serve themselves from the same resources (when the boundaries of the private *oikos* start to collide), the *nomos* had to evolve from a family's set of behaviors based on tradition and good sense to a supra-personal body of regulation (laws) based on technical models. Some phenomena deserve to be mentioned: first, the *oikos* suffers a metamorphosis from the private to the public sphere, and now the house is the whole country, society, community; second, the ruler is no longer the head of the family, the house manager or the father, now is an authority alien to the family; third, the management is no longer based on personal intelligence, ability, skills, wisdom, or wit, but emanates rather from political dispute (which includes the election of the 'right' technical discourse and tools); and fourth and perhaps the most important, the real person is no longer the unit of analysis (but instead the taxpayers, citizens, consumers, electors, workers etc. – collectivizant general terms) nor each person's state and condition are the touchstones to decide (now there is preference for aggregate data, statistics, graphics, and so forth – words, numbers, tables, formulae, models).

In short: persons got off, institutions got in. Moreover, the terms that once gave sense to real persons living together (like family, house, welfare, etc.) were corrupted to apply to never before imagined structures such as: the country as the 'real person's house', the society as the 'real person's family', the State authority as the 'real person's ruler', the legal regulation as the 'real person's management guide', politician/technician speeches as the 'real person's welfare touchstone'. That said, the nowadays challenge is, therefore, to rescue the original³⁰ *oikos* and *nomos*, empowering persons and their families. It is time to come back to the economy in a way to make sure that all families have a house, all families have a head of the family, that all persons of such families will attain welfare. This is the spirit of the economy (not economics) and of the development (not growth). This is the spirit of the *oikonomia*.

3. Back to the *oikonomos*

The "term 'oikonomia' does no longer have a lexicographic identity and has been transferred to the Economics of the Polis" (Baloglou, 2012, p. 23). At some point in history the economy started to be seen as the *quantum* is produced and traded in a period of time at a delimited lieu (city, country, kingdom); accounting first for the material inputs and finished products, but later for anything that was able to be commercialized (e.g. services). According to this view, the economy could be measured through the amount of resources mobilized, but mostly by the sums of the changing hands' money. Such a way to define the economy uses a metaphor³¹ and a metonym at once: a metaphor when 'translates' persons³² to resources and resources to money, and a metonym when 'simplifies' the *oikos* into the market and the *nomos* into its practices (e.g. the prices set by supply and demand). Then, an economic growth here is simply an increase in the measured quantities. Persons and houses became assumptions in theoretical models that deal exclusively with variables and formulae.

In principle, there is nothing wrong with the production, trade, and money. Actually, they are as inevitable as necessary. But the original definition of economy is attached to persons and families and their houses and welfare. Therefore, if anybody wants to talk about economy in its original sense then s/he might want to rethink some statements usually taken for granted. S/he should be preoccupied on how to bring persons again to the center of the *oikonomia*, and how to make sure that every family has a house and attain welfare. A first step would be to admit that: a person shall always prevail over any institution, but no person can prevail over another person.

³⁰ There is no 'lost golden age' nostalgia. The expression 'old economy' is used to rather fight the technical mystification in economics.

³¹ According to McCloskey (1983), "Economics is heavily metaphorical" (p. 502) and "Even Mathematical Reasoning is Metaphorical" (p. 505).

³² Actually all that exists and can potentially enter the market, such as animals, plants, lands, etc.

Philosophy and science have been harming persons and families whenever privileging institutions over them. Here some examples: the *oikonomia* is concerned for “the efficient management of both material and human resources” (Baloglou, 2012, p. 14); Aristotle supported that the “political community (had) absolute priority over any person” (Baloglou, 2012, p. 15); that the “difference between the Oikos and the Polis lies in their size” (Baloglou, 2012, p. 20); that “improving human skill (means) nothing less than increasing the efficiency of production” (Baloglou, 2012, p. 21); that the economy can be restricted to “the management of the Polis finances” (Baloglou, 2012, p. 21); that the economy is the “general handling of political affairs in a polis or region” (Baloglou, 2012, p. 25); that “the wise man (...) is the best economist” (Baloglou, 2012, p. 34); and that “human wants, desire and needs are endless” (Dwivedi, 2012, p. 4).

These few examples clearly allege that, for instance, persons are resources to be managed, politics and polis are more important than persons, persons’ houses and homes can be confused with the polis, human skills exist to serve the market, finances summarize the persons’ lives, politics drives the economy, persons should let technicians to manage their affairs, and, a crucial issue, that persons have unlimited needs. In the minute one accepts that real persons should submit themselves to an institution (rationality, politics, polis, market, money, government, and science, respectively – but also market laws, efficiency, maximization, Congress, policy, etc.), does not matter how appealing and convincing the arguments can be, the original meaning of economy is lost.

Institutions are indeed useful and pertinent and must be kept, but should never obliterate persons. The institutions shall serve the persons, not the other way around. Even simple doubtful statements can have a huge impact on persons’ lives. For example, the explicit idea that the human needs are endless, and the (sometimes implicit) idea that scarcity is evenly distributed. They are doubtful because: first, what may be endless are subjective wants, but objective needs can be satisfied (like food to the hungry, water to the thirsty, shelter to the homeless); and, second, the real problem is not that scarcity exists, but rather how politics distributes it along society. The idea that everybody has the same budget and then the most fit *oikonomos* will win the market game is tricky: the access to the limited resources are granted by politics either directly (concessions, public-private partnerships, privatizations, etc.) or indirectly (grants, line of credits, bills, tax exemptions, etc.).

Also are doubtful the idea that one person can prove to have a better *nomos* than the other and, therefore, that is defensible one person becoming expropriate from her/his *oikos* – as a consequence of the competition or as a result of the game. The fact that persons are different in skills, experience, wisdom, intelligence, and education does not mean any superiority from one person to another; and even a less notable *oikonomos* shall keep her/his *oikos*, family, house, and domain – nobody else having the right to interfere on this, no matter the argument. The idea that a better manager has the right to expand her/his domain at the expenses of the other persons’ domains lacks the public spirit and goes against the original meaning of economy.

Hence, in order to bring back the original *oikonomia* is necessary to assign every person an *oikos*, and in order to bring back the original *oikonomos* is mandatory to recognize that every person is different and has a diverse way of managing the house; so each *nomos* must be respected, protected (from institutions and expropriation), and also supported (so the members of the family can attain welfare).

4. Economy versus Economics

As a field of study that was initially based at the original economy, economics became concerned with wealth, welfare, scarcity, and growth (Mazumdar and Mitra, 2011, p. 2). In the beginning, the intent was to understand and help to improve the activities performed (*nomos*) by the responsible for the *oikos* (chief of the house first, manager of the polis or company later)

whenever facing and seeking to remedy the everyday needs. Such activities included “acquiring, guarding, using, and arranging in proper order” (Baloglou, 2012, p. 27) the resources needed by the estate (such as commodities, labor, and time), so as to preserve and augment it (idem, p. 14). Aristotle has used “the word “*chrematistic*” to convey (...) the natural art of acquisition”, that according to some commentators “often means money” – important in exchanges (ibidem, p. 16).

Thus, economics was supposed to look after the persons’ problems, helping them to deal and fix those problems. But for some reasons economics became disconnected from the real persons and got stuck to its own technical discourse: a panoply of data, variables, models, theoretical approaches, reports, formulae, and so forth; that sometimes do refer to persons, but mostly as a conceptual category. Not even when ‘economics’ allegedly addresses real persons in a direct manner, like in meetings between public policy-makers and poverty persons, it does not appear to convince the later that their problems are to be solved. To put it simply: economy is how real persons live their lives (despite what is told about it by scientists, researchers, or policy-makers), whereas economics is what is thought and said about real persons’ lives. Economics is about theoretical or applied experiments, usually said or written, but economy is about persons living real lives.

At the old economy system, the power was with the responsible for the estate (a real person), whereas at economics the power was somehow transferred to the institutions (science, technology, State, government, ministry, authorities, market, corporations, etc.). Actually, economics became a potential weapon that may be used against persons: rationalizing and justifying (not fixing) their problems, promising and failing to deliver effective solutions. Rich words (spread at the public spheres), poor results (at everyone’s private sphere or *oikos*). Economics is reputable to enhance performances, but the question is “where and with which consequences”? The reported high level of income concentration³³ in every corner of the world is not really the problem, since it is only one of the visible consequences of the main issue – persons weakening. Once more, economy was really about persons empowering.

At the old economy system the persons had power yet, unfortunately, contemporary economics is not here to empower persons – but rather the institutions. That is why the economy is more important than economics to this paper. That explains why the subtitle of this section contrasts both as if they were contradicting each other – what indeed happens. The economy is about persons and the power they effectively have to manage their *oikos*, and the power of such management (*nomos*) to effectively satisfy the families’ needs. Otherwise, economics is about the power of the tools it uses to justify its role as a scientific field at the technical speeches’ market, and is more preoccupied with the efficiency (of the processes, of the means) than with the efficacy (of the policies over the persons’ lives, the real accomplishment of their ends). Again, economy is about identifiable persons, whereas economics is about categorical modeling. The former is supposed to teach management to live better and longer; the later thrives through the textbooks, whiteboards, and computers.

Of course, there is nothing wrong with economics in itself. All and every field of knowledge has value and must be promoted. Actually, the trouble comes from the believing that persons ought to ‘adapt’ (submit) themselves to the “natural laws” emanating from economics. The version that presents the economics’ statements as superior in ‘truth’ because based on statistics and mathematics³⁴, including maxims such as “the agents are rational” and “the laws of the market”

³³ Way before Thomas Piketty, in “the second half of the fourth century AD, the Eastern Christian Fathers developed some interesting economic ideas and suggestions, (...) the majority of which focused on solving the problem of the extreme maldistribution of wealth.” (Baloglou, 2012, p. 52-53)

³⁴ “The kind of mathematics used in economics is typically that of the Department of Mathematics, not that of the departments of Physics or of Engineering. It is existence-theorem, *qualitative* mathematics. It is of no use for science. (The) kind of statistics used in economics is that of Department of Statistics, which

and “the economic aggregates” (to mention a few), intentionally or not contribute to erode the power of persons. As McCloskey has once put it: “objectivity of economics is overstated and, what is more important, overrated” (1983, p. 508), and “All the conversational devices of economics, whether words or numbers, may be viewed as figures of speech” (1988, p. 13). The problem starts when real persons lose for artificial ‘truths’.

But even the ancients were conscious about the positive and negative potentialities of the economy. Here some examples: the ‘economic thought’ of Hesiodo dealt on “how to adjust wants to the resources available”³⁵ (not to leave them unlimited nor to seek for the endless resources’ multiplication) (Baloglou, 2012, p. 11); Plato used the term ‘*chrematistike*’ as the science “that relieves people from poverty” (idem, p. 17); Creon has shown an “ethical aversion (for) the excessive wealth” (ibidem, p. 18); Aristotle said that the acquisition of money is “unrelated to the satisfaction of needs” (ibidem, p. 19); Aristotle, Hypereides, and Demosthenes proposed a “redistribution of wealth inside the polis between the citizens” (ibidem, p. 22); Dichaearchus of Messana brought the idea that “the introduction of private property was the cause for the arising of hate and strife among the citizens” (ibidem, p. 26); Stoics knew that “the value of things (was dependent) on the possibility of their right use” (ibidem, p. 34); and Cicero registered Antipater saying about trade that “it is duty to consider the interest of your fellow-men and to serve society” (ibidem, p. 34).

5. Democratizing scarcity

Does economy necessarily need mathematics³⁶ and statistics³⁷ to be considered reliable, effective, and true? Some say that Keynes, for instance, “did not apply mathematics to describe individual economic conduct” since he had “doubt that calculus can capture the essence of human decisions” (Hamouda, 1994, p. 563); or that “Hicks relegates the mathematics to appendices (whereas) Keynes did not want to use mathematics at all, though he was most knowledgeable in (it)” (Puu, 2009, p.83). Of course, the point is not the use (or not) of numbers and complex models – the issue rests rather on empowering such ‘artificial institutions’ at the expenses of the real persons. The danger is in believing that (technical / political) authorities will know better than you how to manage your *oikos*; going beyond that, on allowing them to interfere (direct or indirectly) over the real persons’ *oikos* and *nomos*.

Whenever external institutions and agents can impose their *nomos* as mainstream and are granted (legal, technical, and material) access so to dispose from the other persons’ *oikos*, in this very moment initiates the debacle of the economy – and is imperative to say that economics has been playing a part in such movement. It is fundamental to remember that the original meaning of economy implicated the coexistence of a wide range of diverse *nomos*, no one more valuable than the other and that all and each *oikos* was sacred and untouchable – since it was concomitantly family and property. As put by Coulanges (2001): “This old tradition shows how sacred (familiar) property had become; for the immovable Terminus signified nothing less than inviolable property” (p. 54), given the *oikos* “is not simply the property of a man, but of a family” (p. 55). Therefore, such a way of seeing economy puts a limit on what can be done with the real persons’ *oikos*.

is *also* a species of “existence theorems.” (...). But this, too, is of no use for science”. (McCloskey, 2005, p. 86)

³⁵ According to Diogenes Laertios, Epicurus believed that “real wealth is only gained by (the) limitations of wants” (Baloglou, 2012, p. 31).

³⁶ “Economics, in other words, is not a Science in the way we came to understand that word in high school. But neither, really, are other sciences. Economists can relax. Other sciences, even the other mathematical sciences, are rhetorical.” (McCloskey, 1998, p. 164-165).

³⁷ “Statistics is rhetorical. That is to say, it depends on a conversation, an agreement among human beings about what they are going to take seriously. It is not immanent in nature.” (McCloskey, 1987, p. 487)

The idea that competition will determine who had the superior *nomos*, with the most fit being prized with the whatever share of the other persons' *oikos* s/he was able to acquire, is misleading in many levels. This is how economics works, quite different from the spirit of the economy. Although economics speaks often about the concept of scarcity, the fact is that scarcity (not wealth only) should be more evenly democratized. For example, establishing an inalienable maximum *per capita* quota for the use of the available resources in a country (inputs and throughputs); or setting an inalienable maximum *per capita* quota on what can be 'environmentalized' (outputs such as products or waste) – both equally applicable also to legal entities (companies, parties, NGOs, etc.). Another way to democratize scarcity is to ascribe limits to what is available: for instance, no person's *oikos* can never be put available to others. Finally, it would be useful to limit to zero the impersonalization of the legal entities³⁸, e.g. perhaps assigning somebody from the board to respond to potential corporate problems as a personal matter.

In the extreme, the planet's resources are limited, as well as the resources of the countries, states, provinces, cities, neighborhoods, etc. From a person's point of view, the lifetime is finite. With the technology already at hand, the challenge is not fighting the scarcity anymore; the conundrum lies rather on how to enforce scarcity more efficiently and effectively – doing so in a more democratic and equitable way. In order to rethink the existence and role of the economy in a manner to make it sustainable, the persons' *oikos* must be recovered and secured, and everybody *nomos* empowered and respected. This is a matter for politics, not for economics. Only politics can empower the economy (real persons) instead of the economics (artificial institutions).

6. Economics it is

To economics the world is an endless space to be conquered by the most fit – who only has to find out how to contour the restrictions spread along the way. Therefore, restrictions such as budget, technology, resources availability, legal regulations, social unwillingness, etc., are taken as surmountable obstacles; sometimes as provoking challenges, that are seen to be there with the sole purpose of to ignite a competition for the best 'solution' – to be brought by the fittest peer amid the group, and who is supposed to be rewarded above all. Such an approach promotes adversariness through persons and antagonism towards the (natural, social, and political) environment, which may trigger collateral effects – some that are partially unexpected, unwanted, inconvenient, and even counterproductive. Whenever such collateral effects appear, it would suffice (according to economics) to add them as new 'restrictions' to be contoured – what is named internalizing the externalities.

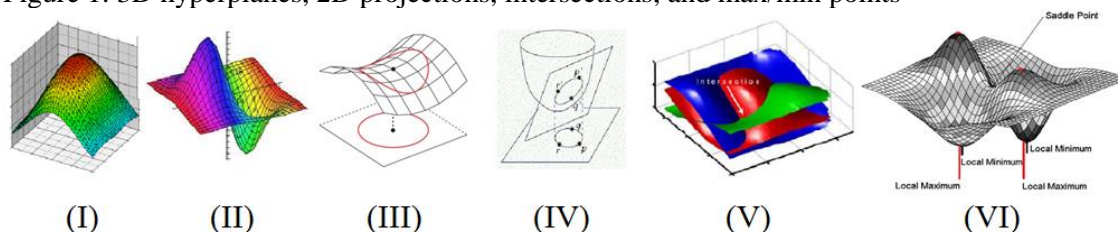
That said, economics became focused in war-like problems-solving that are dressed both as sports contests (e.g. winner *versus* loser, first takes all, etc.) and as the exercise of civil rights (e.g. free expression, free initiative, free movements, etc.). The metaphor of war-like problems-solving is quite useful because it highlights the urgency of the current dealings, as there could be no Tomorrow whatsoever: persons against persons fighting for the 'right' to prevail 'now', jammed in a time-loop. Such crusade grants itself with a free-ticked to mobilize whatever resources are needed to do so: it looks like a race against time to gather and organize equipment, weapons, personnel, stocks, tactics, and strategies. The metaphor is also appealing because the utmost goal of a war is generally achieved at the expenses of the others: persons and environments. As well as 'to defend' yourself is seen as a 'natural right' whose practice may bring liberty, honor, and social esteem; in short, as an unavoidable necessity and a promising duty.

Based on this, economics was designed to combat while chasing for victory and to serve the most fit – accepting 'casualties' as occupational hazards. Its morality can be better understood

³⁸ Companies are allowed but only persons should be entitled with legal personality and responsibility.

by the techniques it uses: economics textbooks work generally with hyperplanes depicted from Cartesian coordinates such as (x, y, z) – e.g. for three dimensions (see Figure 1). The idea is quite simple: anything can be treated as a variable (persons, beings, commodities, time, etc.); any variable may be related to another variable and then put together so to draw a hyperplane (e.g. in a format of a hill or a valley – see drawings I and II); variables are “numbers to be” and exist to align themselves with the already given numbers at the equations (which enacts as ‘restrictions’); hyperplanes represent the surface of the possibilities, and the intersection between hyperplanes restricts, even more, the set of such possibilities (see drawings IV and V); after cutting off a subset from the intersected hyperplanes, the goal is to find a dot on it (to represent a maximum or a minimum) – see drawings III, IV, and VI. Oh, and such hyperplanes may be treated either as a photo (static picture) or as a movie (ever-changing motion pictures). Economics do work with 3D hyperplanes (x, y, z) , but mostly it zeroes one of the axes (freely gyrating the remaining) in order to work with 2D hyperplanes such as (x, y) , or (x, z) , or (y, z) – named graphics.

Figure 1: 3D hyperplanes, 2D projections, intersections, and max/min points



What is seen on those economics textbooks is an introductory discussion about the ‘real world’ and what on it is worthy to mention (issues, needs, restrictions), advancing long enough to propose ‘translating’ all of them into variables that might be related to each other and, when taken together, to be presented as hyperplanes and so on and on. There have been some critics to this approach, such as for instance: persons and beings should never be treated as numbers or variables; persons and environments should never be thought as ‘independent variables’ to be submitted to the ‘formalities of the equation’ – having to adjust to a fixed number (a constant eventually named ‘budget’); equations are not the reality, they are just a way to draw hyperplanes; even nonsense variables (e.g. unicorns and their correlation to dragons in a set of fairytales books) can generate hyperplanes as valid as any other; mathematics should not be allowed to determine interferences at a person’s *oikos* and *nomos*; mathematics and statistics may be used rather *with* things (e.g. bridges, buildings, satellites) but never *against* persons, beings, environments; science and technology should be put at the services of persons and planet, not the opposite.

If economics³⁹ had not gained the power that once pertained to families at their *oikos*, it could be left away without further considerations. But since it has been used in ways that harm families and planet, something should be done for sure. To put it clear: it is time to come back to the economy as it was politically shaped before. As a matter of public policy, current economics must be dismissed – as well as the persons that are responsible for making it pervasive in society. There is no problem to keep advancing economics as a field of study if restricted to the theoretical level only – unless it could evolve in order to finally and really empower persons and engender truly applied environmental sustainability. Of course, the rhetorics of economics do include the public goods, the public welfare, the public sphere, the public interest, and so forth; but, again, just in an extent to come back to the hyperplanes. In theory, the society goes fine; in practice, persons and planet do not.

³⁹ “The conversations of the Classics’ studiers or astronomers rarely impact the other people lives. This is not the case for economists, who do it in a large scale”. (Rêgo, 1998, p. 368) *Free translation*.

The war-like problems-solving economics is essentially detrimental, what has been sometimes called a zero-sum game: in order one can gain, the other has to lose. But even such denomination is misleading because it is not a game nor mathematics has nothing to say about it. The economy is about persons, real persons; it is about their *oikos* and the power they have to manage and live it. The economy does not talk about competition but instead about coexistent living; does not treat persons as means but instead as the lords of the means; does not focus in the management itself but instead in the impact it may cause on persons and environments; does not circumscribe time to Today's but instead extends it to the next generations of the family; does not seek for winning anything from anybody but instead aim to keep (not conquer) the right to an autonomous decent life; does not presuppose infinite non-satisfaction but rather perfectly achievable contentedness. In short, the real economy has been absent from economics – and it is unsure if both can ever meet.

7. Sustainable Human Development (SHD)

Persons are at the very heart of the Human Development definition. As put by the United Nations, “People are the real wealth of a nation. The basic objective of development is to create an enabling environment for people to enjoy long, healthy and creative lives.” (UNDP, 1990, p. 9) However, the daily life is usually driven by money considerations, in a buy-and-sell succession of events; whose aggregated and accumulated registers are often known as economic growth. Under such reality, persons are treated both as productive resources and market inputs, in a clear affront to the concept of human development – which is “much broader than the conventional theories of economic development.” (UNDP, 1995, p. 11) The latter deals mostly with the production, whereas the former is dedicated to enhancing the quality of human lives. Such simple yet meaningful statement decrees the difference: “Human development is the end - economic growth a means”. (UNDP, 1996, p. 1)

Thus stated, human development has three components: • Well-being: expanding people’s real freedoms—so that people can flourish. • Empowerment and agency: enabling people and groups to act—to drive valuable outcomes. • Justice: expanding equity, sustaining outcomes over time and respecting human rights and other goals of society. (UNDP, 2010, p. 22-23)

.....
Four critical areas fundamentally important to achieving human development are highlighted in this section: environmental crises, especially climate change; poverty; the global crisis in employment and the need for decent work; and growing inequalities. These areas represent specific challenges that -while not brand new per se- have grown in prominence in recent years, or changed in nature. (UNDP, 2013, p. 7)

Opposite to what one may think, the human development is not antigrowth, nor lacks of hard economic analysis (UNDP, 1995, p. 122-124). In fact, they are both interdependent and intertwined. Therefore, it is “wrong to suggest that economic growth is unnecessary for human development. (Actually, economic) growth is essential for human development” (idem, p. 122). Conversely, economic growth is concerned with the quantities of things, whereas the human development is rather occupied with the quality of beings. The main challenge seems to lie, then, on how both can syntonize, converge, and eventually merge in a coherent (indeed not exempt of internal tension or conflict) wholeness. Here some examples of such tension and conflict: “technical considerations (have) obscured the fact that the primary objective of development is to benefit people” (UNDP, 1990, p. 9); this “simple but powerful truth (the real wealth of a nation is its people) is too often forgotten in the pursuit of material and financial wealth” (UNDP, 1995, p. 11); the “purpose of growth should be to enrich people's lives. But far too often it does not” (UNDP, 1996, p. 1); and the “simple truth is that there is no automatic link between income growth and human progress” (UNDP, 1990, p. 10). To make it explicit: “there is no automatic link between growth and human development” (UNDP, 1996, p. 1). In spite of that, the endeavor is really to create and ensure such links.

A desirable link can be created between economic growth and human development in four ways: First, emphasis on investment in the education, health and skills of people can enable them to participate in growth and to share its benefits, principally through remunerative employment. (...) Second, more equitable distribution of income and assets is critical for a close link between economic growth and human development. Wherever the distribution of income and assets is very uneven (...) high GNP growth rates have failed to translate into people's lives. Third, some countries have significantly improved human development even without good growth or good income distribution. They have achieved this through well-structured social expenditures by government. (...) Fourth, empowering people (...) is a sure way to link growth and human development. If people can exercise their choices in the political, social and economic spheres, there is a good prospect that growth will be strong, democratic, participatory and durable. (UNDP, 1995, p. 123)

.....

Some of the most important issues determining how growth contributes to human development: • Equity -The more equally GNP and economic opportunities are distributed, the more likely that they will be translated into improved human well-being. • Job opportunities -Economic growth is translated into people's lives when they are offered productive and well-paid work. (...) • Access to productive assets -Many people find their economic opportunities stifled by a lack of access to productive assets. (...) • Social spending -Governments and communities can greatly influence human development by channelling a major part of public revenue into (...) basic social services for all. • Gender equality -Fairer opportunities for women and better access to education, child care, credit and employment contribute to their human development. (...) • Population policy - Education, reproductive health and child survival. • Good governance -When those in power give high priority to the needs of the whole population, and when people participate in decision-making at many levels. • An active civil society -Non-governmental organizations and community groups also play a vital part in enhancing human development. (UNDP, 1996, p. 6-7)

In short, the main idea is to try to avoid a type of growth that is “jobless, ruthless, voiceless, rootless and futureless” (UNDP, 1996, p. 2) – quite the contrary to the human development spirit. As a matter of fact, the concept of human development is so malleable that it keeps expanding to even accommodate human rights such as freedom from discrimination, freedom from fear, freedom from injustice, freedom of thought and speech – for instance (UNDP, 2000, p. 1). Sometimes the impression is that the role to be played by growth is either enable or not-prevent the ‘development’ – simply because its matter/energy/money fundamentals could help or harm persons. Notwithstanding, it is not clear how both growth and development may increasingly syntonize, given that they seem to belong to different realities; at least, partially: growth to the materiality of things, development to the immateriality of beings. When confronted with such level of expectations coming from the sustainable human development theory, the major concern of policymakers and public managers could be understandably the following: “how to pay for it?” From the citizens’ perspective, the real question should be other: “how to put the already existing wealth to work for all?” Say both have a point and are, in an attempt to be fair, halfway inaccurate.

8. Convergences and divergences

The economic crisis such as countries defaults (e.g. Iceland, Greece) and market crashes (e.g. 1929, 2008) can be seen as examples of unsustainability. Fortunately, cases of economic unsustainability can be often reversed – as those examples testify. Usually, it takes time and demands tough operations, like observed on some past productive breakdowns (e.g. commodities as oil, coffee, rubber). However, economic growth is never environmentally neutral, does not matter the phase an economic cycle is in: by definition, the economic activity does interfere with nature and affect its innate equilibrium. Whether in virtuous or wicked moments, the fact is that the economic growth is essentially predatory towards the environment – eventually engendering unsustainability on it. This means that the economic activity (sustainable or not in itself) may be conducive to an environmental unsustainability. In order to avoid that, the vocable ‘development’ was introduced to enrich the prior concept of growth;

then forcing a syntony between economic sustainability and environmental sustainability. Therefore, ‘economic development’ was meant to express zero (resource) exhaustion, (species) extinction, and (ambient) saturation – yet still pursuing growth. It explains the later preference for renewables.

Beyond that, the vocable ‘development’ was also conceived to cover social aspects such as equity of conditions, equitable opportunities, equivalent treatments, unvarying justice, comparable achievements, etc. Although the progress made, with indicators capturing the ‘quality’ of growth within society (e.g. 1966’s level of living index, 1972’s development index, 1976’s basic needs index, 1979’s physical quality of life index, etc.⁴⁰) and between societies (e.g. Gini index), only recently the United Nations have introduced a more comprehensive view of the subject – launching the human development index (HDI) at 1990. Such composite index contains three indicators: “life expectancy, representing a long and healthy life; educational attainment, representing knowledge; and real GDP (in purchasing power parity dollars), representing a decent standard of living” (UNDP, 1995, p. 12). Indeed important, the HDI is far from enough to reflect what could be named as ‘social sustainability’ and ‘political sustainability’. Not to mention any hypothetical joint convergence between all of those ‘sustainabilities’, i.e. economic, environmental, social, and political. In general, the HDI has been criticized due to its “poor data, incorrect choice of indicators, various problems with (its) formula in general, incorrect specification of income in particular, and redundancy” (Stanton, 2007, p. 17). From a deeper outlook the issue seems to be elsewhere: how to quantify, measure, and compare intangible instances vis-à-vis the economic ones.

The economy *versus* economics debate comes across here. The economics’ impulse would be to translate everything into variables, to search for correlation among them, and then to trace hyperplanes whose intersection will produce a subset where to look for points of maximum and/or minimum – which supposedly may include welfare, well-being, enjoyment, contentment, and so forth. Such spirit could be summarized by the Lord Kelvin’s phrase: “When you cannot measure your knowledge is meager and unsatisfactory.” (Merton; Sills; Stigler, 1984, p. 328). Or by the Jacob Viner’s amendment, that is sometimes (not often) taken ironically: “If we cannot measure a thing, go ahead and measure it anyway” (idem, p. 324). Antithetically, the concept of economy (as stated before) would say that the *nomos* does not imply omniscience (perfect information), nor the strict measurement and control of everything as a precondition to rule the *oikos*. It is reasonable to admit that daily life also runs in the absence of technical data, whose importance (if might not be denied) shall be balanced with other metaphysical or balder human affairs, e.g. feelings and intuitions. To put it simply: real persons usually need as much as economics to manage their lives as they need engineering knowledge to cross a bridge.

The prior reference to the ancient economy is a try to put persons back into the center of the economy, and the critical analysis of the mainstream economics had the sole purpose of demystifying its rhetoric – based in mathematics and statistics. A hypothetical “hyperplaneless economics” would be probably a return to the political economy, forcing persons to talk and deliberate around felt issues and their effective solution – instead of over tables, graphics, and formulae (with presumed but seldomly proven link with the persons’ reality – at least from their perspective). In short, that would represent an empowerment of politics in general and of citizens’ politics, in particular. Which brings the sustainable human development aboard. If economics has been failing to deliver all that is guaranteed by common sense, human rights, and the UN’s technical guidelines, then it shall be dismissed until second order. Then the economy, inversely, has to establish the priorities that real persons really care for, and present how to achieve them. Thus, the ‘restriction’ comes to be the SHD implementation, not any budget. To use the rethoric we are trying to eliminate, all the independent variables (including economics, mathematics, and statistics) shall converge to meet the dependent variable: the SHD achievement.

⁴⁰ (Stanton, 2007, p. 13-15)

9. Conclusion

No, economics will not refrain itself from hyperplanes, and there is no problem on this as long as the society can treat them as simple drawings; never as acceptable translations to real lives of real persons. If one departs from the current economics' mindset and toolbox, to say "human economics" is a contradiction – given that numbers and variables have little-or-nothing to say about persons. Therefore, it was worthy to propose a 'hyperplaneless economics' so to shed some light over such antagonism. As well as to recover an idyllic 'old economy' ran by and intended for persons: where science and technology were submitted to the art of management (*nomos*), never reaching any detrimental power over the *oikos* (family and house). Such theoretical exercise has allowed, distinctively, to rather envisage a "human economy" – since the concept of 'economy' was taken as person-centered, family-driven, and welfare-aimed. Not destituted from technical paraphernalia, certainly, but never unsure about such stuff's place and role. Brief: at the economy, the persons have to be served by science and technology – not the opposite. So the concept of economy has brought some convergences with the 'sustainable human development'; since it focuses on persons, the quality of their lives, the permanence of their family (*oikos*) through time, and the ways (*nomos*) they use to secure that. From such perspective, economic development is only an oxymoron when the 'economic' comes from 'economy' – not from economics. Then, it would be safe to believe that the expression "economy development" does imply both human development and environmental sustainability – taken as compatible and convergent affairs.

References

- Baloglou, C. P. (2012) The tradition of economic thought in the Mediterranean world from the ancient classical times through the Hellenistic times until the Byzantine times and Arab-Islamic world. In: Backhaus, J. G. (ed.) *Handbook of the history of economic thought*, Springer Science.
- Coulanges, N. D. F. (2001) *The ancient city – a study on the religion, laws, and institutions of Greece and Rome*. Batoche Books, Kitchener (Canada).
- Dwivedi, D. N. (2012) *Microeconomics – I*. Dorling Kindersley / Pearson Educational, Delhi (India).
- Hamouda, O. F. (1994) Carabelli's On Keynes's Method. In: Wood, J. C. (ed.) *John Maynard Keynes – critical assessments*, Routledge, London / New York, pp. 561-563.
- McCloskey, D. N. (1983) The rhetoric of economics. *Journal of Economic Literature*, vol. 21, n. 2, pp. 481-517.
- McCloskey, D. N. (1987) Rhetoric within the citadel: Statistics. In: Wenzel, J.W. at al. (eds.). *Argument and critical practice*. Proceedings of the Fifth SCA/AFA Conference on Argumentation. SCA, Annandale, USA.
- McCloskey, D. N. (1998) *The rhetorics of economics*. 2nd Edition, The University of Wisconsin Press, Madison, USA.
- McCloskey, D. N. (2005) The trouble with Mathematics and Statistics in Economics. In: *History of Economic Ideas XIII*, 3, pp. 85-102.
- Merton, R. K.; Sills, D. L.; Stigler, S. M. (1984) The Kelvin dictum and social science: an excursion into the history of an idea. *Journal of the History of the Behavioral Science*, Vol. 20.
- Puu, T. (2009) Introduction to mathematical economics. In: Zhang, W.-B. (ed.) *Mathematical models in economics – vol. I*. Eolss Publishers, Oxford (UK), pp. 78-117.
- Rêgo, J. M. R. (1998) *Dois teorias econômicas: "consumo" e "retórica"*. Subsídios para o estudo do campo científico da economia no Brasil. PhD thesis, Fundação Getúlio Vargas, São Paulo, Brazil.
- Stanton. E. A. (2007) *The human development index: a history*. WPS 127, Political Economy Research Institute, University of Massachusetts – Amherst.
- United Nations Development Programme (UNDP). (1990) *Human Development Report 1990. Concept and Measurement of Human Development*. Oxford University Press, New York/Oxford.

- United Nations Development Programme (UNDP). (1995) Human Development Report 1995. Oxford University Press, Oxford/New York.
- United Nations Development Programme (UNDP). (1996) Human Development Report 1996. Oxford University Press, Oxford/New York.
- United Nations Development Programme (UNDP). (2010) The real wealth of Nations: pathways to Human Development. Human Development Report. Palgrave Macmillan, New York (US).
- United Nations Development Programme (UNDP). (2013) Issues for a global human development agenda. Occasional Paper Series. Human Development Report Office: New York (US).

6. Conclusions:

The ‘creative economy’ has been taken mostly as a rearrangement of traditional sectors into a new label and has been quantified generally through the dollar-unit. Whatever escape from the market, prices, monetization, and commercialization, also evades from its domain. The ‘creativity’ itself has been treated as a black box, a factor that one can attract and maintain (via the creative class, Richard Florida’s biome) under special circumstances of habitat (with talent, tolerance, and technology providing a propitious environment). It seems as such theory still needs to develop an approach on how to cultivate creative persons, rather than just offering generic attractors to get them trapped into its ‘gravitational field’. More importantly, such theory also needs to formulate an explanation on how creative persons may contribute to society (at the familiar oikos and at the polis level) – extrapolating their restricted current role as GDP potentiators. Therefore, ‘creativity’ should evolve to become a vector enabling persons to be free, satisfied, and happy.

The ‘sustainable human development’ has much to bestow in this sense, starting by the centrality of persons to such theory. As pointed out by chapter 1, at SHD persons are the reason for everything; the goal should be to enlarge persons’ lives; persons shall have long, healthy, and creative lives; with greater security, power, and freedom. The challenge here is to conceive an augmented theory of the ‘creative economy’, capable to receive and assimilate such endowments coming from the SHD theory. However, even the later faces problems. For instance: its more important index (HDI) only considers longevity, schooling, and income; its complexity has increased dynamically, incorporating matters of justice, freedom, citizenship, happiness, civil and human rights, etc.; and, despite its broad acceptance, the gap between speech and practice still remain remarkable across countries.

From SHD, the concept of sustainability is highly attuned to the idea of dematerialization. The possibility for the alleviation of the (absolute and relative) matter/energy weight all over the economy sounds promising when it comes to sustainability. In theory, a more dematerialized production and immaterialized consumption should lead to a more sustainable model to create, exchange, and distribute wealth (inter- and intra-generations) – lessening the planetary ‘footprints’. Apologies for the oxymoron “more sustainable”, given that, if it is sustainable, there is no more no less. Which brings the fact that the current model is neither sustainable, nor the ‘more sustainable’ policies have been implemented in quantity, spectrum, and velocity necessary to avoid species extinction and resources exhaustion. Actually, the chapter 2 was unable to present indisputable proof that a (synchronic and diachronic) net rebound effect is a necessary consequence to an economy migrating to services, ICTs, and creative sectors. In other words: although appealing, the relation between the de(im)mat and d(r)ebound ratios is still to be measured and proved.

The ‘communication’ was applied in a triple sense: (a) as a sector providing services in communications (public relations, advertising, etc.); (b) as a resource to be modeled and programmed into machines: and (c) as a capital, tangible (medias, gadgets, devices, etc.) and intangible (reputation, brand, sociability, etc.) assets that enable companies and markets. Such triad was analyzed from the perspective of the university, for the objective was to find out the following: first, how the University’s departments are related to the creative economy (with special onto the School of Communications and Arts); second, how the University’s science and technology park (STP) could also be thought in this context.

This thesis has defended the relevance of the Universities’ departments and STPs when it comes to invest and promote both the creative class and economy. It has shown that even Public Relations, a service highly dematerialized and immaterialized, may contribute to foster rebound effects into society – whenever servicing rebound-intensive clients. Otherwise, communications need and generate a panoply of matter-and-energy based hardware, such as antennas, cables, computers, TVs, radios, phones, mainframes, smartphones, etc. – whose rebound net impact is unknown. Robots, for instance, may replace human labor, but are never matter and energy free. In the other hand, dematerialized robots (i.e. software and algorithms) may have a net rebound effect –

which is not clear at this point. Not to mention the social impact that those technologies implicate whenever destroying jobs, given that automation may be linked to increasing unemployment and poverty (Arntz, Gregory, Zierahn, 2016; Smith, Anderson, 2014) – exactly the opposite the ‘sustainable human development’ theory professes.

Albeit the pointed significance of the University’s departments and STPs, it seems as universities are seldom aware of their role in the ‘creative economy’ incubation and maturation – with few Australian and USA exceptions. Their academic model still aims to prepare the labor force for the job market, which sounds awkward due to the beforementioned tendency to automation. In parallel, some of the Science and Technology Parks have been ran as businesses, supposed to have profit as their main concern – not the innovation and creativity that benefit society firstly. So, some STPs became a mix of realtors (rooms, labs, and auditoriums renters) and space lenders – sharing premises with governmental institutions or NGOs, sometimes for free. Therefore, it is necessary to rethink the role Universities and STPs may have vis-à-vis the ‘creative economy’ and the ‘sustainable human development’.

For example, the University of São Paulo (Brazil) does not appear to be preoccupied with the bonds it may have with the ‘creative economy’ – what the absence of a coherent discourse positioning its departments alongside to it comes to prove. Nor its School of Communications and Arts, which supposedly houses the majority of the departments belonging to the creative industries, has ever presented any statement showing a minimum of engagement or commitment over the matter. The researches are few and sparse, with no organic planning. *Mutatis mutandis*, the same can be said about the University of Girona, where the studies and researches are even scarcer. Also, it is not clear whether the ParcUdG is really interested in promoting both the ‘creative economy’ and the ‘sustainable human development’, or not. Even to the local and regional Governments, both subjects are relatively new and remain to be explored.

Perhaps the most original contribution of this thesis is the assets that produce assets, in a very creative and autonomous way. That means: machines able to act as independent economic agents (not only as social agents), embedded with genetic algorithms (GI) and artificial intelligence (AI), capable of innovation without human intervention, whose discoveries may be conducive to copyrights and patents. In short, machines that create

and trade⁴¹ marketable value by their own. Machines that invent fresh wealth, in addition to the GDP accountable to humans and their tools (including devices and dumb-machines). Machines that replace arms and bodies do exist for decades (e.g. ‘memory’ registers and calculation skills), but not machines that can perform intelligence and creativity. Coexisting with the *homo economicus*, such *automata economicus* are very the embodiment of the creative economy: an object that has demanded a huge investment in P&D to arise, until reaching a point from where it can go ahead alone – to produce novel art, unforeseen knowledge, goods, and services.

Antipodally, this thesis has equally tried to bring persons back to the center of the economy. Which is not a simple task, as the specialists from United Nations have noticed. In fact, the system is not persons-centered: it is rather resource-centered, which explains why it translates persons as human-resources or human-capital. Nor the system aims to gradually free the persons so they can invest their time in more meaningful activities, such as the creatives ones. Quite the contrary, is harder and harder to find and keep a job, and even harder to retire soon enough to do so. The tendency is increasing levels of unemployment, longer and extenuating working journeys to those who manage to find a job, and even higher minimum ages to retire. Such reality contrasts with the proposition of a ‘minimum wage’ policy, intended to delink the income from the job market, with a real freeing impact over persons’ lives. Unfortunately, such policy is rarely proposed or implemented.

Of course, those who benefit from the accrued automation argue that, finally, GA and AI will bring liberty so the persons could spend more time being creative and artistic, and developing better community relationships. But maybe the incoming future is not so pinky, given a hypothetical absence of public policies that ensure income to all (regardless if working or jobless) and due to the presence of the *automata economicus* – that is supposed to also replace part of the creative activities. Without decoupling income and job market, and with no third-way emergence, some advances coming from the ‘creative economy’ (e.g. creative machines) may undermine achievements at the ‘sustainable human development’. Unless the resources are put at the service of all in society, what is usually referred as a public good and of public interest (since ‘public

⁴¹ Some algorithms are written to scrutinize the web and gather data, to perform analysis and even to make decisions – selling and buying by their own.

property' is politically almost forbidden), the panorama points to greater wealth concentration and poverty resilience.

Part of the responsibility for this state of thing belongs to economics, with its mathematical models that advocate rationality above all - in order to manage the resources (material, energetic, or human). The destitution of the persons' *oikos* was partly based on the assumption that rationality provides a superior *nomos*, which was justified as being of the public interest. That allowed to expropriate persons from their right of property and management, with science acquiring legal status to enforce resources concentration and managerial primacy. This thesis pleads for the necessity to demystify economics (not to dismiss it), perhaps using its arsenal to defend and promote the individuals and families – not the institutions, companies, governments, markets. There will be no 'sustainable human development' without bringing persons back to the center of the economy, as well as to the center of economics. The virtual economic agent (that only exists in economics) shall be replaced by the real persons with real needs, living real problems.

Finally, this thesis has made clear how much work has still to be done on the Girona's creative economy. Only recently the authorities have started approaching the subject as a matter of public policy, and to gather a minimum of material to concatenate a chapter here was already a defy. In spite of that, the thesis was able to register the beginning of a new field of studies and researches, that could favor both the University of Girona and the Science and Technology Park. If that continues, the perspective involves further investments from the City Hall and Province, requiring additional personnel from both institutions – and even from the private sector. In this sense, this thesis is also partially original since it can be seen as an early contribution to such process. Even though was unable to present indisputable proofs on Girona's 'creative economy' and 'managerial vocation', it revealed the potential of the concept of 'experience economy' (in the Scandinavian overture) to the local and regional economy. It posits that Girona's creative economy is much more than a hope, since is already an installed phenomenon.

References:

- Acker, O., Gröne, F., Lefort, T., & Kropiunigg, L. (2015) The digital future of creative Europe & The impact of digitalization and the Internet on the creative industries in Europe. Booz & Company / PWC.
- Agencia INCAT (2014). "Podríamos decir que la cocina catalana es hoy el Silicon Valley de la cocina mundial". Retrieved from: <http://tinyurl.com/z4fpen4> Access: 26/12/2016
- Aguado, J. M. (2004) Modelos básicos para el estudio de la comunicación colectiva. Universidad de Murcia. Available at: <http://tinyurl.com/m7f5563> Access: 18/05/2017
- Ahmadi, F. et al. (2012) Intellectual capital accounting and its role in creating competitive advantage at the universities. *Interdisciplinary Journal of Contemporary Research in Business*, v. 4, n. 1, p. 894-912.
- Ajuntament de Barcelona. (2015) Barcelona em xifres 2015. Principals indicadors econòmics de l'àrea de Barcelona. Retrieved from: <http://tinyurl.com/jfl85et> Access: 12/03/2017
- Ajuntament de Girona (2011) Superar la crisi, la nostra prioritat. Pla de Govern 2011-2015. Available at: <http://tinyurl.com/h3qf64w> Access: 29/12/2016.
- Ajuntament de Girona (2016) Activitats econòmiques, per tipus. L'Observatori. Retrieved from: <http://tinyurl.com/grllhdk> Access: 28/12/2016.
- Ajuntament de Girona. (2014) El turisme creatiu i industrial, a debat a 'A Girona Emprèn parlem de...'. Retrieved from: <http://tinyurl.com/gqco3z4> Access: 26/12/2016.
- Ajuntament de Girona. (2014a) Girona International Mapping Festival. Retrieved from: <http://tinyurl.com/zhrmaer> Access: 26/12/2016.
- Ajuntament de Girona. (2015) Girona, Destinació de Turisme Esportiu. Retrieved from: <http://tinyurl.com/zfpmkms> Access: 27/01/2017
- Ajuntament de Girona. (2015a) Indústries culturals i creatives a Girona. Àrea de Promoció i Ocupació, Observatori de l'Economia i l'Ocupació.
- Ajuntament de Girona. (2016a) L'Ajuntament de Girona aposta per la indústria cultural i creativa com a motor econòmic de future. Retrieved from: <http://tinyurl.com/ht37kz9> Access: 26/12/2016.
- Ajuntament de Girona. (2016b) Girona Ciutat de Festivals. Retrieved from: <http://tinyurl.com/zzeuf44> Access: 29/12/2016
- Aldia. (2016) Puigdemont veu potencial TIC a Catalunya per competir i col·laborar amb Silicon Valley. Retrieved from: <http://tinyurl.com/hqdvurn> Access: 26/12/2016.
- Allameh, S. M. et al. (2013) A study on the effect of social capital on intellectual capital. Case study: Iran Polly Acryl Company. *International Journal of Management Academy*, v. 1, n. 1, p. 67-77.
- Almeida, A. E. P. (2012) Cultura e sustentabilidade : um estudo do Plano da Secretaria da Economia Criativa. Monografia (Pós-Graduação Lato Sensu) – Celacc/ECA-USP.
- Andersen, C. U.; Pold, S. B. (2014) Post-digital books and disruptive literary machines. In: *Formules* 18, pp. 164-183.
- André, E.; Rehm, M. (2004) Emotions and politeness, HUMAINE D8a Report on Basic Cues and Open Research Topics in Communication and Emotions.
- APTE. (2010) Principales estadísticas de las actividades de los Parques Científicos y Tecnológicos en 2010. Campanillas, Málaga (Spain).

- AQR-IREA. (2007) Sistema d'indicadors estratègics de seguiment municipal: memòria final. Grup de Recerca AQR, Institut de Recerca em Economia Aplicada (IREA), Universitat de Barcelona.
- Araújo, A. P. (2010) A economia criativa e identidade cultural na América Latina . Monografia (Pós-Graduação Lato Sensu) – Celacc/ECA-USP.
- Area Metropolitana de Barcelona. (2011) Per Afrontar la Crisi: la metropoli de Barcelona. Anuari Metropolita de Barcelona, IERMB. Available at: <http://tinyurl.com/mcwoers> Access: 18/05/2017
- Arntz, M.; Gregory, T.; Zierahn, U. (2016) The risk of automation for jobs in OECD countries – a comparative analysis. OECD Social, Employment and Migration Working Papers N. 189, OECD Publishing, Paris.
- Azqueta, C. (2014) Les empreses culturals en clau creativa. In: *DeCultura 11*, Desembre.
- Balaceanu, C.; Apostol, D. (2012) Development and Eco-Efficiency in the Information Society. *International Journal of Academic Research in Business and Social Sciences*, Vol. 2, No. 1, p. 443-451.
- Baloglou, C. P. (2012) The tradition of economic thought in the Mediterranean world from the ancient classical times through the Hellenistic times until the Byzantine times and Arab-Islamic world. In: Backhaus, J. G. (ed.) *Handbook of the history of economic thought*, Springer Science.
- Barbosa, A. A. L.; Castro, F. F. (2012) Blogosfera do Baixo Amazonas e de Carajás e conformação de capital social. In: CISO Pré-Alas - Encontro Norte e Nordeste de Ciências Sociais, XV, Teresina, 2012. *Anais*.
- Barbosa, A. (2009) Feira Preta – por uma outra economia: “economia criativa”. Monografia (Pós-Graduação Lato Sensu) – Celacc/ECA-USP.
- Barcelona Treball. (2013) Indústries Culturals. Informe Sectorial 2013. Amb la collaboració de: Associació Professional de la Gestió Cultural de Catalunya.
- Baró, E. (2009) Les indústries creatives: estat de la reflexió i de l'avaluació del seu pes econòmic a escala internacional. Barcelona: BCF Consultors.
- Beer, E. d. (2014) Creating value through communication. *Public Relations Review*, n. 40, p. 136-143.
- Berkhout, F.; Hertin, J. (2004) De-materialising and re-materialising: digital technologies and the environment. *Futures*, 36, p. 903–920.
- Biever, C. (2004) Polite computers win users' hearts and minds, *New Scientist*, vol. 2456.
- Bille, T. (2012) The Scandinavian approach to the experience economy – does it make sense? *International Journal of Cultural Policy* 18(1), pp. 93-110.
- Boden, M. A. (2009) Computer models of creativity. In: *AI Magazine*, V. 30, N. 3, pp. 23–34.
- Boden, M. A. (2000) State of the art: computer models of creativity. In: *The Psychologist*, v. 13, e. 2, pp. 72-77.
- Bòlit Emprèn. (2013) Accions de suport a les arts visuals i a les indústries creatives de Girona i comarques. Memòria digital del projecte. Retrieved from: <http://tinyurl.com/haspgu9> Access: 26/12/2016.
- Bourdieu, P. (1977) L'économie des échanges linguistiques. *Langue Française* , n. 34, p. 17-34.
- Braga, J. L. (2010) Comunicação é aquilo que transforma linguagens. *Alceu*, v. 10, n. 20, p. 41-54.

- Braga, L. R. (2016) *A. Repressão estatal e capital comunicacional: o bloco dominante e a criminalização do movimento piqueteiro na Argentina*. Tese (Doutorado em Ciências Sociais) – Universidade Federal de Goiás.
- BRASIL. (2007) *Economia solidária: outra economia acontece*. Cartilha da Campanha Nacional de Mobilização Social. Brasília: MTE, Senaes, FBES.
- Bresser-Pereira, L. C. (2009) Os dois métodos e o núcleo duro da teoria econômica. *Revista de Economia Política*, vol. 29, no. 2 (114), pp. 163-190.
- Bridewell, W.; Langley, P. (2010) Two kinds of knowledge in scientific discovery. In: *Topics in Cognitive Science* 2, pp. 36–52.
- Bridy, A. (2012) Coding creativity: copyright and the artificial intelligent author, *Stanford Technology Law Review*, vol. 5, pp. 1-28.
- Bringsjord, S.; Ferrucci, D. A. (2000) Artificial intelligence and literary creativity: inside the mind of Brutus, a storytelling machine. In: *Computational Linguistics*, v. 26, n. 4, pp. 642-647.
- Britton, F. E. K. (2001) Xcar – Part II. More thinking about Xcars, immaterialisation, dematerialisation and more. Ecoplan, Paris, 12p.
- Buning, M.d.C. (2015) Is the EU exposed on the copyright of robot creations?, *Robotics Law Journal*, vol. 1, no. 3, pp. 8-9.
- Caiado, A. S. C. (Coord.). (2011) *Economia criativa na cidade de São Paulo: diagnósticos e potencialidades*. São Paulo: Fundap.
- Cambra de Comerç de Girona (2011) *Cent anys d'economia a les Comarques Gironines*, Girona, 447p.
- Cambra de Comerç de Girona. (2010) *Girona 2010. Les comarques gironines davant el repte de la nova economia global*. Girona.
- CAPTIVATE. (2014) *Leveraging Regional Assets for a Vibrant Future*. Capital Region Creative Economy research study. Albany, NY (USA). Available at: <http://tinyurl.com/hkf4uk3> Access: 18/05/2017
- Carlson, M. (2015) The robotic reporter: automated journalism and the redefinition of labor, compositional forms, and journalistic authority. *Digital Journalism*, v. 3, n. 3, p. 416-431.
- Castelfranchi, C. (2000) Artificial liars: why computers will (necessarily) deceive us and each other, *Ethics and Information Technology*, vol. 2, no. 2, pp. 113-119.
- Castro, F. F. (2011) Capital comunicacional, cidadania e território na Amazônia, In: Malcher, M. A. et al. (Orgs.). *Comunicação midiaticizada na/da Amazônia*. Belém: Scriba/Fadesp, p. 65-82.
- Charles Sturt University. (2016) *Communication and Creative Industries Courses*. Available at: <http://tinyurl.com/kbaggwww> Access: 18/05/2017
- Ciprian, G. G. et al. (2012) From visible to hidden intangible assets. *Procedia - Social and Behavioral Sciences*, v. 62, p. 682-688.
- Colton, S.; Wiggins, G. A. (2012) Computational creativity: the final frontier? In: *European Conference on Artificial Intelligence*, Montpellier (France).
- Córdova, F. M.; Durán, C. A.; Galindo, R. (2016) Evaluation of intangible assets and best practices in a medium-sized port community. *Procedia Computer Science*, n. 91, p. 75-84.
- Coulanges, N. D. F. (2001) *The ancient city – a study on the religion, laws, and institutions of Greece and Rome*. Batoche Books, Kitchener (Canada).
- Creative Tourism Girona. (2016) *Què Fem*. Retrieved from: <http://tinyurl.com/zy6jmcpc> Access: 26/12/2016.

- Cromwell, E.; Galeota-Sprung, J.; Ramanujan, R. (2015) Computational creativity in the culinary arts. In: 28 o International Florida Artificial Intelligence Research Society Conference, pp. 38-42.
- Davies, C. R. (2011) An evolutionary step in intellectual property rights – artificial intelligence and intellectual property, *Computer Law & Security Review*, vol. 27, pp. 601-619.
- De Marchi, L. (2014) Análise do Plano da Secretaria da Economia Criativa e as transformações na relação entre Estado e cultura no Brasil. *Intercom – Revista Brasileira de Ciências da Comunicação*, a. 37, n.1, São Paulo.
- Dehtyarova, I. B.; Kubatko, O. V. (2013) Green economy and sustainable development: the vision of economists. *Mechanism of Economic Regulation*, N. 2, p. 106-112.
- Detroit Economic Growth Corporation. (2016) Creative Economy. Available at: <http://tinyurl.com/lazt9x8> Access: 18/05/2017
- Diari de Girona. (2011) Bosch vol convertir Girona en el Silicon Valley de Catalunya. Retrieved from: <http://tinyurl.com/gmt9wrw> Access: 29/12/2016.
- Diari de Girona. (2013) Sunyer explica com convertir Girona en el ‘Silicon Valley de les arts’ sense costos. Retrieved from: <http://tinyurl.com/jqj9gmo> Access: 26/12/2016.
- Diputació de Girona. (2016) La Diputació presenta cinc PECT a la convocatòria dels FEDER de la Generalitat. Retrieved from: <http://tinyurl.com/hbyr7zm> Access: 27/12/2016.
- Domènech, R. B. (2010) Xarxes de ciutats i localització de l’activitat industrial. In: ALBALATE DEL SOL, Daniel et al. *La indústria catalana després de la crisi*. Papers d’economia industrial 32. Generalitat de Catalunya, p. 47-69.
- Dupej, H. (2012) Next generation literary machines: the “dynamics network aesthetic” of contemporary poetry generators. PhD Thesis, University of Calgary.
- Dwivedi, D. N. (2012) *Microeconomics* – I. Dorling Kindersley / Pearson Educational, Delhi (India).
- Dzeroski, S.; Langley, P.; Todorovski, L. (2007) Computational discovery of communicable scientific knowledge. In: S. Dzeroski, L. Todorovski (Eds.), *Computational Discovery*, LNAI 4660, pp. 1–14.
- El Gerió, (2015) La meitat de les empreses familiars gironines no planifiquen el seu relleu generacional. Retrieved from: <http://tinyurl.com/j4uwu6m> Access: 12/03/2017
- Eskelinen, M.; Koskimaa, R. (eds.) (s/d) *CyberText Yearbook*. University of Juväskylä, Finland. Available at: <http://cybertext.hum.jyu.fi/> Access: 18/05/2017
- EuropaPress. (2016) El Parc Científic i Tecnològic de la UdG pide un mes para renegociar su deuda. Retrieved from: <http://tinyurl.com/gv84qku> Access: 03/01/2017.
- EY. (2014) Creating growth. Measuring cultural and creative markets in the EU. Retrieved from: <http://tinyurl.com/j36hscz> Access: 02/01/2017.
- EY. (2015). Cultural times. The first global map of cultural and creative industries. EY / CISAC.
- FIRJAN. (2014) Mapeamento da indústria criativa no Brasil. Rio de Janeiro: Firjan.
- Floreano, D.; Mitri, S.; Magnenat, S. (2007) Evolutionary conditions for the emergence of communication in robots. In: *Current Biology* 17, pp. 514-519.
- Florida, R. (2002) *The rise of the creative class: and how it's transforming work, leisure, community and everyday life*. New York: Perseus Book Group.

- Florida, R.; Gates, G.; Knudsen, B; Stolarick, K. (2006) *The university and the creative economy*. Fairfax / Pittsburgh / Los Angeles: George Mason University / Carnegie Mellon / UCLA.
- Fonseca, P. C. D. (2003) O método como tema: controvérsias filosóficas, discussões econômicas. In: Corazza, G. (org.). *Métodos da Ciência Econômica*. Porto Alegre: Editora da UFRGS, p. 17-34.
- Fogg, B. J. (1998) Persuasive Computers: Perspectives and research directions, CH198 Conference of the ACM/SIGCHI, New York: ACM Press.
- Fogg, B. J.; Nass, C. (1997) Silicon sycophants: the effects of computers that flatter, *International Journal of Human-Computer Studies*, vol. 46, no. 5, pp. 551-561.
- Fragouli, E. (2015) Intellectual capital & organizational Advantage: an economic approach to its valuation and measurement. *International Journal of Information, Business and Management*, v. 7, n. 1, p. 36-55.
- Fugita, S. (2012) Turismo cultural: um estudo de caso sobre a economia criativa na Vila de Paranapiacaba. Monografia (Pós-Graduação Lato Sensu) – Celacc/ECA-USP.
- Galantucci, B. (2005) An experimental study of the emergence of human communication systems. In: *Cognitive Science* 29, pp. 737-767.
- Ganau, J.; Paül, D.; Rierapp, P. (2012) La distribución de la economía creativa y del conocimiento en catalunya. Dinámicas en los espacios metropolitanos y no metropolitanos. In: *Crisis económica e impactos territoriales - V Jornadas de Geografía Económica AGE*, Univ. de Girona 2012.
- García Fernandez, R. (2011) A metodologia como argumento a favor de uma economia pluralista. In: Guilhoto, J.; Duarte, P. G.; Silber, S. (Org.). *O Brasil e a ciência econômica em debate*, Vol. 2, São Paulo, Saraiva, pp. 137-152.
- Gausa, M. (2010) Catalunya: hiperterritoris / multiciutats /geourbanitats: nous models en xarxa. In: Fundació CatDem. *La Catalunya en Xarxa*. Catarroja: Editorial Afers.
- Gemeinboeck, P.; Saunders, R. (2013) Creative machine performance: computational creativity and robotic art. In: *Fourth International Conference on Computational Creativity*, pp. 215-219.
- Generalitat de Catalunya. (2013) RIS3CAT – Anàlisi dels àmbits sectorials líders I de les capacitats en tecnologies facilitadores transversals. Barcelona.
- Generalitat de Catalunya. (2014) La DGCEC y los sectores culturales en Cataluña. Dirección general de creación y empresas culturales, Instituto Catalán de las Empresas Culturales.
- Georgescu-Roegen, N. (1979) Methods in Economics Science. *Journal of Economic Issues*, Vol. XIII, No . 2, pp. 317-328.
- Ghaderi, M.; Hamidian, M.; Jabari, H. (2015) The impact of IT investments and intellectual capital on firms' performance. *Management Science Letters*, n. 5, p. 867-872.
- Gheorghică, A. E. (2012) The emergence of la Decroissance. Centre for European Studies (CES) Working Papers, Vol. 4 (1), p. 60-72.
- Girard, L. F. (2011) Multidimensional evaluation processes to manage creative, resilient and sustainable city. *Aestimum*, 59, December, p. 123-139.
- Girona Emprèn. (2014) Girona, municipi cooperatiu. Sessió d'experiència de projectes culturals i creatius. Girona, 8 Juliol de 2014.
- Grimmelmann, J. (2016) Copyright for literate robots, *Iowa Law Review*, vol. 101, pp. 657-681.
- Gruehn, D. (2014) Creative industries in germany – recent development and the role of science and technology parks. *World Technopolis Review* 3(1), pp.30-38.

- Guerini, M.; Stock, O.; Bevacqua, E.; Peters, C. (2005) Some ethical issues for persuasive interfaces - ECAs for persuasion, HUMAINE WP6 Workshop, Paris.
- Guinjoan, M.; Murillo, C.; Pons, J. (2004) L'empresa familiar a Catalunya – Quantificació i característiques. Generalitat de Catalunya / CIDEM.
- Hamouda, O. F. (1994) Carabelli's On Keynes's Method. In: Wood, J. C. (ed.) John Maynard Keynes – critical assessments, Routledge, London / New York, pp. 561-563.
- Hattenbach, B.; Glucoft, J. (2015) Patents in an era of infinite monkeys and artificial intelligence, *Stanford Technology Law Review*, vol. 32, pp. 32-51.
- Heinonen, S.; Jokinen, P.; Kaivo-Oja, J. (2001) The ecological transparency of the information Society. *Futures* 33, p. 319–337.
- Heiskanen, E. et al. (2001) Dematerialization: the potential of ICT and services. *The Finnish Environment* 533, Ministry of the Environment, Helsinki.
- Heiskanen, E.; Jalas, M. (2000) Dematerialization through services – a review and evaluation of the debate. *The Finnish Environment* 436, Ministry of the Environment, Helsinki.
- Hendrickson, M. et al. (2012) Creative industries in the Caribbean: a new road for diversification and export growth. ECLAC - Subregional Headquarters for The Caribbean 19, p. 1-69. Retrieved from <http://repositorio.cepal.org> Access: 18/05/2017
- Hogg, N.; Jackson, T. (2008) Digital Media and Dematerialization. An Exploration of the Potential for Reduced Material Intensity in Music Delivery. *Journal of Industrial Ecology*, V. 13, N. 1, p. 127-146.
- IDESCAT. (2016) Macromagnituds i impostos. Retrieved from: <http://tinyurl.com/gwg3gwk> Access: 28/12/2016.
- IERMB. (2012) Per afrontar la crisi: la metropoli de Barcelona. *Anuari metropolita de Barcelona*, Area Metropolitana de Barcelona, Bellaterra, Spain, 359p.
- Ionescu, A. D.; Dumitru, N. R. (2011) Global communication techniques to be applied by multinational companies. *Romanian Economic and Business Review*, v. 6, n. 4, p. 84-92.
- Iwahashi, N.; Sugiura, K.; Taguchi, R.; Nagai, T.; Taniguchi, T. (2010) Robots that learn to communicate: a developmental approach to personally and physically situated human-robot conversations. In: *AAAI Fall Symposium on Dialog with Robots*, Arlington (USA), pp. 38-43.
- Jalali, M.; Abdoli, M.; SAttari, B. (2013) Examining the relation between intellectual capital elements & bankruptcy of companies. *Technical Journal of Engineering and Applied Sciences*, v. 7, n. 1, p. 36-55.
- Jaya, A. (2010) A pragmatic approach towards automatic story generation and reasoning. PhD Thesis, University Chennai.
- Jodaki, A. Z.; Abdeyazdan, M. (2015) Relationship between electronic learning and intellectual capital. *International Journal of Technical Research and Applications*, Special Issue 23, p. 13-16.
- Juriä, K.; Vogel, G. (2005) Does Immaterialization Satisfy the Sustainability Imperative? A life cycle approach. In: Hertwich, E. et alli. *Sustainable consumption: the contribution of research*. Proceedings, Oslo, p. 367277.
- Kabanda, P. (2016). Creative trade for human development. Policy Research Working Paper 7684, World Bank Group.
- Kakooei, Z.; Alinajafi, Z. (2016) The importance of social capital in organizational learning and organizational commitment. Case study: Golestan Province Red Crescent Society. *Nature and Science*, v. 14, n. 11, p. 32-41.

- Kander, A. (2004) Baumol's disease and dematerialization of the economy. Lund University Publications, Sweden.
- Kaufman, D. (2012) A condição de "agente" do consumidor-internauta. In: Fonseca, A. C. et al. Economia criativa: um conjunto de visões. São Paulo: Fundação Telefônica.
- Kaur, S. (2014). Independent Policy Study. Creative Services Support Group. Available at: cssg.info/downloads/CSSG-Independent-Study.pdf. Accessed on: 17/08/2016
- KEA. (2006) The Economy of Culture in Europe. Study prepared for the European Commission.
- Keskinen, A. et al. (2001) A purchase and a chain: impacts of e-commerce on transport and the environment. Report of Working Group 3, Paris, OECD/ECMT.
- Khozani, A. J.; Alvar, S. Z. (2016) Reviewing the relationship of social and intellectual capitals dimensions on the performance of Abadan and Khoramshahr universities staff. *International Journal of Humanities and Cultural Studies*, v. 1, p. 1288-1298.
- Kojori, D. K.; Aghajani, H. A.; Rasooli, G. (2013) Explain the role of intellectual capital on the financial performance of cosmetics companies, with fuzzy approach. *Journal of Basic and Applied Scientific Research*, v. 3, n. 5, p. 892-900.
- Kozima, H.; Yano, H. (2001) A robot that learns to communicate with human caregivers. In: First International Workshop on Epigenetic Robotics, pp 47–52.
- KPMG. (2016) Girona 100, SA – Anàlisi del comptes de 2014 i projecció macroeconòmicai empresarial 2016. Girona, Spain.
- LAEDC. (2015). Otis Report on the creative economy. Los Angeles, USA, OCAD / Los Angeles County Economic Development Corporation.
- Langley, P. (2013) Computational discovery of scientific models: guiding search with knowledge and data. Inaugural Lecture at the University of Auckland, NZ.
- Lipson, H. (2007) Evolutionary robotics: emergence of communication. In: *Current Biology*, vol. 17, n. 9, pp. 330-332.
- Los Angeles County Economic Development Corporation. (2014) Otis Report on the Creative Economy of California. Available at: <http://www.otis.edu/otisreport> Access: 18/05/2017
- Lucas, C. (2005) Self-organization and human robots. In: *International Journal of Advanced Robotic Systems* 2 (1), pp. 64-70.
- Mačerinskienė, I.; Survilaitė, S. (2011) Communication capital and company's value added. In: 1st International scientific conference "practice and research in private and public sector", Proceedings, p. 267-274.
- Mačerinskienė, I.; Survilaitė, S. (2012) The assess model of intellectual capital and a company's value added cohesion. *Creative and Knowledge Society*, v. 2, n. 1, p. 82-94.
- MacLennan, B. J.; Burghardt, G. M. (1993) Synthetic ethology and the evolution of cooperative communication. In: *Adaptative Behavior*, 2 (2), pp. 161-188.
- Madeira, M. G. (2014) Economia criativa – implicações e desafios para a política externa brasileira. FUNAG, Brasília.
- Magaudda, P. (2014) When materiality 'bites back': Digital music consumption practices in the age of dematerialization. *Journal of Consumer Culture*, 11(1), p. 15–36, 2011. Menger, P-M. The economics of creativity – art and achievement under uncertainty. Harvard College, USA.
- Maia, I. S.; Cançado, A. C. (2013) Mídia, imagem e gestão social: como as redes e movimentos sociais podem interagir na construção da imagem de uma localidade. In: Encontro nacional de pesquisadores em gestão social, VII, Belém, 2013. *Anais...*

- Marocco, D.; Cangelosi, A.; Nolfi, S. (2003) The role of social and cognitive factors in the emergence of communication: experiments in evolutionary robotics. In: *Philosophical Transactions of the Royal Society London* 361, pp. 2397-2421.
- Matos, H. (2009) *Capital social e comunicação: interfaces e articulações*. São Paulo: Summus.
- Matuck, A.; Ferreira Jr, A.; Brasil, I.; Stuani, R. (2015) Media design as a creative language, the artists as meta-artists. In: 21st International Symposium on Electronic Art (ISEA), Vancouver (CA).
- Matuck, A.; Nobre, G. F. (2016) Communicative and artistic machines: a survey of models and experiments on artificial agents. *Word Academy of Science, Engineering and Technology*, n.10, p. 1.668-1.672, 2016.
- Mauss, M. (1924) *Essai sur le don: forme et raison de l'échange dans les sociétés archaïques*. Année Sociologique, seconde série, tome 1, Paris.
- Mazzarino, J.; Turatti, L. (2015) Environmental journalism and the transformative power of happenings. *Razón Y Palabra*, n. 91, p. 389-403
- McCloskey, D. N. (1983) The rhetoric of economics. *Journal of Economic Literature*, vol. 21, n. 2, pp. 481-517.
- McCloskey, D. N. (1987) Rhetoric within the citadel: Statistics. In: Wenzel, J.W. at al. (eds.). *Argument and critical practice*. Proceedings of the Fifth SCA/AFA Conference on Argumentation. SCA, Annandale, USA.
- McCloskey, D. N. (1998) *The rhetorics of economics*. 2nd Edition, The University of Wisconsin Press, Madison, USA.
- McCloskey, D. N. (2005) The trouble with Mathematics and Statistics in Economics. In: *History of Economic Ideas* XIII, 3, pp. 85-102.
- Méndez, R.; Michelini, J. J.; Prada, J.; Tébar, J. (2012) Economía creativa y desarrollo urbano en España: una aproximación a sus lógicas espaciales. *Eure* 38(113), pp. 5-32.
- Merton, R. K.; Sills, D. L.; Stigler, S. M. (1984) The Kelvin dictum and social science: an excursion into the history of an idea. *Journal of the History of the Behavioral Science*, Vol. 20.
- Michelini, J. J.; Méndez del Valle, R. (2012) Economía y estrategias de promoción en la región metropolitana de Madrid. In: *Crisis económica e impactos territoriales - V Jornadas de Geografía Económica AGE*, Univ. de Girona 2012.
- Michelini, J. J.; Méndez, R. (2013) Creative industries, spatial contrasts and urban governance in Madrid. *Revista de Geografia e Ordenamento do Território*, n. 3, p. 143-170.
- MINC. (2011) *Ministério da Cultura. Plano da Secretaria da Economia Criativa : políticas, diretrizes e ações – 2011 a 2014*. Brasília, DF.
- Morel, B. (2005) Cantoche Exemplar Proposal. In: HUMAINE WP8 Workshop “emotion in communication”, ITC-Irst Povo, Trento, Italy, 2005. *Proceedings...Trento*.
- Moroni, A.; Zuben, F. V.; Manzolli, J. (2002) Artbitration: human-machine interaction in artistic domains. In: *Leonardo*, Vol. 35, N. 2, pp. 185-188.
- Moulin, J-P. (1992) Modifiable automata self-modifying automata. In: *Acta Biotheoretica*, v. 40, n. 2-3, pp. 195-204.
- Moulin, J-P. (2000) Self programming machines (I). Available at: <http://www.self-programming-machines.org/pdf/sfbt4.pdf> Access: 18/05/2017
- Naumik, E.G. (2012) Communicational capital categorization and assessment. *International Scientific and Theoretical Journal “Herald of the Belgorod University of Cooperation, Economics and Law”*, n. 4, p. 269-273.

- Newbiggin, J. (2010) *The creative economy: an introductory guide*. Creative and Cultural Economy Series 1, London, UK: British Council.
- Niazi, Z.; Bhamra, A. S. (2014) *Decoupling Growth from Resource Generation - Brief for GSDR 2015*. Development Alternatives and Wuppertal Institute.
- Nivel, E.; Thórisson, K. R. (2009) *Self-programming: operationalizing autonomy*, 2nd Conference on Artificial General Intelligence, Arlington, VA (USA).
- Noble, J.; Cliff, D. (1996) *On simulating the evolution of communication*. In: Maes, P. (Eds.) *From animals to animats 4*. 4th International Conference on Simulation of Adaptive Behavior, Cambridge (USA).
- Nobre, G. F. (2016). *Creative industries and dematerialization of the economy*. Proceedings of 10^o ABRAPCORP, Porto Alegre, Brazil, ediPUCRS. Available at: <http://tinyurl.com/n369wly> Access: 18/05/2017
- Nobre, G. F. (2015) *A economia criativa e o valor potencial da Escola de Comunicações e Artes*. *Organicom – Revista Brasileira de Comunicação Organizacional e Relações Públicas*, n. 12, p. 180-190.
- Nobre, G. F. (2016) *Creative industries and dematerialization of the economy: ideas on communications and public relations*. In: FARIAS, L. A.; LOPES, V. S. C. (Orgs.). *Anais do 10^o Abrapcorp*. Porto Alegre: Edipucrs, p. 269-287.
- Nobre, G. F. (2008) *Political communicative agents*. In: International conference on politics and information systems, technologies and applications, 6TH. Orlando, 2008. *Proceedings...* Orlando (FL), p. 88-93.
- Nobre, G. F.; Matos, H. H. G. (2009) *Communicational capital*. In: 74th annual conference, Portsmouth, Virginia. *Proceedings...* The Association for Business Communication, Portsmouth.
- Nobre, G. F.; Matuck, A. (2016) *Communicative machines and technology literacy: the carbon-silicon pedagogical dialogue*. *Proceedings of the Sixth Media and Information Literacy and Intercultural Dialogue*. São Paulo: UNESCO.
- Nobre, G. F.; Matuck, A. (2016a) *Communicative and artistic machines: some remarks on authorship, copyright, and liability*. *International Journal of Humanities and Applied Sciences*, v. 5, p. 145-149.
- Nobre, G. F.; Clemente, A.; Souza, A. (2018) *Transferindo custos: externalidades ambientais como estratégia distributiva*. (forthcoming)
- Nolfi, S. (2005) *Emergence of communication in embodied agents: co-adapting communicative and non-communicative behaviors*. In: *Connection Science*, vol. 17, Iss. 3-4, pp. 231-248.
- Nomelini, M. D. (2013) *II Mostra de Dança das Favelas : o avesso da economia criativa*. Monografia (Pós-Graduação Lato Sensu) – Celacc/ECA-USP.
- Nordhaus, W. D. (2015) *Are we approaching an economic singularity? Information technology and the future of economic growth*. Yale University. Available at: <https://tinyurl.com/y7ue2mqq>
- Northwestern University. (2013) *School of Communication Strategic Initiatives*. Available at: <http://tinyurl.com/zcfpyhl> Access: 18/05/2017
- OECD. (2010) *Reviews of regional innovation: Catalonia, Spain*. Retrieved from: <http://tinyurl.com/jujxntf> Access: 01/01/2017.
- Oh, D-S. (2013) *R&BD 3.0: science and technology parks in the creative economy*. In: UNESCO-WTA International Training Workshop. Daejeon, Korea, September 24-27th.
- Oliveira, J. M. de et. al. (2013) *Panorama da economia criativa no Brasil*. Brasília / Rio de Janeiro: Ipea.

- Oliveira, L. B. (2012) *Gestão comunitária dos recursos hídricos e capital comunicacional socioambiental: um estudo das sociedades de águas de Marques de Souza/RS*. Dissertação (Mestrado em Ambiente e Desenvolvimento), Univates.
- Paiva, C. A. N.; Cunha, A. M. (2008) A ciência econômica: seu(s) objeto(s), método(s) e paradigmas. In: *Noções de Economia*. Brasília, Fundação Alexandre de Gusmão.
- Panal, G. G.; Yáñez, C. N. (2012) Industrias culturales en ciudades españolas. Un primer acercamiento. *Revista de Estudios Regionales* 94, pp. 71-103.
- ParcUdG. (2011) La contribución del Parc Científic i Tecnològic de la Universitat de Girona al Libro Verde. Retrieved from: <http://tinyurl.com/j8bm66v> Access: 30/12/2016.
- Pease, A.; Colton, S.; Smaill, A.; Lee, J. (2002) Lakatos and machine creativity. In: *European Conference on Artificial Intelligence (ECAI)*, Lyon, France.
- Peixoto, M. A. (2011) Igreja universal e uso do capital comunicacional. In: *Congresso internacional de ciências da religião*, V, Goiânia, 2011. *Anais...* Goiânia.
- Pereira, F. C.; Fossá, M. I. T. (2013) Capital comunicacional comunitário e as organizações de comunicação comunitária. In: *Seminário internacional de pesquisa em comunicação*, V, UFSM, 2013. *Anais...* Santa Maria, UFSM.
- Perfil de la Ciutat. (2016) Girona. Retrieved from: <http://tinyurl.com/h5gy5kn> Access: 27/12/2016.
- Perry, M.; Margoni, T. (2010) From music tracks to Google maps: who owns computer-generated works? *Computer Law & Security Review*, vol. 26, pp. 621-629.
- Pinho, C. M. (1996) Metodologia da Ciência Econômica. In: Pinho, C. M.; Vasconcellos, M. A. S. *Manual de Economia*. São Paulo, Editora Saraiva.
- Plepys, A. (2002) The grey side of ICT. *Environmental Impact Assessment Review*, 22, p. 509-523.
- Potts, J. et al. (2008) *Social Network Markets: a new definition of the creative industries*. Springer Science + Business Media, LLC.
- Potts, J.; Cunningham, S. (2010) Four models of the creative industries. *Revue d'Economie Politique*, 120(1).
- Puig, O. (2012) Cap a una economia de serveis. *Revista de Girona* 274, p. 48-52.
- Puu, T. (2009) Introduction to mathematical economics. In: Zhang, W.-B. (ed.) *Mathematical models in economics – vol. I*. Eolss Publishers, Oxford (UK), pp. 78-117.
- Rafiei, M.; Ghaffari, H.; Parsapur, R. (2012) Investigating the impact of intellectual capital on organizational performance. A case study in an Iranian medical science university. *African Journal of Business Management*, v. 6, n. 9, p. 3546-3552.
- Reeves, B.; Nass, C. (1996) *The media equation: how people treat computers, television, and new media like real people and places*. Cambridge: Cambridge University Press.
- Rêgo, J. M. R. (1998) *Duas teorias econômicas: “consumo” e “retórica”*. Subsídios para o estudo do campo científico da economia no Brasil. PhD thesis, Fundação Getúlio Vargas, São Paulo, Brazil.
- Restrepo, F. B., & Márquez, I. D. (2013). The orange economy – an infinite opportunity. *Inter-American Development Bank*.
- Reverté, F. G. et al. (2016) La localización de la clase creativa en ciudades turísticas. Un análisis a escala local del sistema urbano Mediterráneo español. *Investigaciones Turísticas* 11, p. 1-29.
- Reynolds, C. J.; Cassinelli, A. (2009) Machine self-sacrifice. In: *Eighth International Conference of Computer Ethics*, Corfu, Greece.

- Rodrigo, M. (1995) Modelos de la comunicación. In: Portal de la Comunicación. Barcelona, UAB. Available at: <http://tinyurl.com/jwae7ev> Access: 18/05/2017
- Rouholamini, M.; Arbabi, A.; Azinfar, K. (2015) Study of the relationship between intellectual capital management and entrepreneurship in the employees of Municipality District 10 Tehran. *Journal of Novel Applied Sciences*, v. 4, n. 3, p. 309-317.
- Sais, C. (2014) Sant Narcís, el barri artístic. *Girona Cultura 5*. Retrieved from: <http://tinyurl.com/hgm86yy> Access: 26/12/2016.
- Schäfer, J. (2006) Literary machines made in Germany. German proto-cybertexts from the baroque era to the present. In: M. Eskelinen, R. Koskimaa, (eds.) *Ergodic Histories. Cybertext yearbook 2006*, University of Jyväskylä, Finland.
- Schandl, H.; Turner, G.M. (2009) The dematerialization potential of the Australian economy. *Journal of Industrial Ecology*, 13(6), p. 863-880.
- Schauer, T. (2008) Technology and the Growth Problematique. In: First international conference on Economic De-growth for Ecological Sustainability and Social Equity, Proceedings, Paris, April 18-19th.
- Schneider, F. (2003) Growth and Rebound Effect. In: Colloquium on “Sustainable Degrowth” (Décroissance Soutenable), Proceedings, Lyon, France.
- Schwab, M. E. M. G. (2011) Economia criativa e novos arranjos tecnológicos : análise de caso d’A Banda Mais Bonita da Cidade. Monografia (Pós-Graduação Lato Sensu) – Celacc/ECA-USP.
- Sellens, J. T.; Chao, A. D.; Vilà, M. P. C. (2013) L’Empresa gironina a l’economia del coneixement: noves fonts de productivitat i competitivitat? Observatori de Tecnologies de la Informació i la Comunicació de Girona (OTIC), Universitat de Girona.
- Serra, D. S. (2016) Determinants of the concentration of creative industries in Europe: a comparison between Spain, Italy, France, United Kingdom and Portugal. PhD thesis, Universitat Autònoma de Barcelona.
- Siah, P. C. (2014) The relationship study of financial performance and intellectual capital of firms in the capital market of Malaysia. *Journal UMP Social Sciences and Technology Management*, v. 2, n. 1, p. 8-21.
- Smith, A.; Anderson, J. (2014) AI, robotics, and the future of jobs. Pew Research Center. Available at: <http://www.pewinternet.org/2014/08/06/future-of-jobs/> Access: 21/04/2017
- Souza, E. P. (2012) A mercantilização da arte na sociedade moderna. In: II Semana da Licenciatura em História do IFG, Goiânia. *Anais...* Goiânia: IFG.
- Souza, E. P. (2013) *Rock, juventude e capital comunicacional na cidade de Brasília (1970-1980)*. Dissertação (Mestrado em Sociologia) – Universidade Federal de Goiás.
- Stăncioiu, A-F. et al. (2013) Integrated marketing communication in tourism: an analysis. Case study: Muntenia and Oltenia. *Theoretical and Applied Economics*, v. XX, n. 6(583), p. 7-34.
- Stangl, A. (2012) McLuhan e o link da Alegria Criativa. In: Fonseca, A. C. et al. *Economia criativa: um conjunto de visões*. São Paulo, Fundação Telefônica.
- Stanton. E. A. (2007) The human development index: a history. WPS 127, Political Economy Research Institute, University of Massachusetts – Amherst.
- Stock, O. et al. (2004) Computational humour, HUMAINE D8a Report on Basic Cues and Open Research Topics in Communication and Emotions.
- Strycker, J. (2012) Artificial intelligence and the arts. In: Createquity. Available at: <http://tinyurl.com/mcwoers> Access: 18/05/2017

- Suciu, M-C.; Lacatus, M-L.; Ivanovici, M. (2010) Creative economy-feasible options for Romania. *Timisoara Journal of Economics*, Vol. 3 (3), p. 167-174.
- Sundararajan, L. (2014) Mind, machine, and creativity: an artist's perspective. In: *The Journal of Creative Behavior*, Volume 48, Issue 2, pp. 136–151.
- Tamošiūnienė, R.; Survilaitė, S. (2015) The model of intellectual capital evaluation in publicly listed companies. In: 1st International conference on business management, Universitat Politècnica de València, Spain. *Proceedings...* Valencia: Universitat Politècnica.
- Tarcza, T. (2010) Some aspects of the role of visual identity in the successful implementation of the promotional strategy. In: International conference “European integration – new challenges”, 6TH, Oradea, Romania. *Proceedings*, p. 2377-2383.
- Tera Consultants. (2010) Building a Digital Economy: the importance of saving jobs in the EU’s Creative Industries. Retrieved from: <http://tinyurl.com/n4ehdtr> Access: 18/05/2017
- The Arts Alliance. (2008) The Arts Alliance Creative Economic Analysis. Washtenaw County, Ann Arbor, MI (USA). Available at: <http://tinyurl.com/hmgmdzy> Access: 18/05/2017
- The Guardian. (2015) Why Girona makes the perfect base for cyclist Dan Craven. Retrieved from: <http://tinyurl.com/hqkk7nm> Access: 29/12/2016.
- Torner, F. M. (2016) Employee creativity and culture. Evidence from an examination of culture's influence on perceived employee's creativity in Spanish organizations. PhD thesis, Universitat Ramon Llull.
- Triay, S. E. (2010) De fàbrica d’Espanya a motor d’Europa: la Catalunya creativa. In: Fundació CatDem. *La Catalunya en Xarxa*. Catarroja: Editorial Afers.
- Ulrich, P. (2012) Economic development and crosslinking of knowledge in the Pyrenees: a case study on structural change in a “technological triangle” based on the creativity theory by Richard Florida. Master Thesis, University of Frankfurt.
- UNCTAD. (2010). Creative Economy – a feasible development option. Creative Economy Report. New York, USA, UNDP.
- UNCTAD. (2015). Creative economy outlook and country profiles. Trends in international trade in creative industries. United Nations.
- UNCTAD. (2008) The creative economy report. The challenge of assessing the creative economy: towards informed policy-making, Geneva, Switzerland.
- UNESCO. (2013) Creative economy report – widening local development pathways. Special Edition. Retrieved from: <http://tinyurl.com/ljufl28> Access: 12/01/2017.
- United Kingdom Government. (2014) Creative Industries: focus on employment. Department for Culture, Media & Sport, June, 84pp.
- United Kingdom Government. (2011) The art of the possible: using secondary data to detect social and economic impacts from investments in culture and sport – a feasibility study. DCMS/Arts Council/English Heritage/MLA/Sport England, UK.
- United Nations Development Programme (UNDP). (1990). Human Development Report 1990. Concept and Measurement of Human Development. Oxford/New York, Oxford University Press.
- United Nations Development Programme (UNDP). (1995). Human Development Report 1995. Oxford/New York, Oxford University Press.
- United Nations Development Programme (UNDP). (1996). Human Development Report 1996. Oxford/New York, Oxford University Press.

- United Nations Development Programme (UNDP). (2010) The real wealth of Nations: pathways to Human Development. Human Development Report. Palgrave Macmillan, New York (US).
- United Nations Development Programme (UNDP). (2013) Issues for a global human development agenda. Occasional Paper Series. Human Development Report Office: New York (US).
- Universitat de Girona. (2016) Campus Euromediterraneo de Turismo y Agua. Instituto de Investigación en Turismo. Retrieved from: <http://tinyurl.com/hsauhr6> Access: 27/12/2016.
- University of Girona. (2017) Format criteria for submitting paper and electronic versions of theses at the University of Girona. Available at: <http://www.udg.edu/tabid/19376/default.aspx> Access: 26/03/2017
- University of Sunshine Coast. (2016) Available at: <http://tinyurl.com/h3mpy9x> Access: 18/05/2017
- Veruggio, G. (coord.) (2006) EURON roboethics roadmap. Robotic School, Genova (IT).
- Viana, N. (2013) Capitalismo e cinema. *Revista Alceu*, n. 27, p. 7-67.
- Viana, N. (2013a) Histórias em quadrinhos e capital comunicacional. *Revista Espaço Acadêmico*, v. XII, n. 142, p. 1-10.
- Viana, N. (2007) Para além da crítica dos meios de comunicação. In: Viana, N. (Org.). *Indústria cultural e cultura mercantil*. Rio de Janeiro, Corifeu, p. 8-29.
- Vilà, P. C.; Pagès, J. L. (2008) Science and technology parks: creating new environments favourable to innovation. *Paradigmes* 0, May, 141-149.
- Voisen, S. E. (2010) Computational generation of dream-like narrative: reflections on the uncanny dream machine. Master Thesis, University of California.
- Weddle, R. (2013) All inclusive: how areas of innovation are challenging and changing the model for research and science parks. *Site Selection Magazine*, July.
- Weiler, R. (2008) De-Growth for Earth Survival. In: First international conference on Economic De-growth for Ecological Sustainability and Social Equity, Proceedings, Paris, April 18-19th.
- Willard, T.; Halder, M. (2003) The Information Society and Sustainable Development - exploring the linkages. The International Institute for Sustainable Development, Winnipeg, Canada, 37pp.
- XPCAT. (2016) Parc Científic i Tecnològic de la Universitat de Girona. Retrieved from: <http://tinyurl.com/gw72lk5> Access: 30/12/2016.
- Yanco, H. A. (1994) Robot communication: issues and implementations. Master Thesis. MIT, Massachusetts (USA).
- Zadeh, M. S. (2014) Examining the relationship between the intellectual capital and the staff performance. *Management Science Letters*, n. 4, p. 813-818.
- Zadeh, M. S. K.; Abdollahian, E.; Ziaei, S. M. (2014) Investigating the correlation between the intellectual capital and financial performance in companies listed on Tehran Stock Exchange. *Life Science Journal*, v. 11, n. 12s p. 77-83.
- Zykov, V.; Mytilinaios, E.; Adams, B.; Lipson, H. (2005) Robotics: self-reproducing machines. In: *Nature* 435, pp. 163-164.

Appendix:

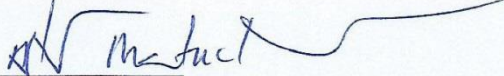
El Dr. **Artur Matuck**, com a coautor/a dels articles següents:

[Communicative and artistic machines: a survey of models and experiments on artificial agents. International Journal of Computer, Electrical, Automation, Control and Information Engineering 10(10), p. 1668-1672.]

[Communicative and artistic machines: some remarks on authorship, copyright, and liability. International Journal of Humanities and Applied Sciences 5(2), p. 145-149.]

Accepto que el Sr. **Guilherme Fráguas Nobre** presenti els articles esmentats com a autor principal i com a part de la seva tesi doctoral, i que aquests articles no puguin, per tant, formar part de cap altra tesi doctoral.

I perquè així consti i tingui els efectes oportuns, signo aquest document.



Prof. Dr. Artur Matuck
School of Communications and Arts
University of São Paulo
Brazil

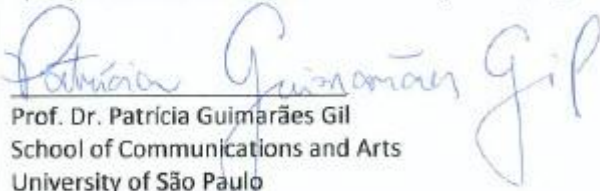
Girona, 29/03/2017

La Dra. **Patrícia Guimarães Gil**, com a coautora del article següent:

[Economia criativa e capital comunicacional. In: ABRAPCORP. Comunicação, economia criativa e organizações. Porto Alegre, edIPUCRS. (accepted as book chapter)]

Accepto que el Sr. **Guilherme Fráguas Nobre** presenti els articles esmentats com a autor principal i com a part de la seva tesi doctoral, i que aquests articles no puguin, per tant, formar part de cap altra tesi doctoral.

I perquè així consti i tingui els efectes oportuns, signo aquest document.



Prof. Dr. Patrícia Guimarães Gil
School of Communications and Arts
University of São Paulo
Brazil

Girona, 30/03/2017

ECONOMÍA CREATIVA



Título	Economía creativa
Título Abreviado	Econ. creativa
País	México
Situación	Vigente
Año de inicio	2014
Año de Terminación	9999
Frecuencia	Semestral
Tipo de publicación	Publicación periódica
Soporte	En línea
Idioma	Español, inglés
ISSN	2395-8200
ISSN-L	2395-8200
Título propio	Economía creativa
Temas	Ciencias Sociales
Subtemas	Economía
Clasificación Dewey	330
Editorial	Centro de Investigación en Economía Creativa
Naturaleza de la publicación	Revista técnico-profesional
Naturaleza de la organización	Institución de investigación
Notas	Fuente: V5, primavera verano, 2016
Revista arbitrada	Si

Economía creativa publica de manera semestral artículos de investigación, reseñas y estudios de caso inéditos que tampoco estén siendo arbitrados de forma simultánea en otra publicación; que destaquen por su enfoque crítico, que propicien la discusión en nuestro campo de especialidad y contribuyan a la integración de los especialistas del rubro.

- Características cumplidas / cumpridas / Standards met: 36
 Características no cumplidas / Não cumpridas / Standards not met: 0

Texto completo	Cobertura Temporal	Formato de Salida	Acceso
centro.edu.mx/ojs_01/index.php/economi...	2014-	PDF	Gratuito

• DATOS DE CONTACTO

Responsables	Karla Paniagua (Editora en Jefe)
Calle y Número	Constituyentes 455
Sector / Barrio / Colonia	Colonia América
Ciudad	México
Estado / Provincia / Departamento	Distrito Federal
Teléfono	(52-55) 27899000 +8844
E-mail	economia.creativa@centro.edu.mx; kpaniagua@centro.edu.mx
Código Postal	11820

• ÍNDICES Y RESÚMENES

Latindex-Catálogo
Latindex-Directorio
Periódica (Índice de Revistas Latinoamericanas en Ciencias)

• DISTRIBUCIÓN

Distribución (Vías)	WWW
Distribución Geográfica	Internacional

• DATOS DE REGISTRO

Folio	25043
Folio Único	22381
Centro de Acopio	México
Fecha de Alta	2016-01-12
Fecha de Modificación	2016-08-12

- Revistas por base de datos
- Revistas acumuladas por año
- Revistas por situación actual actual
- Revistas por año de inicio
- Revistas por idioma de publicación
- Histórico
- Revistas por país
- Revistas acumuladas por año
- Revistas electrónicas
- Histórico
- Revistas por país
- Revistas acumuladas por año
- Revistas por año de inicio
- Histórico
- Directorio
- Catálogo



Trata-se de uma revista semestral que traz artigos, depoimentos, resenhas, entrevistas e pesquisas de especialistas conceituados nacional e internacionalmente - tanto do mercado como do meio científico - visando enriquecer as discussões das áreas de Relações Públicas (RP) e Comunicação Organizacional (CO), sejam de caráter empírico, teórico ou aplicado, sob os princípios da ética. A cada número, a revista publica um dossiê temático que se converte em uma significativa contribuição para estudantes, pesquisadores e profissionais que atuam no ambiente corporativo. Os textos são, em geral, resultantes de pesquisas na universidade, apresentados em uma linguagem acessível para a sociedade, na tentativa de trazer novas contribuições para o debate de assuntos contemporâneos que devem ser equacionados tanto pela academia como pelo mercado. Existe, também, um espaço destinado a artigos resultantes de pesquisa empírica, como um estímulo para que se realizem mais estudos aplicados sobre a temática comunicacional. Seu projeto editorial reúne contribuições de estudiosos e especialistas nacionais e, também, internacionais.

Características cumplidas / cumpridas / Standards met: 33

Características no cumplidas / Não cumpridas / Standards not met: 3

Título	Organicom : Revista Brasileira de Comunicação Organizacional e Relações Públicas (Online)
Título Abreviado	Organicom (Online)
País	Brasil
Situación	Vigente
Año de inicio	2004
Año de Terminación	9999
Frecuencia	Semestral
Tipo de publicación	Publicación periódica
Soporte	En línea
Idioma	Portugués
ISSN	2238-2593
ISSN-L	1807-1236
Título propio	Organicom
Temas	Ciencias Sociales
Subtemas	Sociología, administración, ciencias sociales y humanidades, ciencias de la comunicación
Clasificación Decimal Universal	658
Organismo responsable	Abrapcorp - Associação Brasileira de Pesquisadores de Comunicação Organizacional e Relações Públicas; Universidade de São Paulo, Escola de Comunicações e Artes, Programa de Pós-Graduação em Ciências da Comunicação; Universidade de São Paulo, Escola de Comunicações e Artes, Departamento de Relações Públicas, Propaganda e Turismo, Curso de Especialização em Gestão Estratégica em Comunicação Organizacional e Relações Públicas
Editorial	Universidade de São Paulo, Escola de Comunicações e Artes
Naturaleza de la publicación	Revista de investigación científica
Naturaleza de la organización	Asociación científica o profesional
Revista arbitrada	Si

Texto completo	Cobertura Temporal	Formato de Salida	Acceso
http://revistaorganicom.org.br/sistema/in...	2004-	PDF	Gratuito

• DATOS DE CONTACTO

Responsables	Luiz Alberto de Farias, Margarida Maria Krohling Kunsch
Calle y Número	Av. Prof. Lúcio Martins Rodrigues, 443
Sector / Barrio / Colonia	Cidade Universitária
Ciudad	São Paulo
Estado / Provincia / Departamento	SP
Lugar	São Paulo, SP
Teléfono	(55 11) 3091-2949
E-mail	organicom@revistaorganicom.org.br; assinaturas@revistaorganicom.org.br
Código Postal	05508-900

• ÍNDICES Y RESÚMENES

Latindex-Catálogo
Latindex-Directorío

• DISTRIBUCIÓN

• DATOS DE REGISTRO

Folio	21023
Folio Único	11281
Centro de Acopio	Brasil
Fecha de Alta	2012-03-19
Fecha de Modificación	2012-04-12

- Revistas por base de datos
- Revistas acumuladas por año
- Revistas por situación actual actual
- Revistas por año de inicio
- Revistas por idioma de publicación
- Histórico
- Revistas por país
- Revistas acumuladas por año
- Revistas electrónicas
- Histórico

centro.

Mexico City, 23rd may, 2017
CIEC 77/17

Letter of Acceptance

Hereby we state that after a process of peer to peer review, the academic paper entitled *Creative Economy at Girona, Spain*, by **Guilherme Fráguas Nobre** has been evaluated and accepted for its publication in the academic journal *Economía Creativa*, Spring/2018 issue.

We thank you the punctuality and professionalism of his collaboration. This document is issued for the purposes may deem convenient to the interested.



CENTRO
DE INVESTIGACIÓN
EN ECONOMÍA
CREATIVA

Karla Paniagua Ramírez
Editor in chief
Economía Creativa.
Centro de Investigación en Economía Creativa
Centro | diseño | cine | televisión

Centro de diseño, cine y televisión
Constituyentes 455, Col. América, México, D.F. 11820
T. 27899000 | centro.edu.mx/dfs

Declaration

The papers:

1042 - *Creative economy and communicational capital*

1027 - *Economy, economics, and sustainable human development: towards an 'hyperplaneless economics'*

1231 - *Creative economy at girona, spain: a potential, a hope, and investments to be.*

were accepted to be presented by **Guilherme Nobre** during the 24th APDR Congress "Intellectual Capital and Regional Development: New landscapes and challenges for space planning", held in Covilhã (Portugal), 6-7 July 2017.



Francisco Carballo-Cruz
President of APDR