Survey 2016

Survey on 15 years of activity

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July 2016

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Notes on the Survey made by *Noema* on the occasion of 15 years of activity

Intro

Noema (nóēma, from Greek νόημα, "thought", "concept", "idea") is a website devoted to the relationships and influences among culture, sciences and technologies. "Culture" also means "habits", "lifestyles", "communication", "art", "society", "economy", "media", "philosophy"…, while "technologies" should be intended in a broader meaning than the mere digital realm.

Noema was born in November 1999 and it has been officially online since March 2000. But its roots date back to the beginning of '90s: in March 1994 a small group at the University of Bologna published *NetMagazine*, then renamed in *MagNet*, the first online magazine in Italy, an experience which is still mentioned in the books on Interface Design.
Noema has always been a key magazine in the analysis of the cultural systems' transformations, and it keeps on in exploring and monitoring the society's evolution thanks to its net of authors. In 2003 RAI International selected it as best Italian website.

On the occasion of 15 years of activity *Noema* has launched a Survey on which inventions, scientific disciplines, technologies and events in the last 15 years have deeply influenced, or will be influencing, the relationships among culture, society, sciences and technologies. The Survey took place in two times, from April 13 to May 4, 2016. In the first phase, since the number of the elements to include could have been too high, *Noema* has asked to every member of its International Board and of the Editorial Staff for indicating five entries, from which, basing on the recurrences, have been drawn 21 entries. These entries, selected by *Noema*, have been finally proposed to a circle of people based on the magazine's and its members' network. The result is one hundred of answered Surveys (not bad considering the specificity of many topics, the required knowledge and the difficulty to evaluate the impact of some issues).

Interpretation of data based on the sum of the evaluations per each entry

After considering four alternatives, Google Forms (https://goo.gl/4GO9Vq) has been finally selected for the Survey. The processing of data took place partly in Google Forms and partly in Datacracker (https://www.datacracker.com). The Survey has been open for 20 days (from April 13 to May 4). Data and charts are published at the end of this text.

In the final analysis it is possible to group the responses into three basic categories, based on the total score obtained by adding up, for each item, the number of preferences multiplied for the assigned values, which ranged from 1 to 5. At the end of the 21 items there was a field, named "More (please indicate)", which allowed users to post comments and items not included in the Survey. Since it was not mandatory to answer all questions, a small percentage of people have overlooked a voice, probably because they were unable to express an opinion on that subject (some items require pretty specialized expertise), as regularly has been noted in the field "More". This data interpretation identifies the items that have received the absolute highest numerical evaluation, and basically we believe that hierarchically it reflects the overall importance attributed to each entry.

This first approach is useful to provide an overall view, shown in Chart 1. (see side).

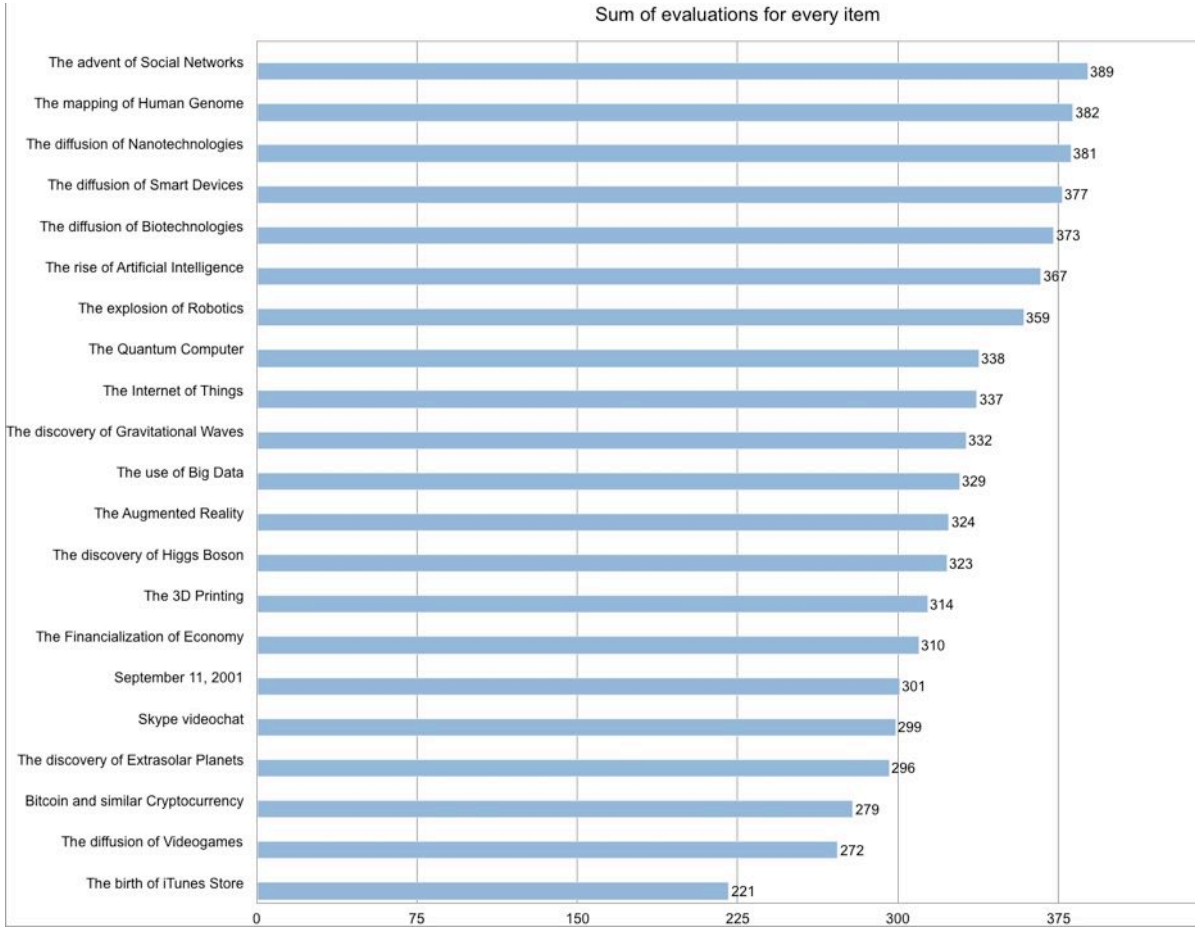
In general, with a few exceptions, the score differences between all items are narrow, therefore the initial choices made by the Board and the Editorial Staff have largely reflected the opinion of those who filled out the Survey. This is also highlighted by the fact that, although people could add new topics in a dedicated field, only 15 have used this possibility. And some of the added topics could be included in the proposed items.

From the chart it is possible to identify three groups, separated by a number of preferences (22 between the first and the second; 11 between the second and the third). Therefore, it is possible to identify three categories:

1) Elements of primary importance

2) Elements of medium importance

3) Minor elements



To the first category belong the seven items that earn the most points, from 389 to 359. The most valued topics were “The advent of Social Networks”, “The mapping of Human Genome”, “The diffusion of Nanotechnologies”, “The diffusion of Smart Devices”, “The diffusion of Biotechnologies”, “The rise of Artificial Intelligence” and “The explosion of Robotics”. From score 338 to 323 there is the group of “The Quantum computer”, “The Internet of Things”, “The discovery of Gravitational Waves”, “The use of Big Data”, “Augmented Reality” and “The discovery of Higgs boson”. Finally, from score 314 to 221, there is a third group, which includes “3D Printing”, “The Financialization of Economy”, “September 11, 2001”, “Skype videochat”, “The discovery of Extrasolar Planets”, “Bitcoin and similar Cryptocurrency”, ”The diffusion of video games” and far behind “The birth of the iTunes Store”.

In this scenario, some results seem interesting. If in fact the

importance of Social Networks may seem obvious, it is surprising instead the low rating of world-class phenomena, such as the spread of video games, the iTunes Store and especially the use of Skype. Just up to fifteen years ago, when Noema was born, only TV broadcasters were able to communicate, expensively, remote audio-visual information in real time (the "live TV"), but now you can do it massively and economically (the cost of a PC, smartphone or tablet and of a connection to a network). Other surprises arise from the positions of two key elements of the last fifteen years: the financialization of economy, among the major causes of a severe global crisis, and the catastrophe of 11 September 2001, that has profoundly changed the international geopolitical balance. Probably in doing the Survey, people have focused on scientific disciplines and technologies, more than on social, economic and political issues. The lesser importance of the economic and social dimensions also emerges from the low evaluations assigned to the use of Bitcoin and virtual money, to the diffusion of video games and, in particular, to the birth of the iTunes Store by Apple.

Other elements are interesting. In the leading group scientific disciplines like Genetics, nanotechnologies, biotechnologies, Artificial Intelligence and Robotics share the top spots with everyday devices and technologies such as smart devices and Social Networks. In the second group, rapidly growing pervasive technologies intended for common use, like Internet of Things (with all the security and privacy issues involved), Augmented Reality and Big Data, are living with the voices perhaps more "esoteric" and difficult to assess in the Survey, like the advent of quantum computers, which leads the group, and the discoveries of Gravitational waves and the Higgs boson. These so specialized last entries have attracted no-rating (as reported in the "More" field, described above), otherwise they probably would have been higher up in the rankings. Beyond the intrinsic importance of these items, which are deeply linked to scientific research, their relatively high position is interesting, because it shows a great consideration of their influence in the cultural and social evolution.

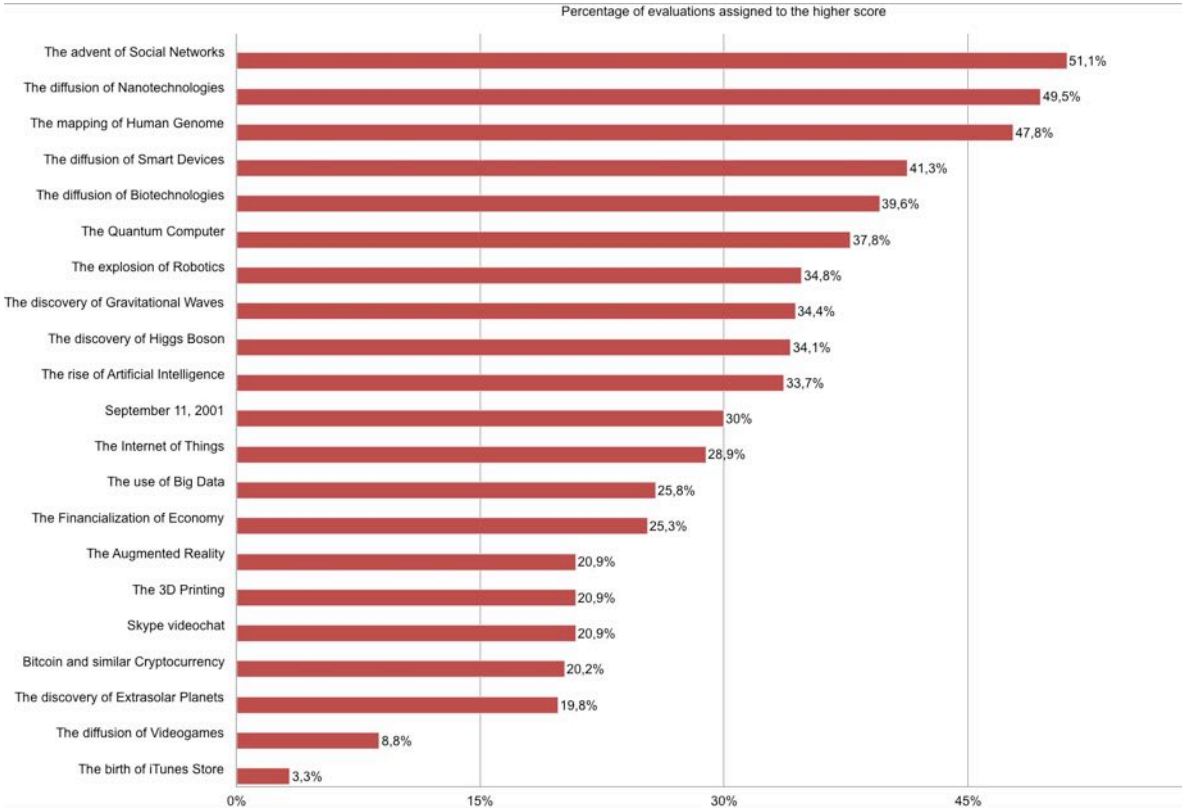
Finally, probably we would have expected a higher evaluation of some voices. It is the case of 3D printing, for example, that promises to technically, economically and culturally revolutionize the approach to artifacts, triggering a transformation probably still larger than that introduced by desktop publishing in the mid-80s of '900. It is also amazing the low position of Bitcoin (and the so-called "virtual coins"), the internationally accepted digital money which use of is rising.

Interpretation of data based on the preferences of the highest rating for each entry

In addition to the general analysis, that adds up the evaluations in overall manner, additional data analysis may consider the concentration of the evaluations. For example, how many times the most important score (5) is selected for each entry, that is, which items are considered more important. In this ranking, given by Graph. 2, the first three entries, with about 50% of the evaluations, do not change, albeit with a reversal of position between the mapping of Human Genome and nanotechnologies. Nevertheless differences are highlighted in respect to the general procedure above described and shown in the first chart. Some items take revenge gaining positions: for example, September 11, 2001 (+5 positions), the Quantum computer and the discovery of Higgs boson (+3 positions), while others items recede, like Internet of Things (-4 positions), Augmented Reality (-3 positions), Big Data and 3D printing (-2 positions), and others vary in limited measure, or don't change at all, their position.

Conclusions

In conclusion, we can affirm that this Survey, on the occasion of 15 years of *Noema* activities, has provided an interesting overview on contemporary times. We profoundly thank the Board, *Noema*'s Editorial Staff and the people who responded to the invitation to participate by donating a bit of their time: they not only participated in the creation of a snapshot of the contemporary, they also offered a valuable recognition to the long activities of Noema.



The selected items will profoundly influence society, politics and social dimensions, everyday life, habits, over a period of time ranging from the day before yesterday to a remote future. Being able to look forward, as tiring, difficult and sometimes disappointing it can be, it is an advantage, such an important and unique role to become ingrained in our species, as the whole history of humanity, starting with the acquisition of symbolic capacity, demonstrates.

Many of the items referred in the Survey, if not all, have blind spots, not only with respect to the knowledge that we have, but also about their use. Internet of Things, Big Data, Augmented Reality, quantum computer raise intense criticism towards respect for privacy, data security, social control, pervasiveness of devices which can also spread personal and neuralgic information. In fact, these applications lead to the extreme the long-standing discussion on social networks, on video games, on online stores, on smart devices, on communications and IP transactions, basically on our online life, increasingly interconnected, extended and public.

Other critical issues concern genetics and the knowledge of the human genome, that is of our very long-term memory, and the possibility of intervention and manipulation. Similar issues concern biotechnology, and especially the disciplines of life, thanks to the ability to modify the living – to be understood also in the meaning of environment – in a much more rapid and deep way than what humanity has always done since prehistoric times with the techniques of breeding and selection. In a multiplicity of increasingly interconnected fields, which in recent years converge and hybridize with the living, Robotics, Artificial Intelligence and nanotechnologies

tend to the realization of increasingly autonomous and capable entities, algorithmic and/or with material bodies, veritable new life forms created by human culture.

All this happens in the light of the new acquisitions of theoretical disciplines, that enormously expand the visions and planning of human action. Like the proof of existence of gravitational waves, which confirms one of the most powerful theoretical constructs about the universe ever produced by the human mind. Or the proof of existence of Higgs boson in the remote origins of the universe, a primordial key element in the mass constitution of the elementary particles. Or, again, the search and the discovery of planets outside the solar system, that open perspectives of which we still confusedly perceive the applications.

One could argue that the space for political, economic and social reflections, represented in the Survey by the presence of only two entries, the financialization of economy and the events of September 11 2001, is limited if compared to the others. This probably reflects the character of the magazine, and also the variety and the different interests of its international audience. *Noema* has always been open to interpretations' comparison, to one-way criticism, it has always given space to discussions of many voices. As we know, the new – innovation – is not born from identity, but from difference.

How humanity will move in this increasingly accelerating *hic sunt leones* territories, outlined by the topics of this Survey? How it will relate with the new life forms which humanity is creating through a myriad of disciplines? What ecological scenarios will open up in times which are critical for the looming environmental problems that threaten the very existence of the planet? What new social and political actors will be expressed by these transformations? What changes in industry, economy, energy, manufacturing, information, work, creativity, leisure? What radical phenomena will emerge? How daily life, social existence, will change? What artistic forms will arise from the techno-scientific universe? Will the human adventure, the species of symbols, be able to survive to itself?

17 June 2016

Pier Luigi Capucci
Noema President & Editor in Chief

A few considerations on *Noema Final Report*

My considerations "statistically speaking" are not a correct sample as regards all the issues included in the *Noema* 15 Years Survey, but more simply a personal impression.
I have mainly looked at two items, A) The Discovery of the Gravitational Waves, B) The Financialization of Economy. It is a matter of fact that the score that these two items received is a relatively low one: 34.4% for the Waves, 25.3% for the Financialization of Economy. In the final report, correctly, elements have been separated in three categories, the Waves are in the second category, the Financialization (…) in the third.

Generally speaking, I agree on what has been written in the *Final Report*, that is to say: "In this scenario, some results seem interesting. If in fact the importance of Social Networks may seem obvious, it is surprising instead the low rating of world-class phenomena, such as the spread of video games, the iTunes Store and especially the use of Skype. (…) Other surprises arise from the positions of two key elements of the last fifteen years: the financialization of economy, among the major causes of a severe global crisis, and the catastrophe of 11 September 2001, that has profoundly changed the international geopolitical balance. Probably in doing the Survey, people have focused on scientific disciplines and technologies, more than on social, economic and political issues. (…) [may be…] more "esoteric" and difficult to assess in the Survey, like the advent of quantum computers, which leads the group, and the discoveries of Gravitational waves and the Higgs boson".

Anyway, intentionally, I limit my self of considerations to the two above mentioned items, A) and B). Let me go around on some phenomena, discoveries, visions, ideological attitiudes… and technologically induced changes.

The Third Life

"What humans call 'technology' is indeed their destiny, their peculiarity, their attitude. Symbolic ability is itself a technology, and the many languages, media, projects, devices, machines, are the tools. Technologies arose from human biology, since they derive from the symbolic ability that emerged – and is inseparable – from the body. Today, technologies are intimately part of the human biology, they are merging with it. (…)
In a near future, human life and culture will expand also beyond biological limits, through the Third Life, the life that humans are giving to the entities built by their culture"[1] (Capucci) .

An interessing question: what *emerges* in our body initially when we immerge in a networked world when human life will expand beyound biological limits?

Emersiologie

"The *émersiologie* [the italic is mine] is a reflexive science arisen from the emersion of the sensitive alive in the consciousness of the lived body. The emersion is the involuntary movement in our body of networks, humors and images the emerged part of which our consciousness knows only. The additional step of the alive in 1st person - which is coming true with the in vivo neurosciences - is the immersion in the body living to demonstrate the conditions of its cognitive emersion (that is its emergence since its immerged) in the consciousness of the lived body."[2] (Andrieu & Burel).

Urgrund, the primordial abyss

Caltech theoretical physicist Kip Thorne is considered the gravitational waves prominent scientist. During his career at Caltech, the Californian Institute of Technology, he gave a fundamental contribution to the making of *Ligo,* the machine that discovered the

gravitational waves.
The Laser Interferometer Gravitational Waves Observatory (LIGO) is designed to open the field of gravitational waves astrophysics through the direct detection of gravitational waves predicted by Einstein's General Theory of Relativity. Researches on Gravitational Waves are very active, the realization of *Lisa Pathfinder* is apparently at a satisfactory stage.

The Laser Interferometer Space Antenna (LISA) is a joint NASA-ESA project to develop and operate a space-based gravitational wave detector (…) LISA will discover many extraordinary astrophysical sources. (…) Astrophysical parameters, such as mass, spin and luminosity distance of many sources will be measured with uncommon precision. (…) Gravitational waves observations will enable studies of: the formation and growth of massive black holes and their co-evolving host galaxies. General Relativity in extreme conditions; cosmology; searches for new physics (…).[3]

Very particular stars, the pulsars (short for pulsating radio stars) are natural detectors of the gravitational waves. Pulsar is a highly magnetized, rotating that emits a beam of, but this is another story. Thorne's work inspired a science fiction film, *Interstellar* (2014), directed by Christopher Nolan. In the epic journey of *Interstellar,* the hypotesis is that in the black holes takes shape a space-time passage (one wormhole) allowing journey through three dimensions. If I am not wrong Thorne is not sure that wormholes exist in the Universe, anyway thise space-time passage would possibly allow three dimensional journeys.[4] Now he is working at the scenario of a new science-fiction film with Stephen Hawking...

If "Life is a constant struggle in man and in the universe between light and darkness" (Jakob Boehme, 1575-1624), may be, in the future, with "black holes and time warps" (Thorne) shall we actually travel through the space-time? Jakob Boehme, the German Christian mystic and metaphysician, would probably be very pleased - considered his studies on the primordial abyss (*Urgrund*) - of new opportunities due to researches on cosmology, structure of our Galaxy, a… new phisycs.

οἶκος νόμος (oikos nomos)

…The house and the law, the rule. By acting according to the rules you have an order. *Oikos nomos* means to manage a house, which is not synonymus of making profits. The more the "house" is in order, the more confidence you get.
A good news in the last years, also under e a symbolic point of view, was the attribution of the Nobel Prize in Economic Sciences to Angus Deaton (2015). Beyond the prize motivation – "for his analysis of consumption, poverty, and welfare" – his research and work underline the essential role of the relationships among consumption, savings, incomes – and prices – in order to analyze welfare, poverty and economic development.

I guess to avoid a once-upon-a-time analysis on the above mentioned issues, I just want to take the occasion to pay homage to one of my gurus, Amartya Sen, a key figure also to analyze the present economical situation. In 1998 he was awarded the Nobel Prize in Economic Sciences for his contributions to welfare economics and social choice theory and for his interest in the problems of society's poorest members. Sen was called the "conscience of his profession", he still inspires generations of researchers. Roughly speaking finance and economy are not really synonymous, they cross each other, they need each other, more and more, lately, they dangerously compete each other, and this is also a great social risk. An alarming problem, mainly in the last fifteen years, is the runaway increase of the sometimes called "synthetic finance", which drains resources not transferring them in the real economy.

This is a clawback generating instability, very difficult to control. Catastrophical crisis like 11th September 2001 attack in New York, the 2008 Lehman Brothers one in USA, Brexit, made things worse. There

is a certain difference between a finance investing in assets, shares, bonds, and the synthetic finance with its delirious value estimated around one trillion (in US dollars).[5] A widespread effect of the above mentioned issues is inequality. Thomas Piketty, a brilliant and discussed star of these times in economical studies, has concentrated much of his attention to inequality and, consequently, to redistribution. Piketty's remedy is redistribution through a progressive global tax on wealth. His best-seller, *Capital in the Twenty-First Century* (2013), focuses on in Europe and the US since the 18th century. The book's central thesis is that inequality is not an accident but rather a feature of capitalism that can be reversed only through state intervention. The book thus argues that unless capitalism is reformed, the very democratic order will be threatened.

Virtual currencies

Bitcoin is a digital asset and a payment system invented by Satoshi Nakamoto, who published the invention in 2008 and released it as opensource software in 2009. Craig Steven Wright has also claimed to be the creator of bitcoins. In December 2015, *Wired* and *Gizmodo* magazines named Wright as likely to be bitcoin's creator.

Bitcoin (*bit coin*) is not the only virtual currency, but apparently, it is the more well know and the largest in terms of total market value. It is a decentralized virtual currency, allowing peer to peer transactions between users directly, without an intermediary. These transactions are verified by network nodes and recorded in a public distributed ledger called the block chain. Even being a digital asset, as unit of account (its value is rather fluctuating) bitcoins need the confidence, which is one of the basic principles of economics. Bitcoins are created as a reward for payment processing work in which users offer their computing power to verify and record payments into a public ledger. This activity is called mining and miners are rewarded with transaction fees and newly created bitcoins. Besides being obtained by mining, bitcoins can be exchanged for other currencies, products, and services.
Finance services provided by bitcoin are totally legitimate, one of the questions is that apparently users are not protected by refund rights or chargebacks. I avoid now to enter in the possible criminal use of bitcoins, I am convinced that criminal activites are using all kind of financial opportunities. An interesting Italian virtual currency, complementary to Euro, is the Sardex. Based in Sardinia it was created in 2009 (Sardex.net). In practice, Sardex, allows the trade of goods and services among the enterprises which are members.[6]

Virtual currencies are many, will they spread in all directions with an Uber-like effect or will they have limited influences? In a not yet digital era an experimental currency was introduced at the times of Great Depression. The Wära was a demurrage-charged currency used in Germany, introduced in the late 1920s as a free economy experiment in various places. It was introduced by Hans Timm and Helmut Rödiger, followers of Silvio Gesell, in 1926. The Wära is comparable to current models of local currencies. The word Wära, invented by Timm and Rödiger, comes from the words Währung (currency) and währen ("to last"), in the sense of "lasting", "stable". One Wära corresponded to one Reichsmark. Wära banknotes were available in denominations of 1/2, 1, 2, 5 and 10 Wära. Each Wära banknote had a monthly demurrage fee of one percent of its nominal value. This fee could be balanced by the acquisition of demurrage stamps of 1/2, 1, 2, 5 and 10 Wära-cents (1 cent equalled 1 Reichspfennig). On the back of the Wära banknote was a series of printed fields, where the demurrage stamps could be glued onto. The idea of this measure was to place the currency under compulsory circulation. To avoid losing value, each owner of Wära currency had to spend their currency by its due date.

To come to a conclusion, as you read in the *Final Report*: "What artistic forms will arise from the techno-scientific universe? Will the human adventure, the species of symbols, be able to survive to itself?"

Footnotes

1) Pier Luigi Capucci, in Snežana Štabi, Dmitry Bulatov, Aleksandra Kostič (eds.), *Soft Control: Art, Science and the Technological Unconscious*, Maribor, ACE Kibla, 2015, pp. 50-51.
2) Bernard Andrieu, Nicolas Burel, *La communication directe du corps vivant. Une émersiologie en première personne*, Hermès, 2014, p. 68. For this abstract on émersiologie, see also in "ResearchGate" https://www.researchgate.net/publication/275520705 .
I had the chance to discuss topics analyzed in this abstract with one of his author, Bernard Andrieu. Emersiology is also very pertinent to my searches on Immersive Arts. In fact, I am curating the Italian version of the "Manifeste Emersif – Naissance des Arts Immersifs", written by Bernard Andrieu and Anais Bernard, scheduled to be published by *Noema*.
3) I am in debt for these information on LIGO and LISA respectively to https://www.ligo.caltech.edu/page/about and http://lisa.nasa.gov/
4) Kip S. Thorne, *Black Holes and Time Warps: Einstein's Outrageous Legacy*, New York, W.W. Norton & Company, 1994.
5) An appealing article on synthetic finance is on :
https://speculativematerialism.com/2013/07/18/why-study-the-ontology-of-synthetic-finance-a-first-note/
"Perhaps its time to say a few words clarifying one reason why speculative materialism is interested to study the ontology of synthetic finance (and as always, why a Deleuzian is uniquely situated to do so)…" (Benjamin Lozano) July 18, 2013.
6) An article interesting on Sardex is on : http://www.rethinkecon.it/sardex-the-islander-currency-en/

4 July 2016

Franco Torriani
Noema Advisory Board

Noema Survey: an indisciplined reflection
So close, so far away...

I Am Alive and You Are Dead
P.K. Dick

Surely *Noema* Survey, made on the occasion of its 15 years, gave us an interesting overview of the contemporary world. This survey could be a strong reflection on our life totally absorbed by digital communication. Our lives are all over deeply affected by the new technologies. The big global problem is that we are immersed in a quantification of data processing. I.e., Internet of things, big data, augmented reality, the quantum computer, they create a great infoscape, in which the data produce other information and profiling. In this scenario, cameras scattered everywhere and our smartphones become mirrors of our self, the urgency is, perhaps, to create a kind of invisibility.

Today we have CCTV, digital cameras, wireless communication systems, the 3D animations in real time and the opportunity to share our experiences through the internet and social networks, email, chat, MMOD, Facebook, Flickr, Twitter, SnapChat. So we are always together, but at the same time so alone, just sitting in front of a black screen. There is a gap between sharing and storage?

Art, science and technology are living a period of deep changes, while the scientific research raises urgent questions of ethics. Global connectivity creates new arenas for interaction between science, art and technology, but shapes other questions on a possible global crisis. We normally use the term 'digital' because it is embedded in our culture. The relationship between science and technology is so

incisive, but still it remains rather complex. For the first time, not only humans are aware of this development, but it is the human being who craves for a kind of hybridization with technology.

In the era of molecular biology, of robotics and bioart we can start talking about new forms of life ("third lives"), between human nature and artificial, creating a sort of hybridization and close compelling cooperation. Even artists have begun to use the bio-technology tools to track and display the complexity of life.

In fact ethics and morality pertain to our innate responsibility in giving sense to our daily alternative world-making. In other words, we must not forget that art has a transgressive dimension (uncanny) that does not imitate the world, but rather interprets it by giving a new meaning.

The introduction of new technological devices has extended the limits of our body, opening philosophical and scientific debates on a new perspective, oversteppping the anthropocentric one. The new media have changed the perception of the world and have also changed the relationship between human being and nature. Multimedia, interactivity, hypermediality and virtuality are the ingredients of a new dimension of communication and information. The body is immersed in the process of this acceleration, opening up to virtual and quantum boundaries and acquiring new meanings.

Nowadays, the body rethought as a subject-object becomes a device that participates in this mutation. In other words, the transdisciplinarity device may promote interesting ways of thinking, and a way is just that of the artistic metaphor.

In this new digital process, the art is rethought as a process in which science and technology are strictly interrelated and, through this high degree of knowledge and awareness, the natural evolution, will be the consequence of a physical-digital revolution, that mixes atoms and bits, bodies and digital data, for a new Big Bang. Perhaps, a simple way, could be that of re-arranging our eyes, where the universe with its micro and macro constellation, substantially has never been so close, so far away.

Giorgio Cipolletta
Noema Editorial and Media Staff

Charts and data

L'11 Settembre 2001 [September 11, 2001]

	%
1	11%
2	21%
3	20%
4	18%
5	30%
NET	100%
Average	3.3
Sum	301
Missing Count	4

L'11 Settembre 2001 [September 11, 2001] SUMMARY
sample size = 90; total sample size = 94; 4 missing; 95% confidence level

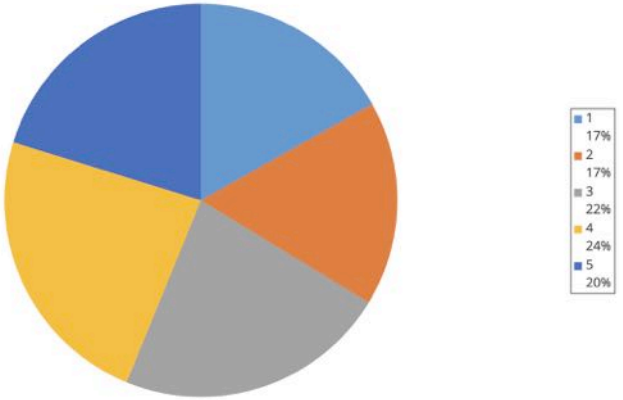
The highest percentage for **L'11 Settembre 2001 [September 11, 2001]** is 30% for '5'.

The lowest percentage for **L'11 Settembre 2001 [September 11, 2001]** is 11% for '1'.

Il denaro virtuale (Bitcoin e analoghi) [Bitcoin and similar Cryptocurrency]

	%
1	17%
2	17%
3	22%
4	24%
5	20%
NET	100%
Average	3.1
Sum	279
Missing Count	5

Il denaro virtuale (Bitcoin e analoghi) [Bitcoin and similar Cryptocurrency] SUMMARY
sample size = 89; total sample size = 94; 5 missing; 95% confidence level



There are no significant differences between the categories of **Il denaro virtuale (Bitcoin e analoghi) [Bitcoin and similar Cryptocurrency]**.

L'uso dei Big Data [The use of Big Data]

	%
1	2%
2	10%
3	29%
4	33%
5	26%
NET	100%
Average	3.7
Sum	329
Missing Count	5

L'uso dei Big Data [The use of Big Data] SUMMARY
sample size = 89; total sample size = 94; 5 missing; 95% confidence level

The highest percentages for **L'uso dei Big Data [The use of Big Data]** include:

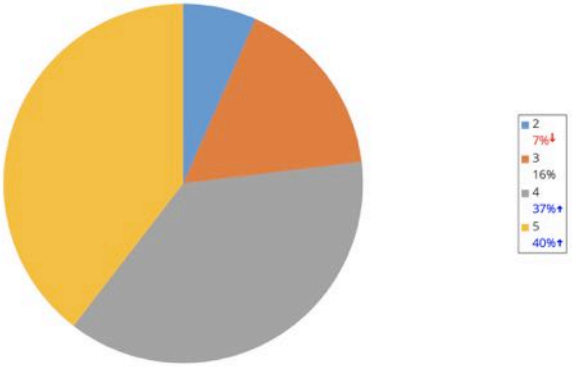
- 33% for '4'.
- 29% for '3'.

The lowest percentage for **L'uso dei Big Data [The use of Big Data]** is 2% for '1'.

La diffusione delle Biotecnologie [The diffusion of Biotechnologies]

	%
2	7%
3	16%
4	37%
5	40%
NET	100%
Average	4.1
Sum	373
Missing Count	3

La diffusione delle Biotecnologie [The diffusion of Biotechnologies] SUMMARY
sample size = 91; total sample size = 94; 3 missing; 95% confidence level



The highest percentages for **La diffusione delle Biotecnologie [The diffusion of Biotechnologies]** include:

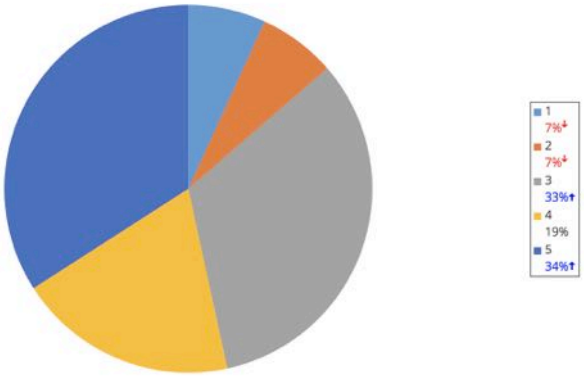
- 40% for '5'.
- 37% for '4'.

The lowest percentage for **La diffusione delle Biotecnologie [The diffusion of Biotechnologies]** is 7% for '2'.

La scoperta del Bosone di Higgs [The discovery of Higgs Boson]

	%
1	7%
2	7%
3	33%
4	19%
5	34%
NET	100%
Average	3.7
Sum	323
Missing Count	6

La scoperta del Bosone di Higgs [The discovery of Higgs Boson] SUMMARY
sample size = 88; total sample size = 94; 6 missing; 95% confidence level



The highest percentages for **La scoperta del Bosone di Higgs [The discovery of Higgs Boson]** include:

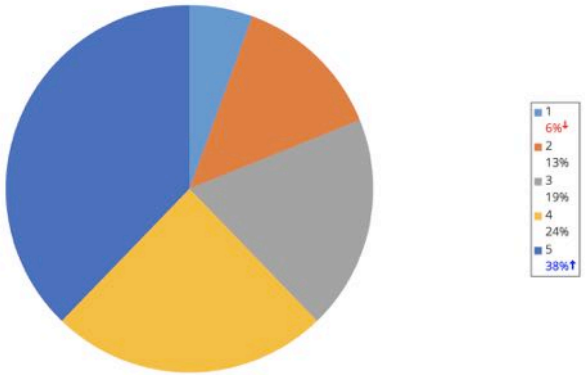
- 34% for '5'.
- 33% for '3'.

The lowest percentage for **La scoperta del Bosone di Higgs [The discovery of Higgs Boson]** is 7% for '1'.

Il computer quantistico [The Quantum Computer]

	%
1	6%
2	13%
3	19%
4	24%
5	38%
NET	100%
Average	3.8
Sum	338
Missing Count	4

Il computer quantistico [The Quantum Computer] SUMMARY
sample size = 90; total sample size = 94; 4 missing; 95% confidence level



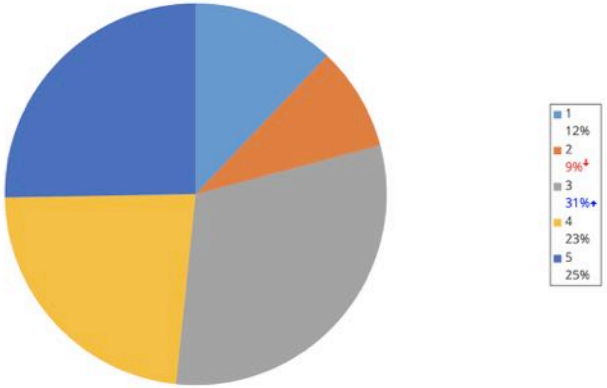
The highest percentage for **Il computer quantistico [The Quantum Computer]** is 38% for '5'.

The lowest percentage for **Il computer quantistico [The Quantum Computer]** is 6% for '1'.

La finanziarizzazione dell'economia [The Financialization of Economy]

	%
1	12%
2	9%
3	31%
4	23%
5	25%
NET	100%
Average	3.4
Sum	310
Missing Count	3

La finanziarizzazione dell'economia [The Financialization of Economy] SUMMARY
sample size = 91; total sample size = 94; 3 missing; 95% confidence level



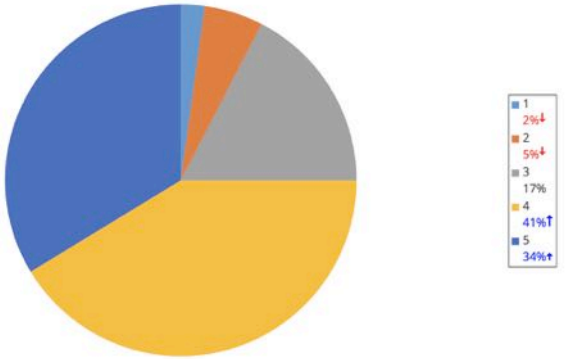
The highest percentage for **La finanziarizzazione dell'economia [The Financialization of Economy]** is 31% for '3'.

The lowest percentage for **La finanziarizzazione dell'economia [The Financialization of Economy]** is 9% for '2'.

L'evoluzione dell'Intelligenza Artificiale [The rise of Artificial Intelligence]

	%
1	2%
2	5%
3	17%
4	41%
5	34%
NET	100%
Average	4.0
Sum	367
Missing Count	2

L'evoluzione dell'Intelligenza Artificiale [The rise of Artificial Intelligence] SUMMARY
sample size = 92; total sample size = 94; 2 missing; 95% confidence level



The highest percentages for **L'evoluzione dell'Intelligenza Artificiale [The rise of Artificial Intelligence]** include:

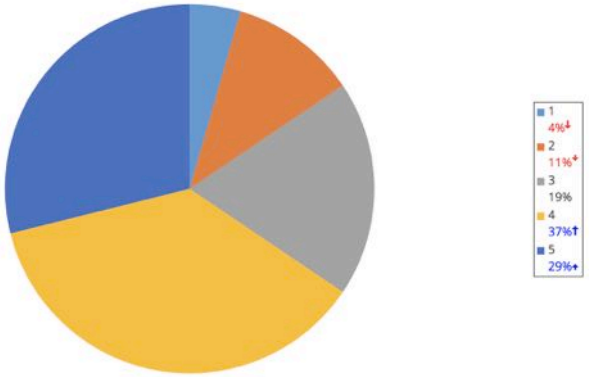
- 41% for '4'.
- 34% for '5'.

The lowest percentage for **L'evoluzione dell'Intelligenza Artificiale [The rise of Artificial Intelligence]** is 2% for '1'.

L'Internet of Things [The Internet of Things]

	%
1	4%
2	11%
3	19%
4	37%
5	29%
NET	100%
Average	3.7
Sum	337
Missing Count	4

L'Internet of Things [The Internet of Things] SUMMARY
sample size = 90; total sample size = 94; 4 missing; 95% confidence level



The highest percentages for **L'Internet of Things [The Internet of Things]** include:

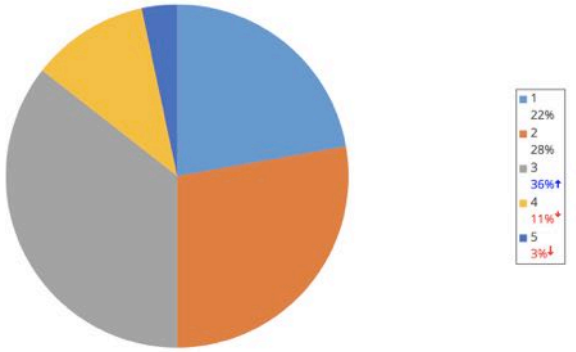
- 37% for '4'.
- 29% for '5'.

The lowest percentage for **L'Internet of Things [The Internet of Things]** is 4% for '1'.

La nascita di iTunes Store [The birth of iTunes Store]

	%
1	22%
2	28%
3	36%
4	11%
5	3%
NET	100%
Average	2.5
Sum	221
Missing Count	4

La nascita di iTunes Store [The birth of iTunes Store] SUMMARY
sample size = 90; total sample size = 94; 4 missing; 95% confidence level



The highest percentage for **La nascita di iTunes Store [The birth of iTunes Store]** is 36% for '3'.

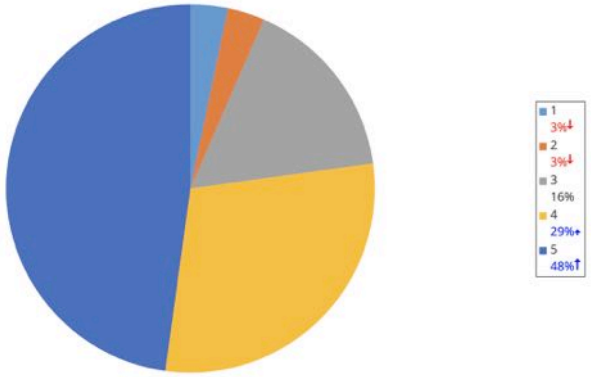
The lowest percentages for **La nascita di iTunes Store [The birth of iTunes Store]** include:

- 3% for '5'.
- 11% for '4'.

La mappatura del genoma umano [The mapping of Human Genome]

	%
1	3%
2	3%
3	16%
4	29%
5	48%
NET	100%
Average	4.2
Sum	382
Missing Count	2

La mappatura del genoma umano [The mapping of Human Genome] SUMMARY
sample size = 92; total sample size = 94; 2 missing; 95% confidence level



The highest percentages for **La mappatura del genoma umano [The mapping of Human Genome]** include:

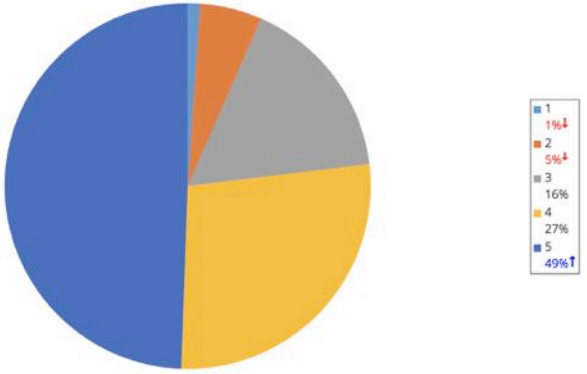
- 48% for '5'.
- 29% for '4'.

The lowest percentage for **La mappatura del genoma umano [The mapping of Human Genome]** is 3% for '1'.

La diffusione delle nanotecnologies [The diffusion of Nanotechnologies]

	%
1	1%
2	5%
3	16%
4	27%
5	49%
NET	100%
Average	4.2
Sum	381
Missing Count	3

La diffusione delle nanotecnologies [The diffusion of Nanotechnologies] SUMMARY
sample size = 91; total sample size = 94; 3 missing; 95% confidence level



The highest percentage for **La diffusione delle nanotecnologies [The diffusion of Nanotechnologies]** is 49% for '5'.

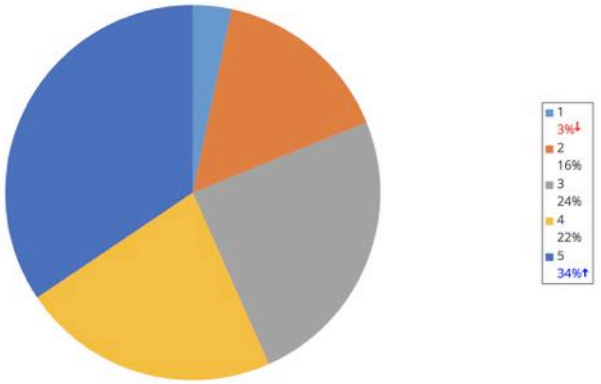
The lowest percentages for **La diffusione delle nanotecnologies [The diffusion of Nanotechnologies]** include:

- 1% for '1'.
- 5% for '2'.

La scoperta delle onde gravitazionali [The discovery of Gravitational Waves]

	%
1	3% ↓
2	16%
3	24%
4	22%
5	34% ↑
NET	100% ↑
Average	3.7 ↑
Sum	332 ↑
Missing Count	4

La scoperta delle onde gravitazionali [The discovery of Gravitational Waves] SUMMARY
sample size = 90; total sample size = 94; 4 missing; 95% confidence level



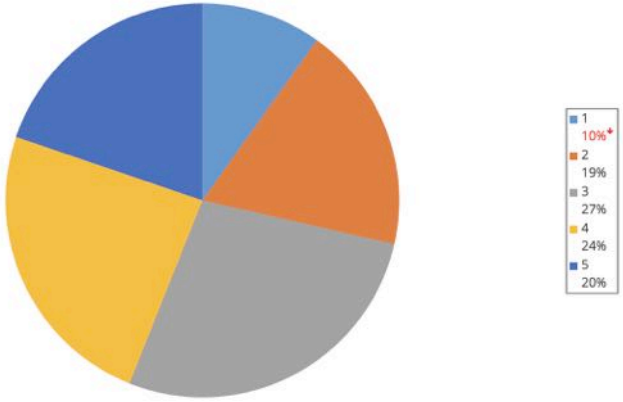
The highest percentage for **La scoperta delle onde gravitazionali [The discovery of Gravitational Waves]** is 34% for '5'.

The lowest percentage for **La scoperta delle onde gravitazionali [The discovery of Gravitational Waves]** is 3% for '1'.

La scoperta dei pianeti extrasolari [The discovery of Extrasolar Planets]

	%
1	10% ↓
2	19%
3	27%
4	24%
5	20%
NET	100% ↑
Average	3.3 ↑
Sum	296 ↑
Missing Count	3

La scoperta dei pianeti extrasolari [The discovery of Extrasolar Planets] SUMMARY
sample size = 91; total sample size = 94; 3 missing; 95% confidence level

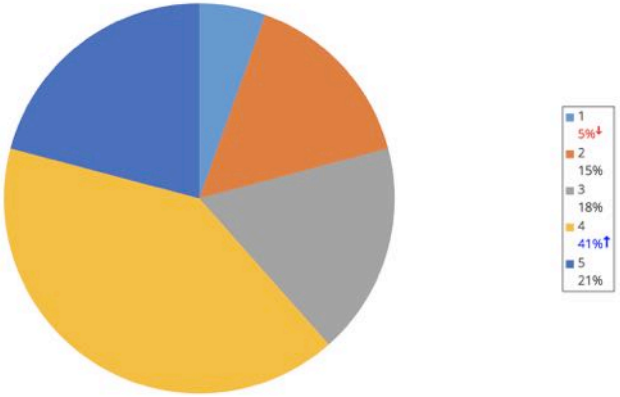


The lowest percentage for **La scoperta dei pianeti extrasolari [The discovery of Extrasolar Planets]** is 10% for '1'.

La Realtà Aumentata [The Augmented Reality]

	%
1	5% ↓
2	15%
3	18%
4	41% ↑
5	21%
NET	100% ↑
Average	3.6 ↑
Sum	324 ↑
Missing Count	3

La Realtà Aumentata [The Augmented Reality] SUMMARY
sample size = 91; total sample size = 94; 3 missing; 95% confidence level



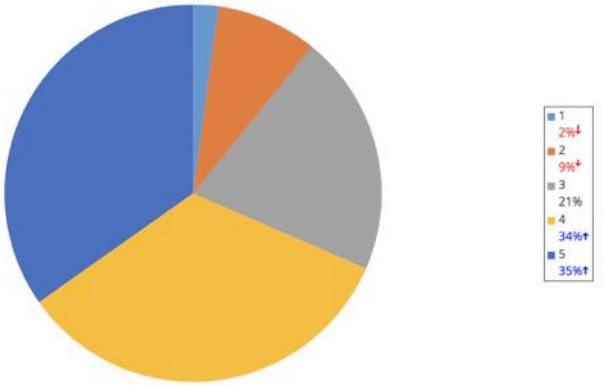
The highest percentage for **La Realtà Aumentata [The Augmented Reality]** is 41% for '4'.

The lowest percentage for **La Realtà Aumentata [The Augmented Reality]** is 5% for '1'.

L'esplosione della Robotica [The explosion of Robotics]

	%
1	2% ↓
2	9% ↓
3	21%
4	34% ↑
5	35% ↑
NET	100% ↑
Average	3.9 ↑
Sum	359 ↑
Missing Count	2

L'esplosione della Robotica [The explosion of Robotics] SUMMARY
sample size = 92; total sample size = 94; 2 missing; 95% confidence level



The highest percentages for **L'esplosione della Robotica [The explosion of Robotics]** include:

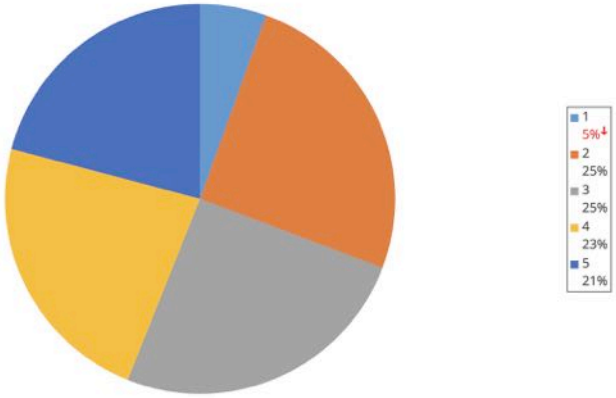
- 35% for '5'.
- 34% for '4'.

The lowest percentage for **L'esplosione della Robotica [The explosion of Robotics]** is 2% for '1'.

La videochat di Skype [Skype videochat]

	%
1	5%
2	25%
3	25%
4	23%
5	21%
NET	100%
Average	3.3
Sum	299
Missing Count	3

La videochat di Skype [Skype videochat] SUMMARY
sample size = 91; total sample size = 94; 3 missing; 95% confidence level

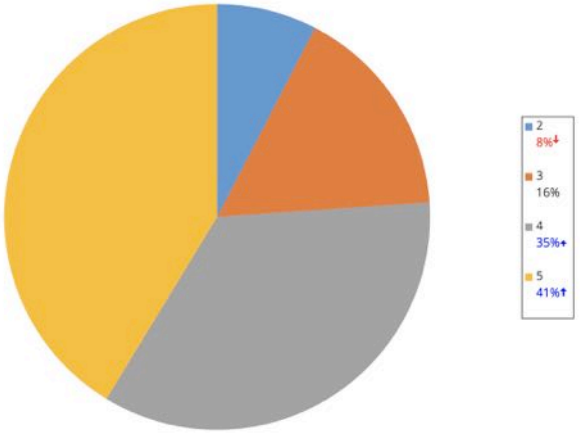


The lowest percentage for **La videochat di Skype [Skype videochat]** is 5% for '1'.

La diffusione degli Smart Devices [The diffusion of Smart Devices]

	%
2	8%
3	16%
4	35%
5	41%
NET	100%
Average	4.1
Sum	377
Missing Count	2

La diffusione degli Smart Devices [The diffusion of Smart Devices] SUMMARY
sample size = 92; total sample size = 94; 2 missing; 95% confidence level



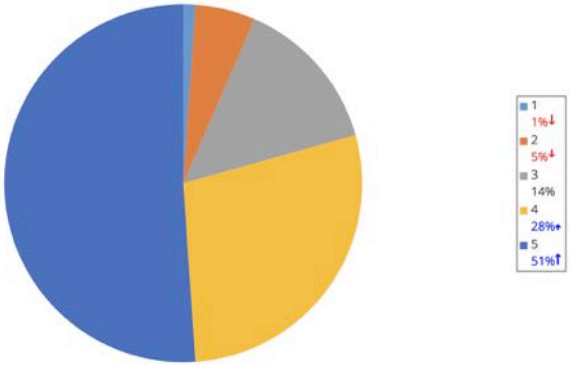
The highest percentages for **La diffusione degli Smart Devices [The diffusion of Smart Devices]** include:
- 41% for '5'.
- 35% for '4'.

The lowest percentage for **La diffusione degli Smart Devices [The diffusion of Smart Devices]** is 8% for '2'.

La nascita dei Social Network [The advent of Social Networks]

	%
1	1%
2	5%
3	14%
4	28%
5	51%
NET	100%
Average	4.2
Sum	389
Missing Count	2

La nascita dei Social Network [The advent of Social Networks] SUMMARY
sample size = 92; total sample size = 94; 2 missing; 95% confidence level



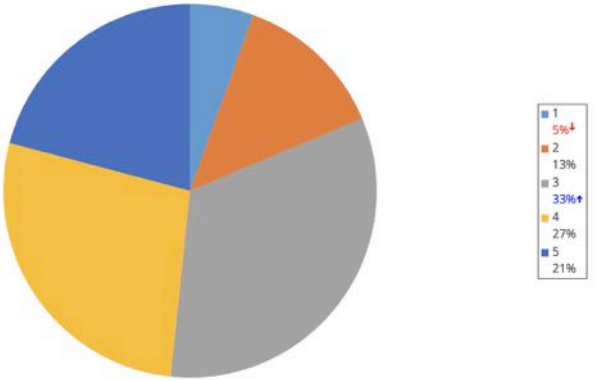
The highest percentages for **La nascita dei Social Network [The advent of Social Networks]** include:
- 51% for '5'.
- 28% for '4'.

The lowest percentage for **La nascita dei Social Network [The advent of Social Networks]** is 1% for '1'.

La stampa 3D [The 3D Printing]

	%
1	5%
2	13%
3	33%
4	27%
5	21%
NET	100%
Average	3.5
Sum	314
Missing Count	3

La stampa 3D [The 3D Printing] SUMMARY
sample size = 91; total sample size = 94; 3 missing; 95% confidence level



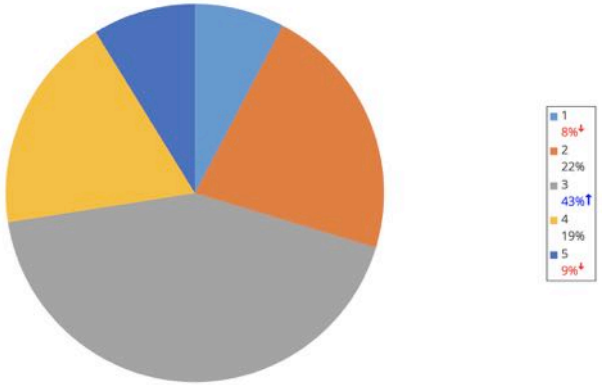
The highest percentage for **La stampa 3D [The 3D Printing]** is 33% for '3'.

The lowest percentage for **La stampa 3D [The 3D Printing]** is 5% for '1'.

La diffusione dei videogame [The diffusion of Videogames]

	%
1	8% ↓
2	22%
3	43% ↑
4	19%
5	9% ↓
NET	100% ↑
Average	3.0 ↑
Sum	272 ↑
Missing Count	3

La diffusione dei videogame [The diffusion of Videogames]
SUMMARY
sample size = 91; total sample size = 94; 3 missing; 95% confidence level



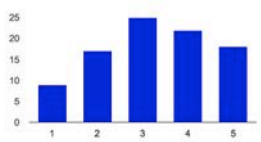
The highest percentage for **La diffusione dei videogame [The diffusion of Videogames]** is 43% for '3'.

The lowest percentages for **La diffusione dei videogame [The diffusion of Videogames]** include:

- 8% for '1'.
- 9% for '5'.

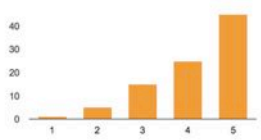
Voci [Items]	Score	% score 5
La nascita dei Social Network [The advent of Social Networks]	389	51,1%
La mappatura del genoma umano [The mapping of Human Genome]	382	47,8%
La diffusione delle nanotecnologie [The diffusion of Nanotechnologies]	381	49,5%
La diffusione degli Smart Devices [The diffusion of Smart Devices]	377	41,3%
La diffusione delle Biotecnologie [The diffusion of Biotechnologies]	373	39,6%
L'evoluzione dell'Intelligenza Artificiale [The rise of Artificial Intelligence]	367	33,7%
L'esplosione della Robotica [The explosion of Robotics]	359	34,8%
Il computer quantistico [The Quantum Computer]	338	37,8%
L'Internet of Things [The Internet of Things]	337	28,9%
La scoperta delle onde gravitazionali [The discovery of Gravitational Waves]	332	34,4%
L'uso dei Big Data [The use of Big Data]	329	25,8%
La Realtà Aumentata [The Augmented Reality]	324	20,9%
La scoperta del Bosone di Higgs [The discovery of Higgs Boson]	323	34,1%
La stampa 3D [3D Printing]	314	20,9%
La finanziarizzazione dell'economia [The Financialization of Economy]	310	25,3%
L'11 Settembre 2001 [September 11, 2001]	301	30%
La videochat di Skype [Skype videochat]	299	20,9%
La scoperta dei pianeti extrasolari [The discovery of Extrasolar Planets]	296	19,8%
Il denaro virtuale (Bitcoin e analoghi) [Bitcoin and similar Cryptocurrency]	279	20,2%
La diffusione dei videogame [The diffusion of Video games]	272	8,8%
La nascita di iTunes Store [The birth of iTunes Store]	221	3,3%

La scoperta dei pianeti extrasolari [The discovery of Extrasolar Planets]



1	9	9.9%
2	17	18.7%
3	25	27.5%
4	22	24.2%
5	18	19.8%

La diffusione delle nanotecnologies [The diffusion of Nanotechnologies]

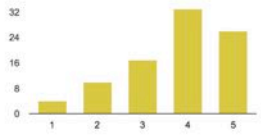


1	1	1.1%
2	5	5.5%
3	15	16.5%
4	25	27.5%
5	45	49.5%

La Realtà Aumentata [The Augmented Reality]

1	5	5.5%
2	14	15.4%
3	16	17.6%
4	37	40.7%
5	19	20.9%

L'Internet of Things [The Internet of Things]



1	4	4.4%
2	10	11.1%
3	17	18.9%
4	33	36.7%
5	26	28.9%

Il denaro virtuale (Bitcoin e analoghi) [Bitcoin and similar Cryptocurrency]

1	15	16.9%
2	15	16.9%
3	20	22.5%
4	21	23.6%
5	18	20.2%

La finanziarizzazione dell'economia [The Financialization of Economy]

1	11	12.1%
2	8	8.8%
3	28	30.8%
4	21	23.1%
5	23	25.3%

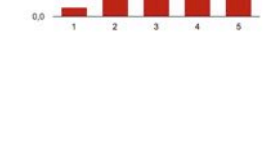
L'11 Settembre 2001 [September 11, 2001]

1	10	11.1%
2	19	21.1%
3	18	20%
4	16	17.8%
5	27	30%

L'uso dei Big Data [The use of Big Data]

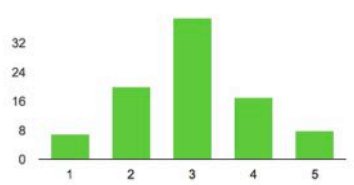
1	2	2.2%
2	9	10.1%
3	26	29.2%
4	29	32.6%
5	23	25.8%

La scoperta delle onde gravitazionali [The discovery of Gravitational Waves]



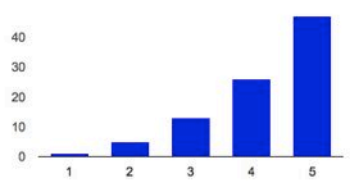
1	3	3.3%
2	14	15.6%
3	22	24.4%
4	20	22.2%
5	31	34.4%

La diffusione dei videogame [The diffusion of Videogames]



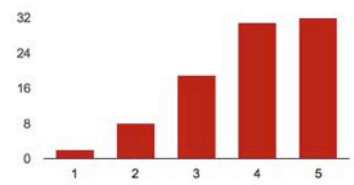
1	7	7.7%
2	20	22%
3	39	42.9%
4	17	18.7%
5	8	8.8%

La nascita dei Social Network [The advent of Social Networks]



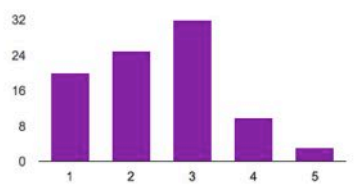
1	1	1.1%
2	5	5.4%
3	13	14.1%
4	26	28.3%
5	47	51.1%

L'esplosione della Robotica [The explosion of Robotics]



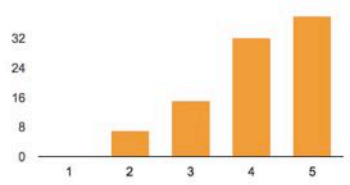
1	2	2.2%
2	8	8.7%
3	19	20.7%
4	31	33.7%
5	32	34.8%

La nascita di iTunes Store [The birth of iTunes Store]



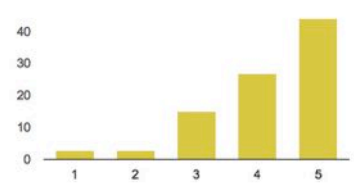
1	20	22.2%
2	25	27.8%
3	32	35.6%
4	10	11.1%
5	3	3.3%

La diffusione degli Smart Devices [The diffusion of Smart Devices]



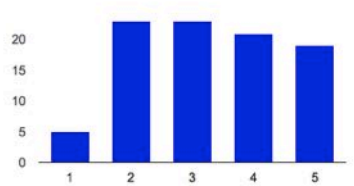
1	0	0%
2	7	7.6%
3	15	16.3%
4	32	34.8%
5	38	41.3%

La mappatura del genoma umano [The mapping of Human Genome]



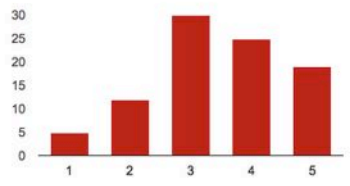
1	3	3.3%
2	3	3.3%
3	15	16.3%
4	27	29.3%
5	44	47.8%

La videochat di Skype [Skype videochat]



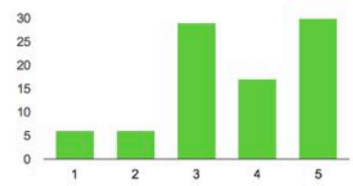
1	5	5.5%
2	23	25.3%
3	23	25.3%
4	21	23.1%
5	19	20.9%

La stampa 3D [The 3D Printing]



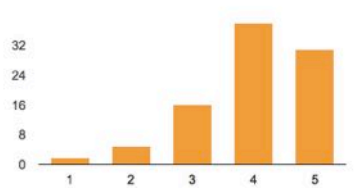
1	5	5.5%
2	12	13.2%
3	30	33%
4	25	27.5%
5	19	20.9%

La scoperta del Bosone di Higgs [The discovery of Higgs Boson]



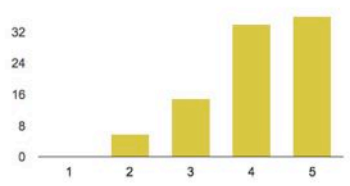
1	6	6.8%
2	6	6.8%
3	29	33%
4	17	19.3%
5	30	34.1%

L'evoluzione dell'Intelligenza Artificiale [The rise of Artificial Intelligence]



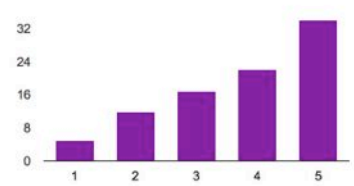
1	2	2.2%
2	5	5.4%
3	16	17.4%
4	38	41.3%
5	31	33.7%

La diffusione delle Biotecnologie [The diffusion of Biotechnologies]



1	0	0%
2	6	6.6%
3	15	16.5%
4	34	37.4%
5	36	39.6%

Il computer quantistico [The Quantum Computer]



1	5	5.6%
2	12	13.3%
3	17	18.9%
4	22	24.4%
5	34	37.8%

Main Projects

NOEMA

Noema is a website devoted to the relationships and influences among culture, sciences, technologies and society.
http://noemalab.eu

FIVE WORDS FOR THE FUTURE

FiveWordsForTheFuture's main object is to help people to identify and understand what's new, innovation, and to imagine the future.
http://fivewordsforthefuture.eu

<m>

<mediaversi> is a books series published by CLUEB and coproduced by *Noema* which aims at reflecting in an interdisciplinary way on the relationships among media (not only the digitally based ones), emergent technologies and society in its fundamental expressions: culture, representations, communications, arts.
http://mediaversi.it

e.lab e-learning.lab

The **e.lab** (e-learning.lab) was born in 2002 from *Noema*'s activities as a teaching platform to collaborate. The e.lab is online for the courses which need a learning system to share material, confront on topics and improve their teaching activities.
http://noemalab.eu/e-learning/

NOEMA publishing

Noema publishes multimedia eBooks in mobi, epub, ibooks and PDF formats.

n.blog

Since 2005 the **n.blog** has been supporting events on *Noema*'s topics almost in realtime. It offers reportages, writings, images, interviews, comments, movies from events and festivals worldwide.
http://blogs.noemalab.eu

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