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The smart home in the mind and in the practice of digital natives.
The case of "Sapienza" University

Abstract

Smart home e giovani: quale la percezione? La presente indagine pilota, effettuata da un gruppo di studiosi dell'Università Sapienza di Roma mira ad analizzarne i risultati, rappresentando una ricognizione essenziale di quello che è l'universo dei giovani in relazione al mondo smart e alla domotica. L'Ateneo Sapienza sposa appieno la sfida lanciata da Horizon 2020 con il progetto ReStart4Smart, un laboratorio pratico in cui poter conoscere e sperimentare, fare ricerca e innovare, condividere e divulgare, tanto problemi quanto, e più possibile, soluzioni ambientali ed abitative.
Chi sono realmente i nativi digitali? E qual è il loro livello di conoscenza della smart home? Quali i valori e quali i comportamenti concreti in relazione all'utilizzo intelligente delle nuove tecnologie?

Milestone value of the European Union but also project, theme and problem, sustainability[1] is mainly energy rationalization as new goal of planetary development and (hopefully) source of value for the West. This assumption is often combined with the use of new digital technologies. In such cases, the goal is the creation of societies, and therefore also the city and houses, not only more efficient but also more inclusive and secure.

Horizon 2020[2] is perhaps the instrument through which the European Commission is mainly pursuing these goals by funding scientific research and innovation, and by supporting projects

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[1] "Sustainability" refers to that condition of development "able to ensure the satisfaction of the needs of the present generation without compromising the ability of future generations to realize their own". This category was introduced, as known, in 1972 within the framework of the first UN Conference on the environment, but it is starting from 1987, through the publication of the Brundtland report, that sustainability is enshrined as an objective and declined through the concept of 'sustainable development'. Although initially totally focused on aspects of ecological type, the concept of sustainability currently encompasses inside it issues and aspects of nature not only environmental but also economic and social. Thus understood, Sustainability becomes a real model socio-economic-environmental, a dynamic template in so far as it is based on the changing relations between the ecological system and anthropogenic system, both strongly influenced by technological scenario available. Sustainability assumes, therefore, the connotations of development and not more than mere economic growth. One development therefore that aimed at becoming true no longer focuses on categories of economic prosperity and growth, but passes from the social sphere in order to arrive at an idea of progress and wellbeing different from that resulting from traditional measure of richness based on GDP. For more information see, in particular, the entry 'Sustainability' of the online encyclopedia Treccani, the UN documents, *Transforming our world: the 2030 agenda for Sustainable Development*, 2015, available at the link http://www.un.org/ga/search/view_doc.asp?symbol=A/RES/70/1&Lang=E and *United Nations Global Compact Progress Report. Business solutions to sustainable development*, 2017, available at the link https://www.unglobalcompact.org/docs/publications/UN%20Impact%20Brochure_Concept-FINAL.pdf. For an original Russian approach to the issue of the sustainability see also the work by J. AGYEMAN, Y. OGNEVA-HIMMELBERGER, *Environmental Justice and sustainability in the Former Soviet Union*, BUT-MIT Press, Cambridge 2009.

[2] Horizon 2020 is a funding program drawn up by the European Commission with the aim of promoting and supporting research within the European Research Area (ERA), for the years 2014-2020. The goal of sustainability is found inside of Horizon 2020, in social challenge 6 "*Europe in a changing world - inclusive, innovative and reflective*

and specific manifestations. This is the case of "Solar Decathlon"[3], an international academic competition born in America. Designed a little more than a decade ago by Nation Mall in Washington DC[4], such competition has soon found the support by the Department of American energy. It is designed for students and teachers of all the universities of the world to enable them planning and realizing, inside a contest structured in 10 tests, an "energetically self-sufficient" or more simply "smart" house.

In these years the Sapienza University is participating in the Middle East Edition[5] of the competition through the project "ReStart4Smart"[6]. The project takes its name from the 4

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societies". It pursues the aim of smart, sustainable and inclusive growth. This purpose binds strongly to the use of technologies capable of urging responsible behavior and the idea, carried out in a European context, of integration between the different social sectors in terms of the policies to be developed. From this point of view, the reflection on sustainability cannot be separated from the role of scientific excellence and industrial leadership. The construction of "knowledge and innovation communities" then emerges as central to realize new approaches to sustainable growth connected to entrepreneurship. According Horizon 2020, sustainable growth must not be, in fact, understood exclusively as responsible management of natural resources, but also as a responsibility in social and economic terms, meaning, then the concept of sustainable growth in the broadest sense of the term. EUROPEAN COMMISSION, *Europe 2020. A strategy for smart, sustainable and inclusive growth*, 2010, document available at the link: http://ec.europa.eu/eu2020/pdf/COMPLET%20EN%20BARROSO%20%20%20007%20-%20Europe%202020%20-%20EN%20version.pdf.

[3] The U.S. Department of Energy Solar Decathlon is a collegiate competition of 10 contests that challenge student teams to design and build full-size, solar-powered houses. The winner of the competition is the team that best blends design excellence and smart energy production with innovation, market potential, and energy and water efficiency.
Solar Decathlon is more than a competition. It's an intensive learning experience for consumers and homeowners as they experience the latest technologies and materials in energy-efficient design, clean energy technologies, smart home solutions, water conservation measures, electric vehicles, and sustainable buildings.
The Solar Decathlon provides a hands-on experience and unique training that prepares the competing students to enter the clean energy workforce. This international competition has been a driving force in raising awareness about clean energy since its inception in 2002. Technologies and solutions used in Solar Decathlon homes have advanced the residential building industry both in the United States and abroad. Https://www.solardecathlon.gov/.

[4] The National Mall is a landscaped park within the National Mall and Memorial Parks, an official unit of the United States National Park System. It is located near the downtown area of Washington, D.C., the capital city of the United States, and is administered by the National Park Service (NPS) of the United States Department of the Interior. Https://www.nationalmall.org/.

[5] In 2015 the Dubai Supreme Council of Energy, Dubai Electricity and Water Authority, and the U.S. Department of Energy signed an agreement to collaborate on the development of Solar Decathlon Middle East (SDME 2018-2020), a competition that integrates unique local and regional characteristics. The 2018 edition of this competition is organized by DEWA, in Dubai at the Mohammed Bin Rashid Al Maktoum Solar Park. The SDME 2018 embraces the goal of developing and promoting ideas, capacities and technologies that can be implemented for the benefit of the inhabitants of the Middle East region. Each project must be a good response to our cultural, climatic and social contexts, as well as a high-performance prototype that should successfully perform during the period of time during which compares it with others. To proposals should be focused on solving the issues and needs for sustainable living in this region, where high temperatures, high humidity and dust condition our daily lives during most part of the year. Https://www.solardecathlonme.com/.

[6] The project team of Sapienza Team, "ReStart4Smart" aims at making a Smart Solar House able to ensure the maximum efficiency and effectiveness in the use of natural resources and to provide an environment built attractive, affordable, secure, comfortable and healthy, competitive in terms of costs and able to improve the life of all the actors involved. The name ReStart4Smart literally indicates the desire to introduce a new approach to make architecture that, by returning to the traditions of the past, knows how to exploit all the possibilities offered using renewable energy sources and the use of technological solutions and constructive highly innovative and low environmental impact. The characteristics of energy efficiency and environmental performance typical of a Zero Energy Building and a Green Building, the project ReStart4Smart intends to add those of intelligence and flexibility through a continuous interaction with the environment with the built environment and with users in order to acquire data and information useful for the optimization of its operation until the possibility, thanks to an innovative building system, to vary with rapid and economical distribution structure and size to cope with the growing needs of the single household and to adapt to the different types of building fabric of the city. The project aims at improving the various aspects of design and construction of buildings, by design tools, methods of construction, the characteristics of the

"smart" pillars founding it: shape, system, envelope and people. Spaces, consumption, cost and relationality thereby become objectives to fluidize and optimize within an *international stage* and a *practical laboratory* in which you can get to know and experience, do research and innovate, share and disseminate, so much problems as, and more possible, environmental solutions and housing. Students are in first row in the competition, at least as much as in the world are the younger generations: they are the true protagonists of the challenge, they are the digital natives to which the task of making the model of dwelling of the XXI century is given.

But who are really the digital natives? And what is their level of knowledge of the smart home?[7] Which are the values and the concrete behaviors related to the intelligent use of the new technologies?

To approach this cutaway view, a team of scholars[8] of the Department of Political Sciences of Sapienza University has made a short pilot survey. The survey was carried out on a sample of 140 students of the Faculty of Architecture of La Sapienza University in Rome, sufficiently balanced as far as genre was concerned (46% males and 54% females) and with an age distribution concentrated within the band of 23 years (90% of respondents). As will be seen below, the figures seem to confirm some basic convictions of Professor Casini, Faculty Advisor of the project "ReStart4Smart".

Table n.1

M	F	TOT
64	75	139

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building envelope and installations up to the behavior of users, promoting at the vast public conscious use of energy and sustainable technologies to increase the energy efficiency of buildings, as well as to encourage the integration of renewable energy sources in buildings, showing how the solar houses high performance can be comfortable, attractive and affordable. Http://www.restart4smart.com/it/.

[7] On the concept of smart home see, in particular: N. BALTA-OZKAN, R. DAVIDSON, M BICKET, L. WHITMARSH, *Social barriers to the adoption of smart homes*, in «Energy policy», vol. 63, pp. 363-374; D.D. BRIERE, *Smart home for dummies*, Frommer's, New York 2003; M. CAPOLLA, *Progettare la domotica. Criteri e tecniche per la progettazione della casa intelligente*, Maggioli Editore, Santarcangelo di Romagna 2011; R. HARPER, *Inside the Smart Home: Ideas, possibilities and methods*, R. Harper (ed.), Springer-Verlag, London Ltd 2003; K. SAUL-RINALDI, R. LEBARON, J. CARACINO, *Making sense of the Smart Home. Applications of Smart Grid and Smart Home Technologies for the Home Performance Industry*. National Home Performance Council, USA 2014.

[8] For further information on the components of the research group and the implementation of their respective tasks, see note n. 1.
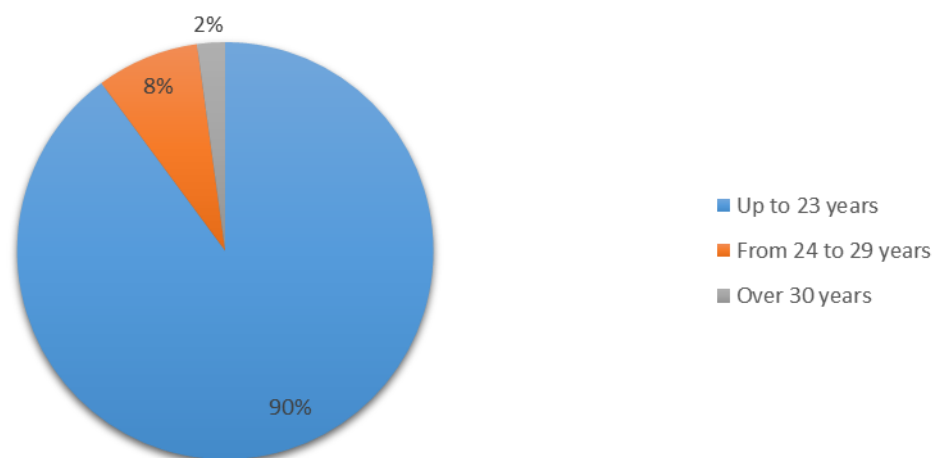
Figure n.1

Sex
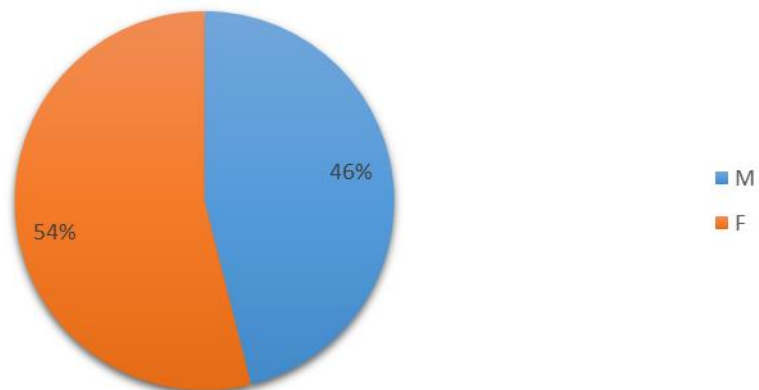
Table n.2

ETA'		
A	Up to 23 years	124
B	From 24 to 29 years	11
C	Over 30 years	3
TOT		138

Figure n.2

Age

The choice of the sample under examination is linked to its representativeness compared to a wider universe here only "spied". Is the universe of all those who for various reasons (economic,

environmental, social, etc.) or varied social attributes (age, gender, nationality, identity) espouse the horizon of sustainability through the creation of digital society, to obtain benefits in terms of safety, innovation and social inclusion.

Being a "pilot survey", the research only constitutes an essential reconnaissance of what is the universe of young people in relation to the smart and domotic world.

The limitation to a few cases was then chosen in order to identify, through a *background search*, the main variables that intervene on the topic under examination, the field of investigation and the key aspects of the problems related thereto, specific weight as the mechanisms of interaction and more in general the dynamics that exemplify.

This survey, consistently with its "pilot"[9] characteristics, therefore aims to short range "first inventory" of problems and connections to which a wider research should refer.

The data confirm first some evidence now acquired in the literature about the dichotomy "Access/non-access". Even more than in other cases, this dichotomy is certainly significant, but not exhaustive. The ratio of respondents with the network, and more in general with the new information technologies, in fact proves to be much more variegated than the simplification "proximity/distance". "Use", or "type of use", becomes the determining, key variable conceptual category. The words with which Warschauer has secured a certain Assumption: "What is really important about ICT is not so much the availability of a computer and an Internet connection, but rather the skill on the part of individuals to use these tools and to engage in significant social practices"[10] are especially true in the case of "Use of smart technologies".

The running thus confirms as an acquired and almost tautological factor. The Internet is used daily by almost all the sample and for more than two hours per day. Even if a substantial proportion of the sample (29% of respondents) is able to restrict usage to only two hours, the new information technologies can confirm their penetration in the ordinary life so much more widespread and pervasive than any other technology of the past. Their presence is not considered as an accessory, but constitutive of social experience in its entirety as in everyday life.

Table n. 3

| DOM 4	How long do you daily surf internet?	F (absolute frequency)
A	Less than an hour	16
B	Up to two hours	40
C	More than two hours	76
D	Other	8
E	Never	0
TOT		140

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[9] C. MONGARDINI, *La conoscenza sociologica*, ECIG, Genova 1993.

[10] M. WARSCHAUHER, *Technology and Social Inclusion: Rethinking the Digital Divide*, Mit Press, Cambridge (Mass.) 2003, p. 38.
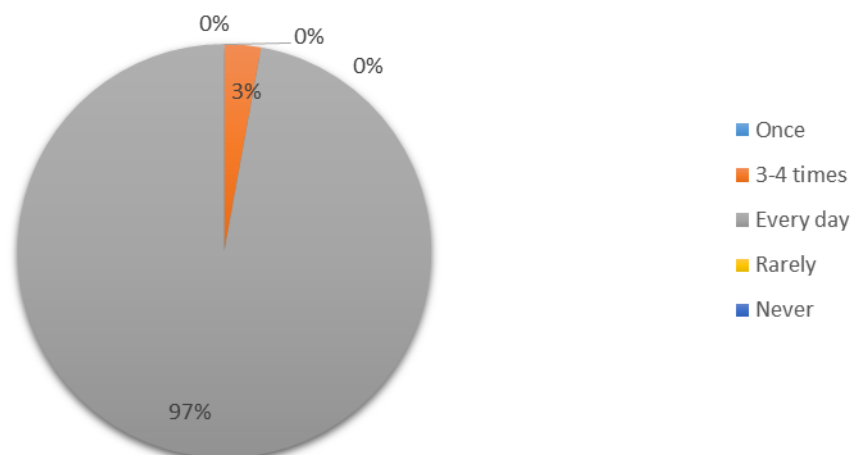
Figure n. 3

How long do you daily surf internet?
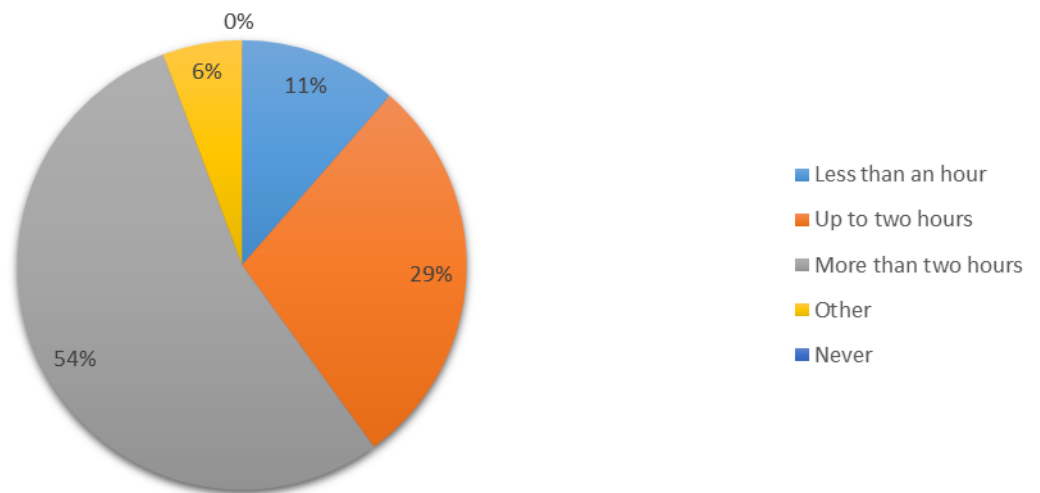
Table n. 4

DOM 3	How many times a week do you connect to the internet on average?	F (absolute frequency)
A	Once	0
B	3-4 times	4
C	Every day	136
D	Rarely	0
E	Never	0
TOT		140

Figure n. 4

How many times a week do you connect to the internet on average?

If, however, we skip from the dichotomy "presence/absence" or "Access/non-access" to the consideration of the far more explanatory dimension of the use skills, the reality looks more articulated and data not always confirm the common sense.

Firstly, the identikit of "digital natives" that generally the literature reserves for this category of users is faded. Rather than being defined as an "expert" or "ordinary skill", in fact, the main component of the sample (49% of respondents) defines as "sufficiently clever".

Table n. 5

DOM 1	The type of user that you believe to be?	F (absolute frequency)
A	**Expert**	17
B	**Moderately experienced**	41
C	**Sufficiently clever**	69
D	**Beginner**	13
E	**Do not use the internet**	0
TOT		140

Figure n. 5

## The type of user that you believe to be?
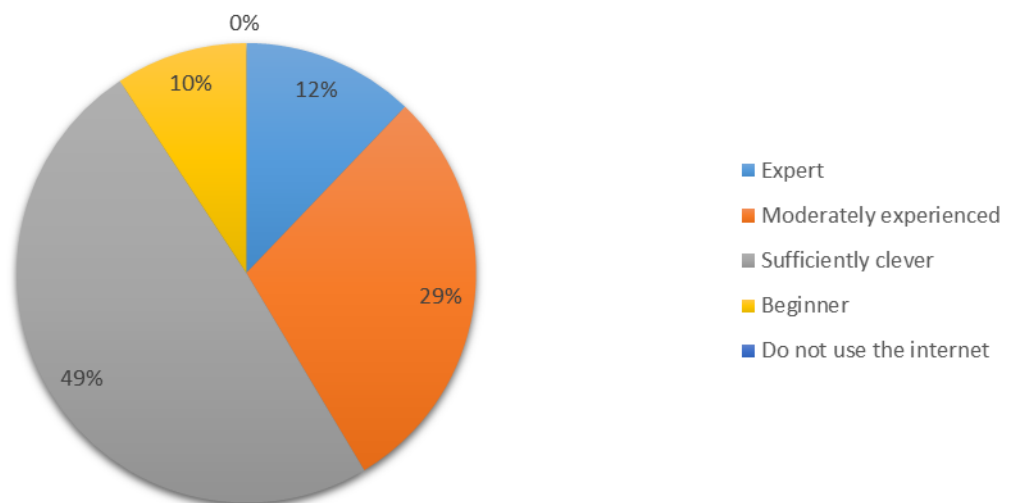
Despite being "capable", and even if they call themselves "smart people" (46% of respondents), respondents do feel "experts" and instead seem very aware of the fact that the level of skills and abilities needed to be able to use (at best) these tools can also be much higher than that in their possession or in the possession of the general average users.

Table n. 6

DOM 19	Would you call yourself a smart person?	F (absolute frequency)
A	Yes	65
B	No	26
C	I don't know	49
TOT		140

Figure n. 6
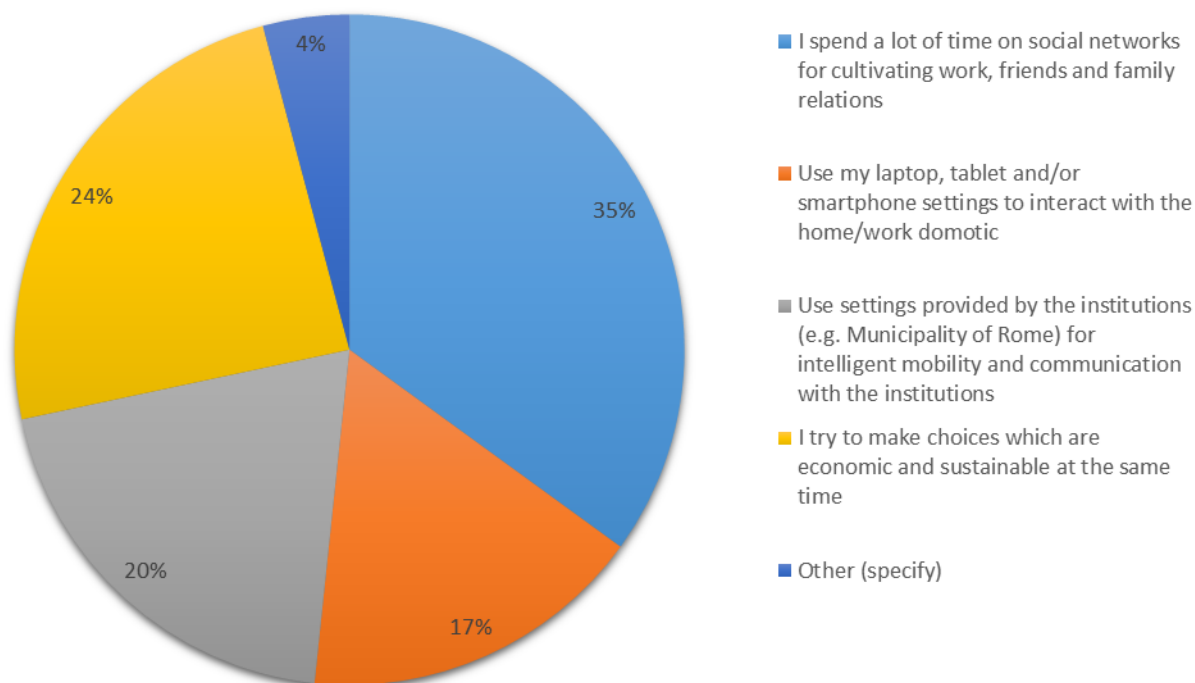

Would you call yourself a smart person?
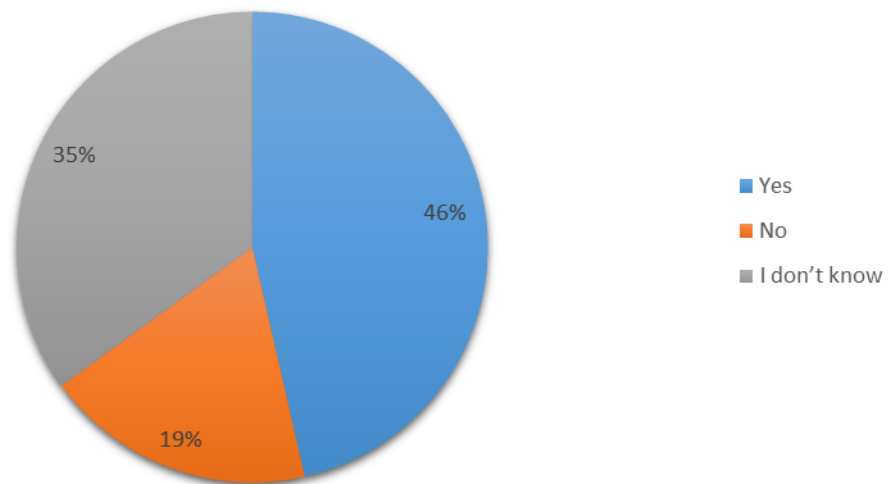
Table n. 7

DOM 20	If so, why? (More than one answer allowed)	F (absolute frequency)
A	I spend a lot of time on social networks for cultivating work, friends and family relations	42
B	Use my laptop, tablet and/or smartphone settings to interact with the home/work domotic	20
C	Use settings provided by the institutions (e.g. Municipality of Rome) for intelligent mobility and communication with the institutions	24
D	I try to make choices which are economic and sustainable at the same time	29
And	Other (specify)	5

Figure n. 7

If so, why?

- I spend a lot of time on social networks for cultivating work, friends and family relations
- Use my laptop, tablet and/or smartphone settings to interact with the home/work domotic
- Use settings provided by the institutions (e.g. Municipality of Rome) for intelligent mobility and communication with the institutions
- I try to make choices which are economic and sustainable at the same time
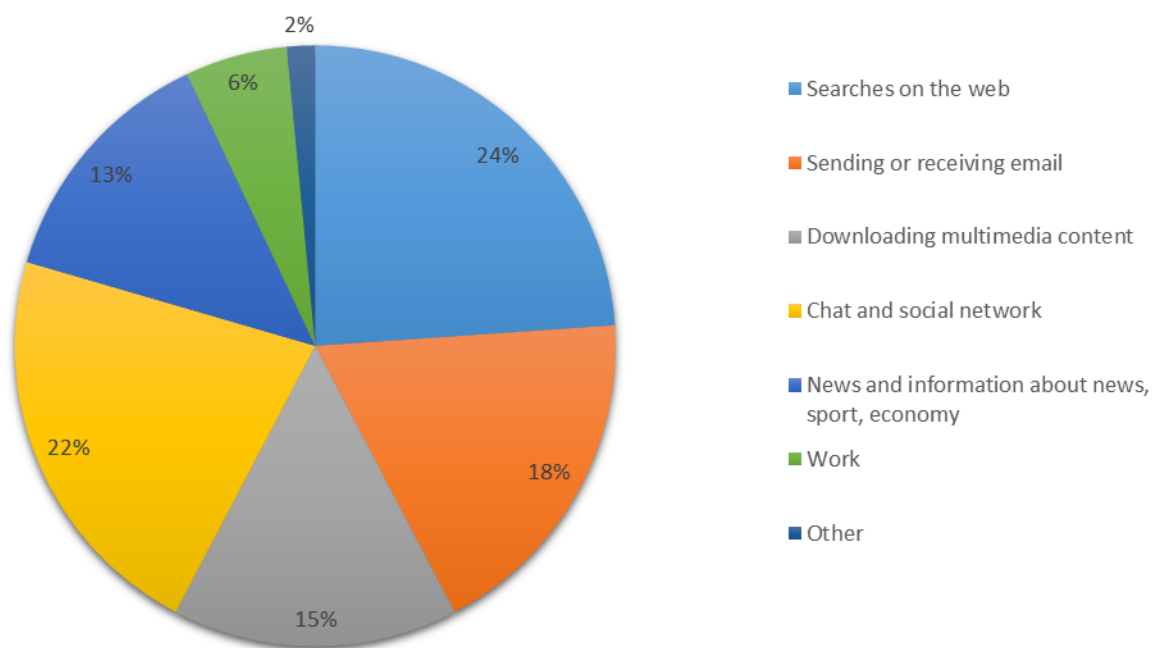- Other (specify)

The most performed activities through new technologies are: web searches and use of social networks. The social networks are also the activity more used through the smartphone, like activities such as Send/receive calls and SMS/MMS; they are among the sources of information and the main culture after the Internet and TV news, and also constitute the type of app more used in absolute. Instagram and Facebook stand out with equal intensity among social networks.

Table n. 8

DOM 2	For which of the following activities do you use most internet? (More than one answer allowed)	F (absolute frequency)
A	Searches on the web	126
B	Sending or receiving email	97
C	Downloading multimedia content	81
D	Chat and social network	115
E	News and information about news, sport, economy	71
F	Work	29
G	Other	8

Figure n. 8

For which of the following activities do you use most internet?

2%
6%
13%
24%
22%
18%
15%

- Searches on the web
- Sending or receiving email
- Downloading multimedia content
- Chat and social network
- News and information about news, sport, economy
- Work
- Other

Table n. 9

DOM 11	Which smart devices do you own? (More than one answer allowed)	F (absolute frequency)
A	Smartphone	139
B	Tablet	72
C	Notebook	42
D	Pc	124
E	E-book reader	17
F	Smart tv	68
G	Household appliances	83

H	Video game consoles	63
I	I do not own smart devices	0
L	Other	2

Figure n. 9

Which smart devices do you own?

Legend:
- Smartphone
- Tablet
- Notebook
- Pc
- E-book reader
- Smart tv
- Household appliances
- Video game consoles
- I do not own smart devices
- Other
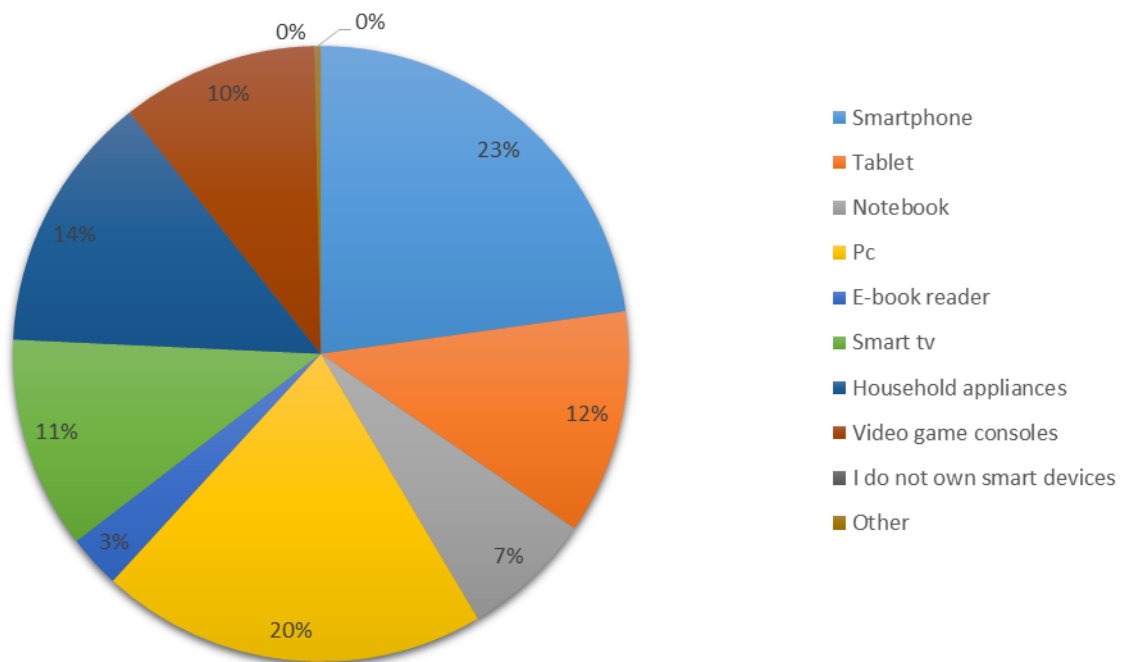
Table n. 10

DOM 12	Which types of apps do you use most?	F (absolute frequency)
A	Social Network	130
B	Productivity (health, fitness, shopping)	45
C	Education and consulting	43
D	Photography and editing	66
E	Entertainment (movies, music, books, games)	106
F	App for the control of domotic systems	10
G	Do not use app	1
H	Other	0

Figure n. 10

Which types of apps do you use most?
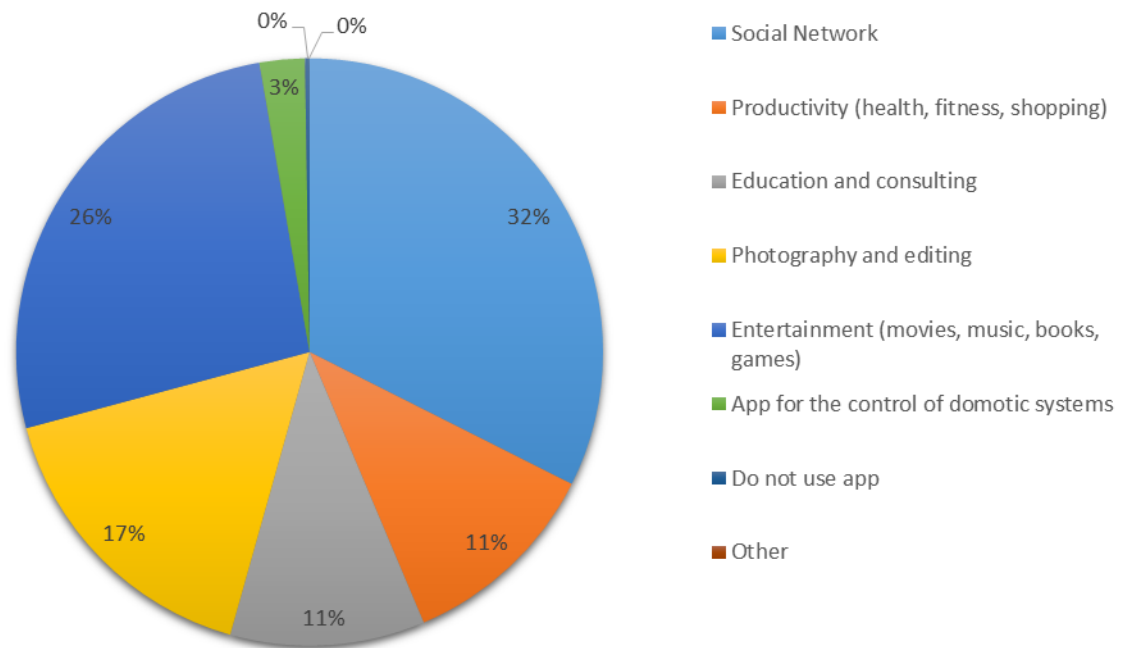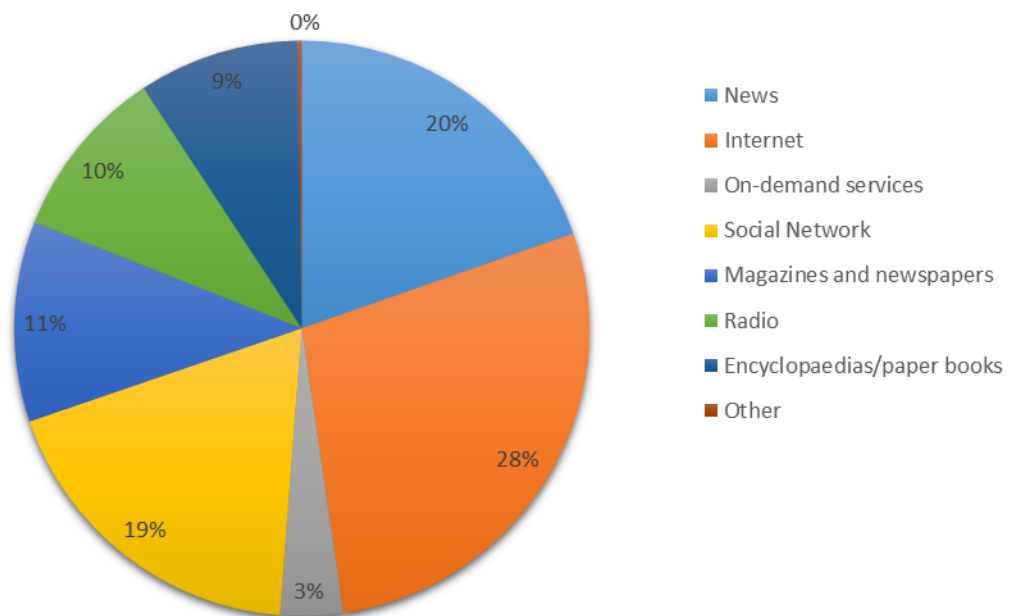

Table n. 11

DOM 9	Which information/culture sources do you enjoy? (More than one answer allowed)	F (absolute frequency)
A	**News**	89
B	**Internet**	127
C	**On-demand services**	16
D	**Social Network**	84
E	**Magazines and newspapers**	51
F	**Radio**	44
G	**Encyclopaedias/paper books**	41
H	**Other**	1

Figure n. 11

Which information/culture sources do you enjoy?

Table n. 12

DOM 5	Do you use one or more of the following social networking? (More than one answer allowed)	F (absolute frequency)
A	Facebook	126
B	Instagram	127
C	Twitter	12
D	Youtube	121
E	Skype	28
F	Other	8

Figure n. 12

Do you use one or more of the following social networking?
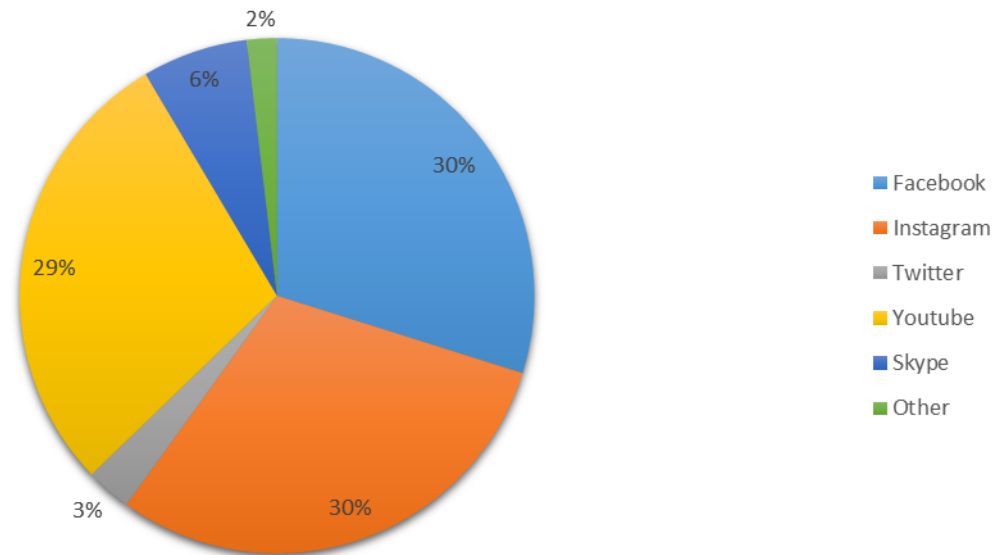
As well as based on results from studies about the more generic use of the internet and smart devices, also as regards the social network there is certainty that these tools can bring significant benefits to people's lives. Besides being emblematic, this is interesting if compared with the element of the "influence", less equipped with value for users of social networks than you might expect. 80% of respondents stated in fact that they do not call themselves influencers in one or more socials they use. It seems, therefore, we do not need to dig in the realm of fame and reputation to understand the fundamental reasons that push toward the use of social, but rather in that of the "facilities" that in terms of comfort and benefits people expect from these instruments.

Table n. 13

DOM 6	How long for do you daily use social networks?	F (absolute frequency)
A	Less than an hour	31
B	Up to 2 hours	53
C	More than two hours	48
D	Other	6
E	Never	1
TOT		139

Figure n. 13

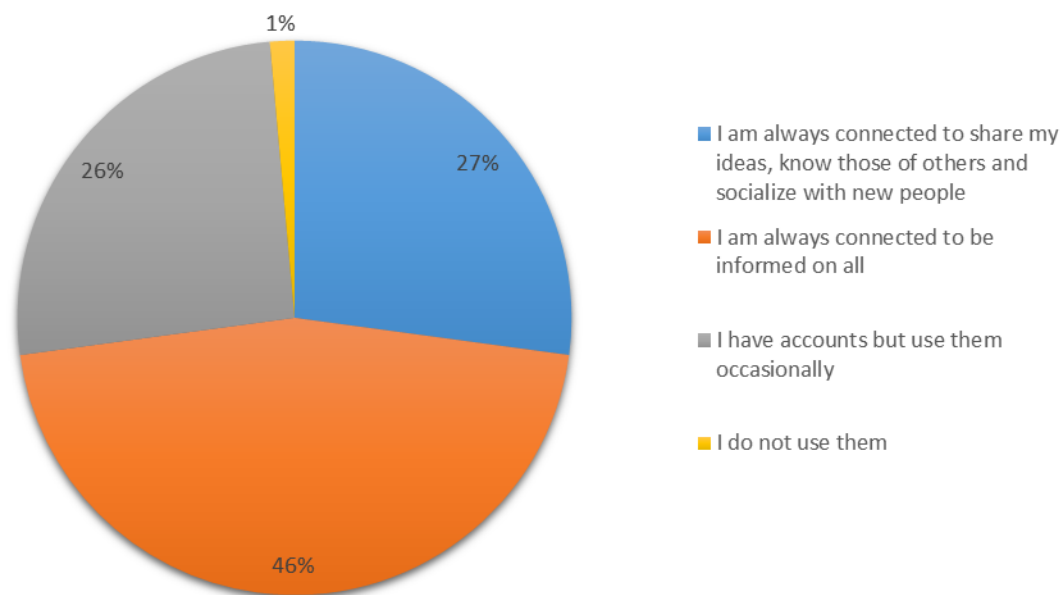## How long for do you daily use social networks?
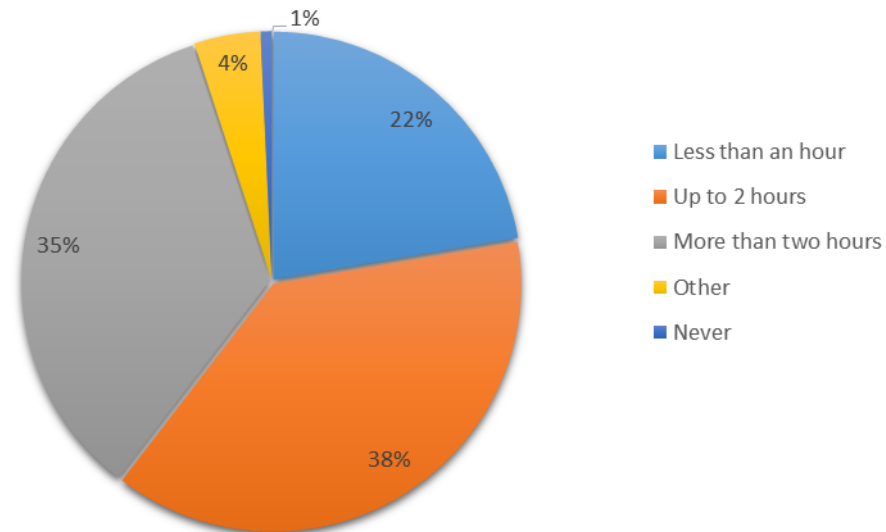
Table n. 14

DOM 21	How much do you daily use social networks?	F (absolute frequency)
A	I am always connected to share my ideas, know those of others and socialize with new people	38
B	I am always connected to be informed on all	64
C	I have accounts but use them occasionally	36
D	I do not use them	2
TOT		140

Figure n. 14

How much do you daily use social networks?

- I am always connected to share my ideas, know those of others and socialize with new people
- I am always connected to be informed on all
- I have accounts but use them occasionally
- I do not use them

Table n. 15

DOM 7	Would you call yourself an influencer in one or more of the social network that you own?	F (absolute frequency)
A	Yes, my blogs are my main job	3
B	Yes, my blogs have more than 5000 Followers	3
C	No	111
D	No, although I have many followers	20
E	Other	2
TOT		139

Figure n. 15

## Would you call yourself an influencer in one or more of the social network that you own?
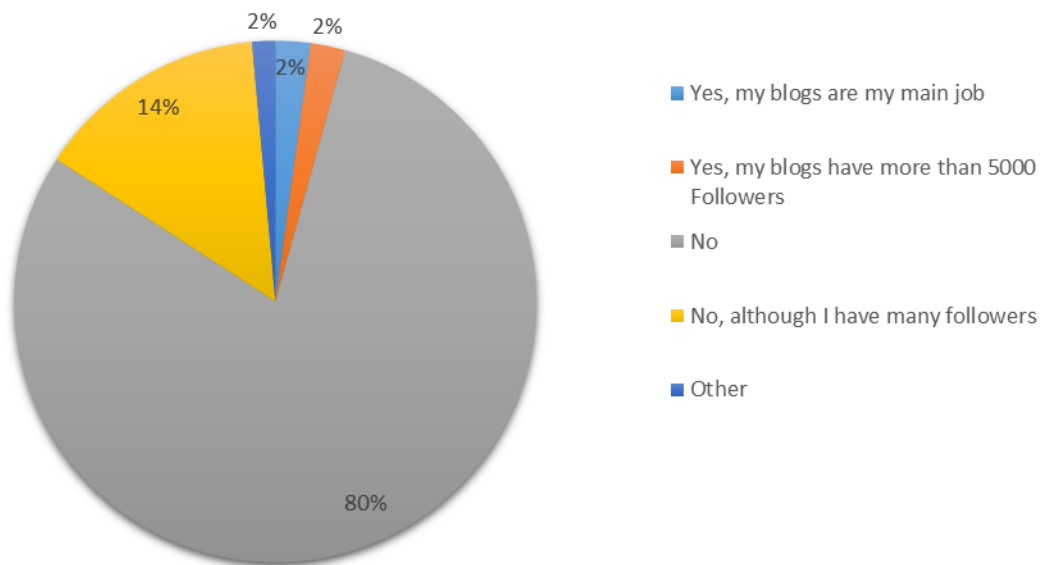
These first considerations, therefore, however simple in their assumed as in the data to which they relate, show a distinct consideration of these tools as "smart" and the conviction that they should serve precisely to this cause: simplify and facilitate the normal activities of life through a digitalization of the same. This is desirable. The key word becomes the "addiction": for many of the respondents, many of the activities we carry out daily *depend or may depend* many on these instruments.

Table n. 16

DOM 8	What do you usually use your smartphone for? (More than one answer allowed)	F (absolute frequency)
A	Send/receive calls and SMS/ MMS	121
B	Connect to the internet	123
C	Use social networks	123
D	Use domotic and/or smart services Apps	26
E	Play media	99
F	I do not have a smartphone	1
G	Other	0

Figure n. 16

## What do you usually use your smartphone for?
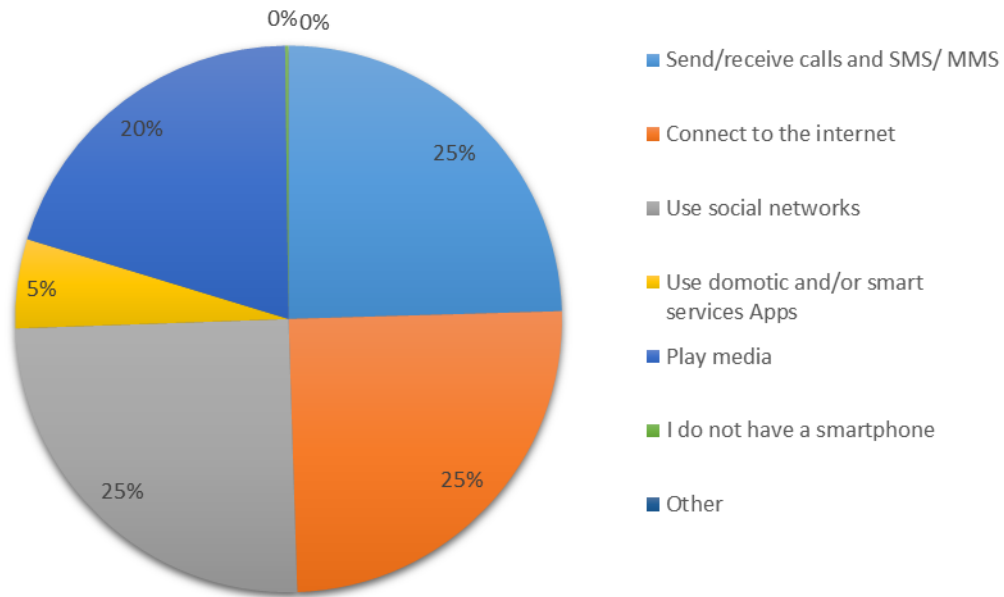
In light of this contrast that stands out among the notoriety and reputation on the one hand and the practical needs on the other, and of the strength of the needs of concreteness instead of self-show, of persuasion on other as "relationality" that stimulates the use of new technologies, the data is still evident that the choice of the field toward the digitization is not so marked even for the digital natives. As far as the 55% of respondents have enough need for the proper conduct of the activities of daily life, well 33% of people declare that they consider as little effective the influence of these instruments in their own lives and they also replace with other means, if necessary.

Table n. 17

DOM 10	How much do social networks, internet and technology influence your daily life?	F (absolute frequency)
A	A lot, I cannot live without	15
B	Pretty much, most of my activities depend on them	76
C	Not too much, I can replace them with other means if necessary	45
D	At all, I do not use them and I do not need it	2
E	Other	0
TOT		138

Figure n. 17

How much do social networks, internet and technology influence your daily life?
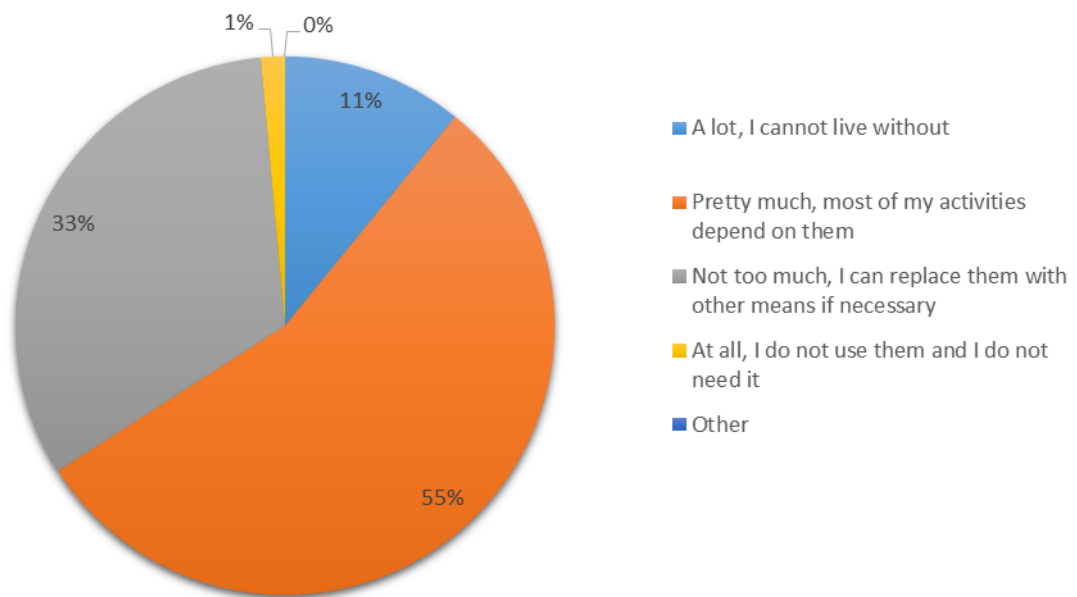
Reality that emerges, therefore, is not so defined in the sense of a full membership and total, unconditional, to smart world and for that there is a significant component of the sample ready to recognize how smart these tools are, and then to recognize the importance to make more intelligent the ordinary management of activities, this orientation is not marked as you would expect.

What is true in general to the use of new technologies or for use smart them, was also confirmed at the level of the domotic systems in their own homes. Well the 32% of respondents do not know them and 29% do not know them but would like to buy. There is knowledge, then, to what does not exclude an availability of maximum, a sort of open-mindedness or guidance to the possibility of equipping their own home. The datum is so paradoxical as stunning, especially if we consider not only that it is "digital natives", but also of students, is also in the first years of the Faculty of Architecture: therefore, presumably more brought in a "natural" toward certain knowledge and/or informative sensitivity and practices.

Table n. 18

DOM 13	Do you have domotic systems in your home?	F (absolute frequency)
A	Yes, use them on a daily basis	12
B	Yes, but do not use them very much	16
C	No I don't know them	43
D	No, but I would like to buy them	40
E	No, I'm not interested in them	21
F	Other	4
TOT		136

Figure n. 18

Do you have domotic systems in your home?
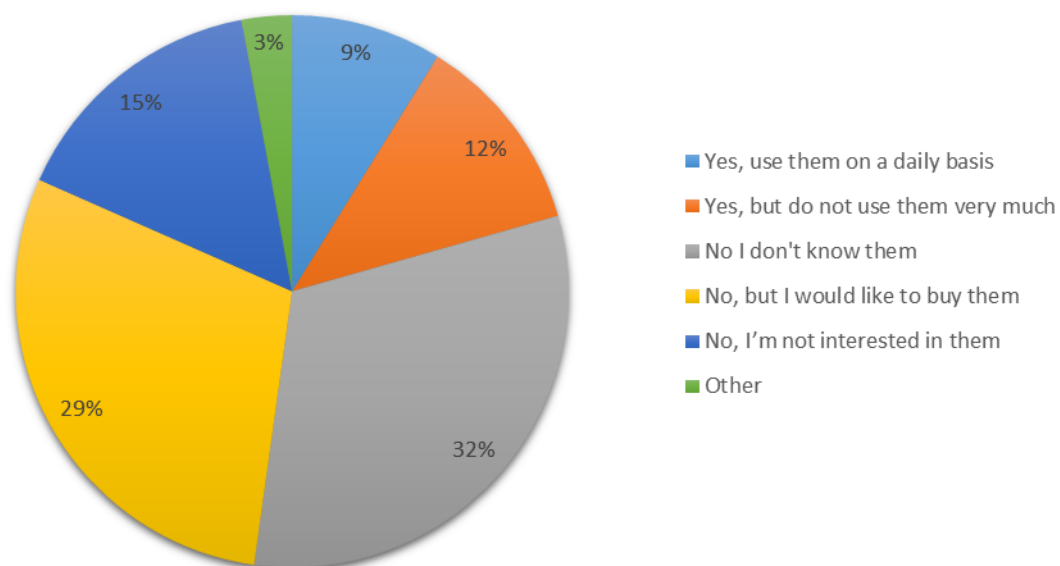
Table n. 19

DOM 14	Would you let a virtual assistant manage your daily activities?	F (absolute frequency)
A	Yes, I do that already.	2
B	Yes	41
C	No	86
D	Other	9
TOT		138

Figure n. 19

## Would you let a virtual assistant manage your daily activities?
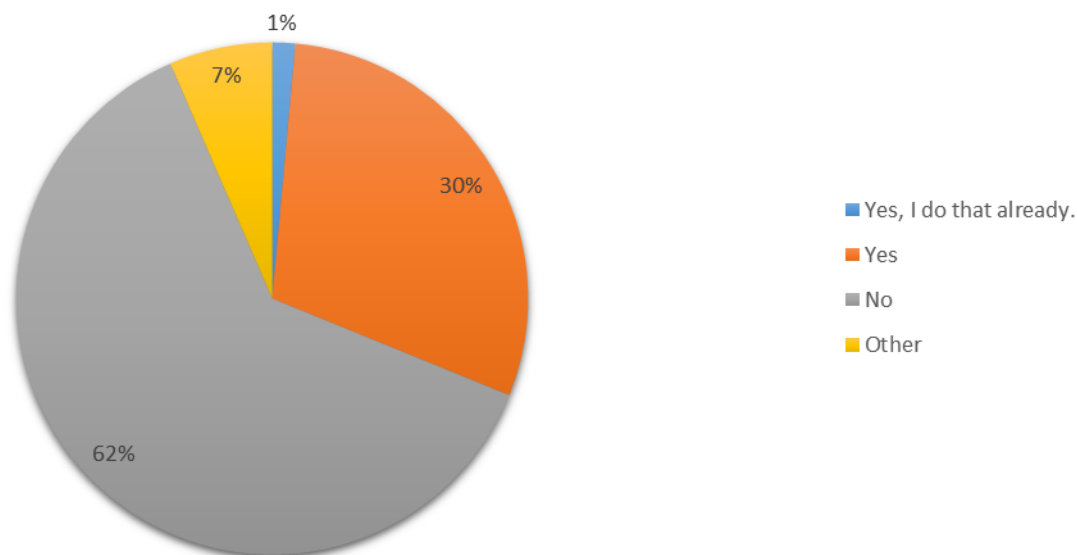
On the one hand, then, these tools are searched for practical needs and facilitation of daily life, on the other hand there is not a high level of knowledge of them nor an awareness of their potential, to the point to replacement with other instruments. Even in the case where you think of these devices as a possible "gift", the comparison with more "traditional" gifts is not unbalanced in favor of them, while the choice of "Both" types of gift, without particular preferences for none of the two prevails.

Table n. 20

DOM 16	Do you think that the use of the internet, social networks and devices smart have brought or will bring significant benefits in your daily life?	F (absolute frequency)
A	Absolutely yes	26
B	Yes	90
C	No	8
D	Absolutely no	4
E	I don't know	12
TOT		140

Figure n. 20

Do you think that the use of the internet, social networks and devices smart have brought or will bring significant benefits in your daily life?
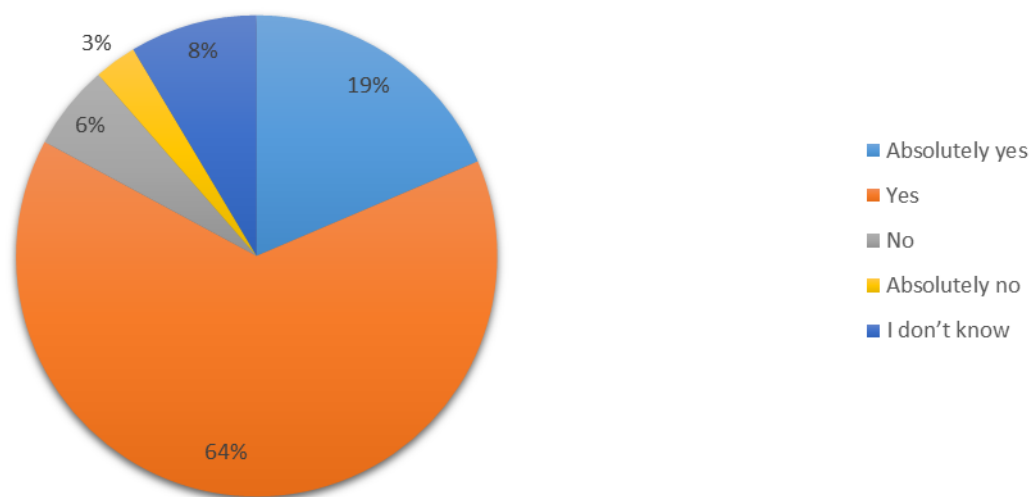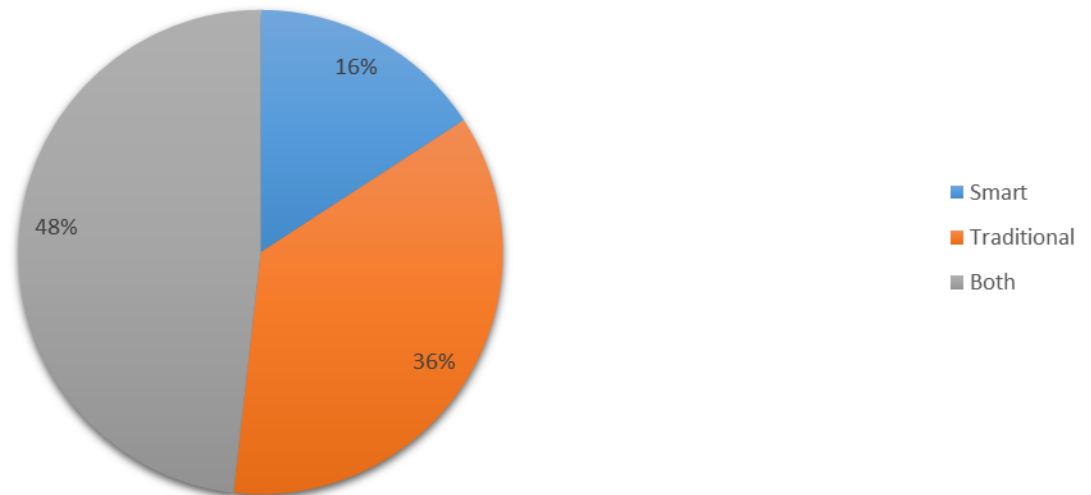

Table n. 21

DOM 17	If you had to get or buy a gift, would it be a smart or traditional object?	F (absolute frequency)
A	Smart	22
B	Traditional	50
C	Both	67
TOT		139

Figure n. 21

If you had to get or buy a gift, would it be a smart or traditional object?

Table n. 22

DOM 18	Do you use online shopping services?	F (absolute frequency)
A	Yes, on a daily basis	23
B	Often	66
C	Occasionally	45
D	No	6
TOT		140

Figure n. 22

## Do you use online shopping services?
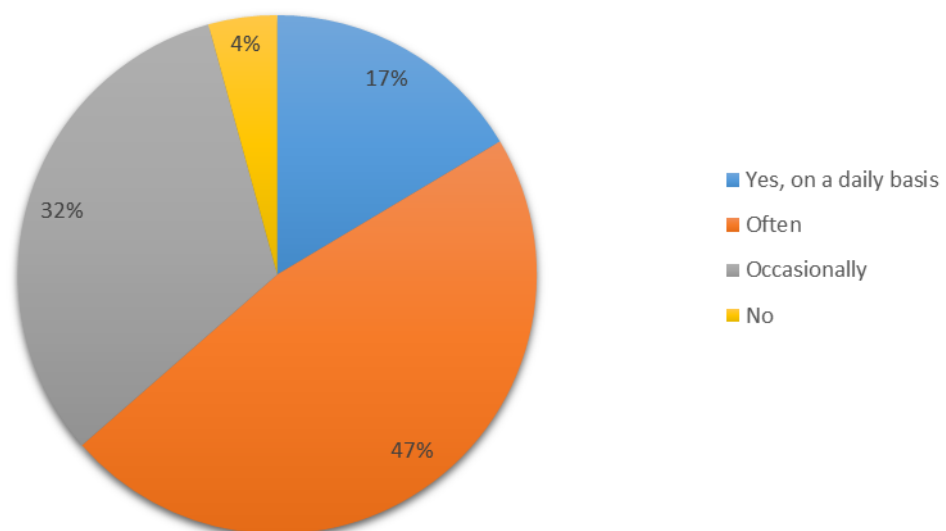
The contradictory aspects, therefore, probably explained if we refer to the characteristics which according to the respondents these smart devices should have to meet *the full their needs*.

Should first and foremost a "last", possess high capacity to "connection" and also be very "cheap". The sustainability of these devices stands out, therefore, in all its clarity. Why have a sense for users, such devices should be smart and to be such, must be materially sustainable, socially and economically.

Table n. 23

DOM 15	What are the features that a smart device should possess to fully meet your needs? (You can choose more than one answer)	F (absolute frequency)
A	Ease of use	61
B	Management and automated control	57
C	Economic Convenience	87
D	Durability	96
E	High Capacity of connection	88
F	Other	2

Figure n. 23

What are the features that a smart device should possess to fully meet your needs?
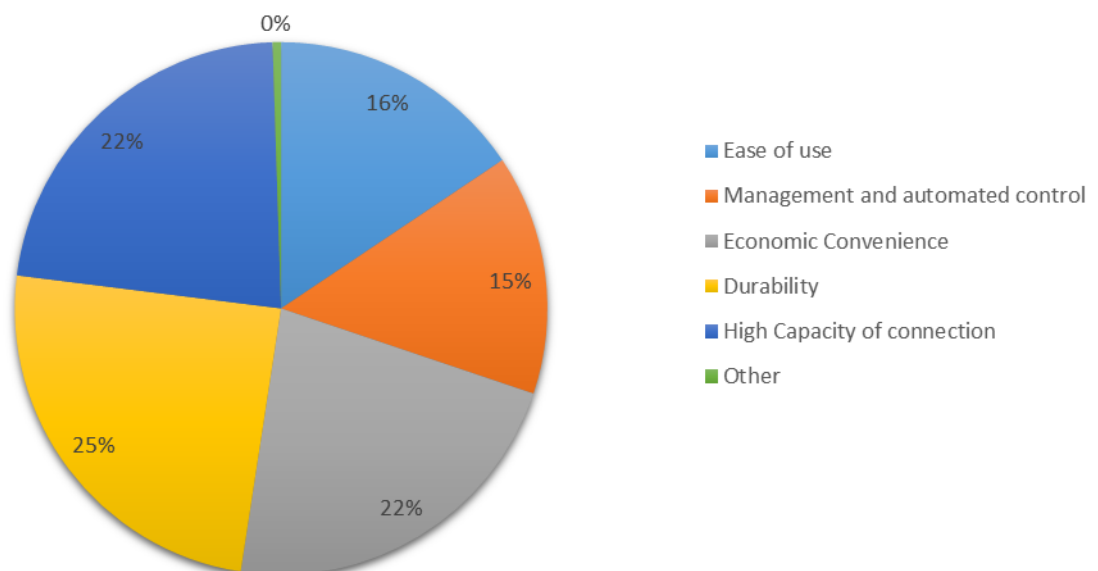
The invitation would seem to be then directed toward a fuller implementation of the concept of smart, so that its implementation does not take place in a partial manner, but complete, especially as regards the potential in terms of sustainability. Expectations could therefore

explain the ambivalence of the ratio in respect of new devices that do not appear yet "mature" on the plane of the "expectations of sustainability".

If from a context more "indistinct", goes on to consider the specific environment of smart home, the situation changes only apparently, while in substance confirms the general framework. It is true that the requirement of relationality stands out with much more sharpness: The house is mainly "household" (40% of preferences).

Table n. 24

DOM 22	What meaning from the house? (You can choose more than one answer)	F (absolute frequency)
A	Family environment	115
B	Environment of individual relaxation	64
C	Working environment	21
D	Safe environment/protective tape	89

Figure n. 24

What meaning from the house?
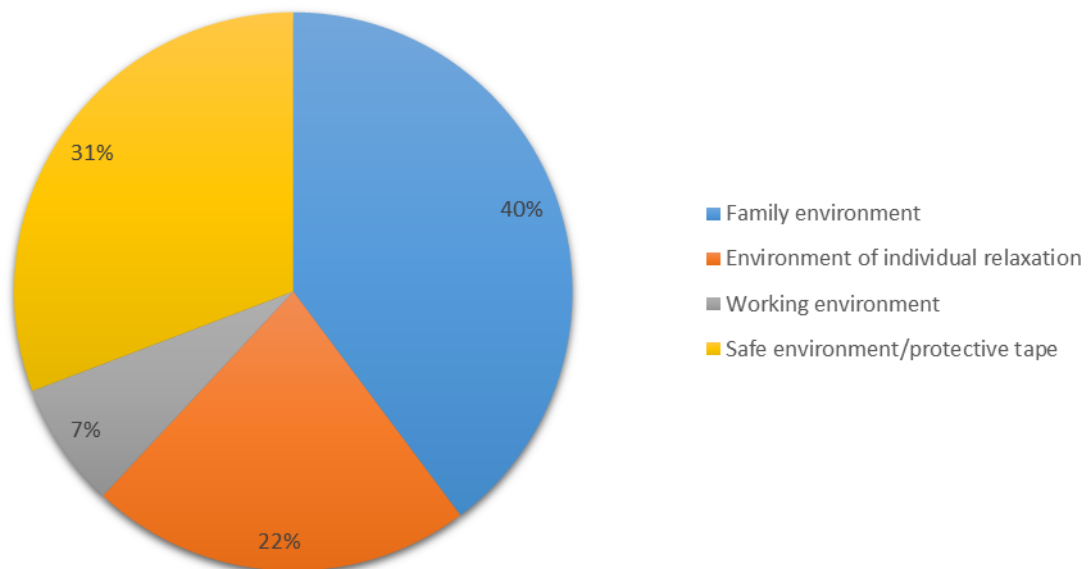
However it is not to a dimension of socialization, or even inclusion/entertainment/interactivity that we must refer to seize it in its versions smart. From a smart home, in fact, not expected more "Mix" or cohesion, but mainly "safety and protection", followed by comfort and sustainability.

An image a pyramid guide values that orient toward the smart home can exemplify best these dynamics.

Table n. 25

DOM 24	What are the needs which, according to you, must satisfy the intelligent house? (Put in order of preference from 1 to 5)	Absolute frequency preferably n.1	Absolute frequency preferably n.2	Absolute frequency preferably n.3	Absolute frequency preferably n.4	Absolute frequency preferably n.5
A	Comfort	36	40	31	17	0
B	Safety	46	44	26	7	1
C	Connection	6	10	16	59	31
D	Sustainability	36	30	40	12	6
E	Socialization	1	0	10	27	82

Order Of Preference	Needs to be met through the smart home
1	Safety
2	Comfort - Sustainability
3	Connection
4	Socialization

Figure n. 25
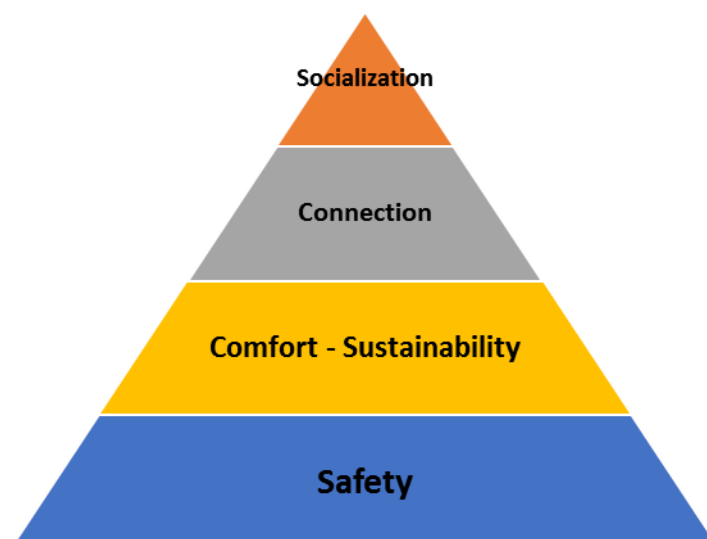
Table n. 26

DOM 25	What characteristics must possess, according you, products for the intelligent house? (You can choose more than one answer)	F (absolute frequency)
A	Simplicity in use	118
B	Economy	81
C	An attractive design	33
D	Guarantee of reliability	91
E	Interactivity	45
F	Environmental Sustainability	105

Figure n. 26

What characteristics must possess, according you, products for the intelligent house?
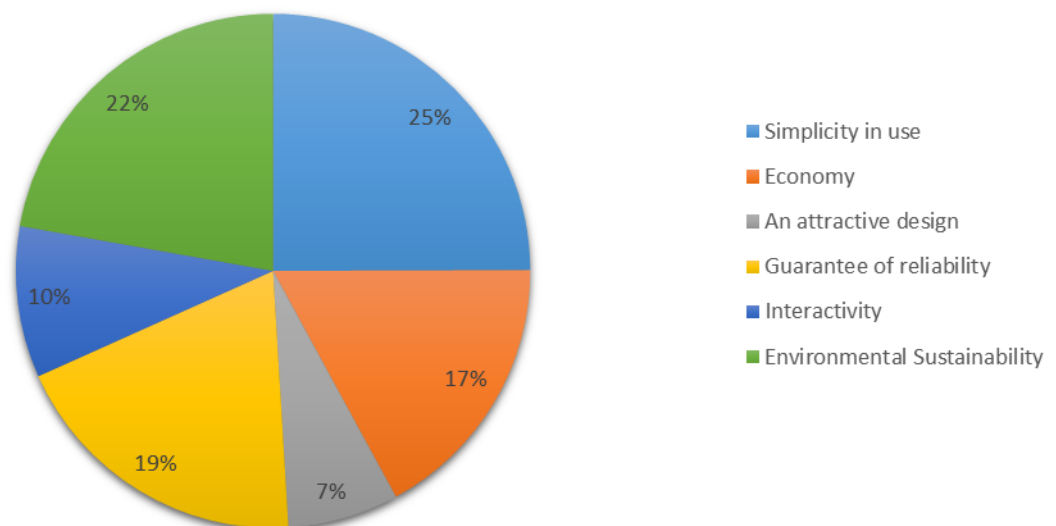
Table n. 27

DOM 26	What are the reasons that you may push to buy products for the smart home? (Put in order of preference from 1 to 5)	Absolute frequency preferably n.1	Absolute frequency preferably n.2	Absolute frequency preferably n.3	Absolute frequency preferably n.4	Absolute frequency preferably n.5
A	Entertainment	10	15	21	37	27
B	Safety	63	31	16	6	0
C	Constant connection	10	22	38	22	17
D	Aid in domestic management	36	40	20	19	2
E	Inclusion	0	5	7	14	41

Order Of Preference	Reasons to buy products for the smart home
1	Safety
2	Aid in domestic management
3	Constant connection
4	Entertainment
5	Inclusion

Figure n. 27
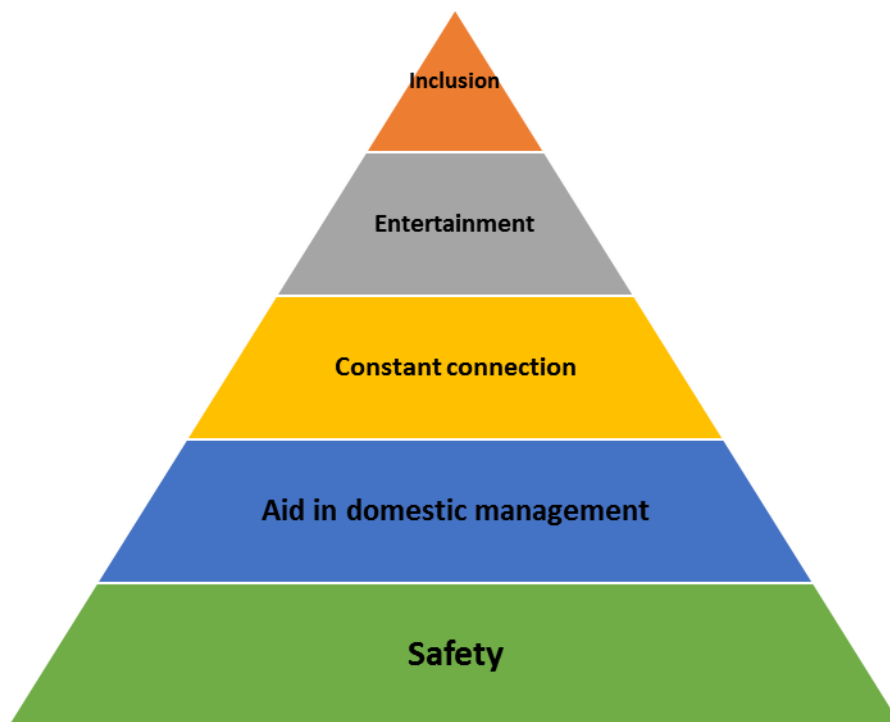
A confirmation of this scale of values is also the choice of the room from which one would start to make their home smart: the most frequent answer was bedroom and the reasons are to be traced in the association of this space with an environment which is "of one's own", probably because of the living conditions of the students which is often concentrated in a single room.

Table n. 28

DOM 34	Which room of the house would make smart at first?	F (absolute frequency)
A	Dining room	36
B	Bathroom	6
C	Kitchen	11
D	Bedroom	87
TOT		140

Figure n. 28

Which room of the house would make smart at first?

26%

4%

8%

62%

- Dining room
- Bathroom
- Kitchen
- Bedroom
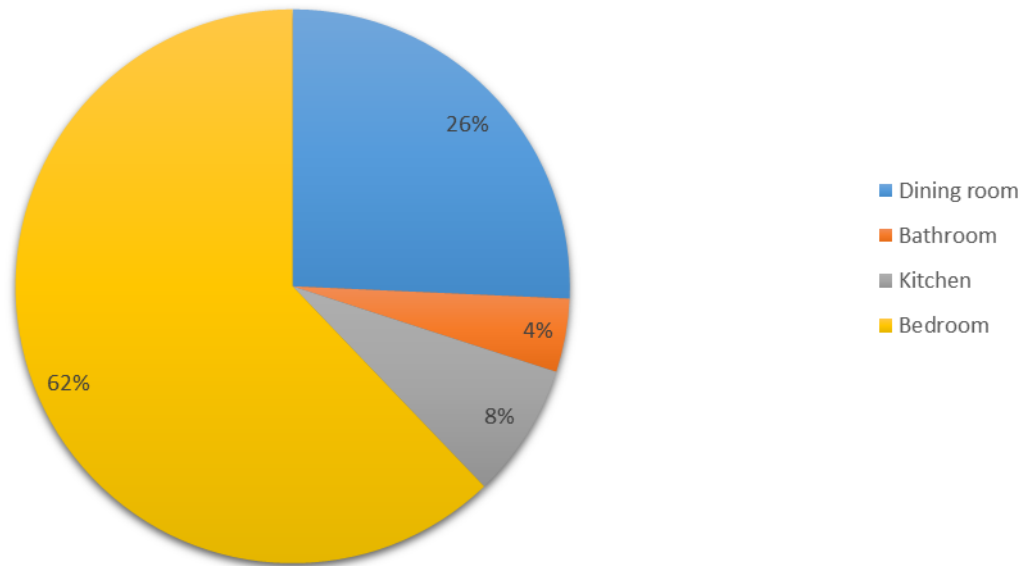
Table n. 29

DOM 32	What is the environment of the house in which throw more time?	F (absolute frequency)
A	Dining room	37
B	Bathroom	5
C	Kitchen	10
D	Bedroom	88
TOT		140

Figure n. 29

What is the environment of the house in which throw more time?
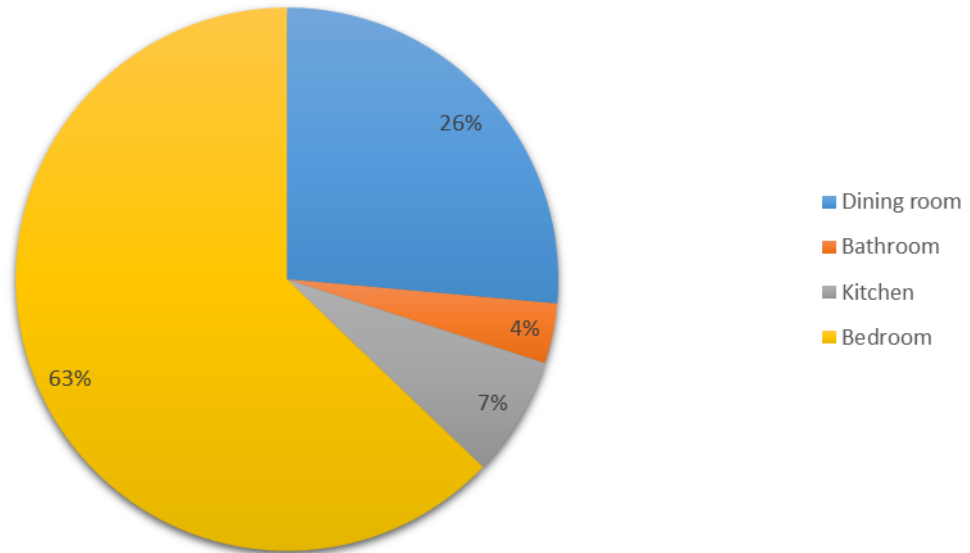
Table n. 30

DOM 33	Why throw more time precisely in this environment? (You can choose more than one answer)	F (absolute frequency)
A	We work	49
B	Socialize with others	32
C	I dedicate myself to the entertainment and leisure	80
D	It allows me to have a place for me	89
E	I have no alternatives	4

Figure n. 30

Why throw more time precisely in this environment?

Interesting the reasons capable of braking in the purchase of certain devices. First prevail economic reasons: products for the smart home are regarded as too expensive. Not by chance, if you ask "How many smart products have been purchased in the course of the last year", the answer "none" prevails markedly.
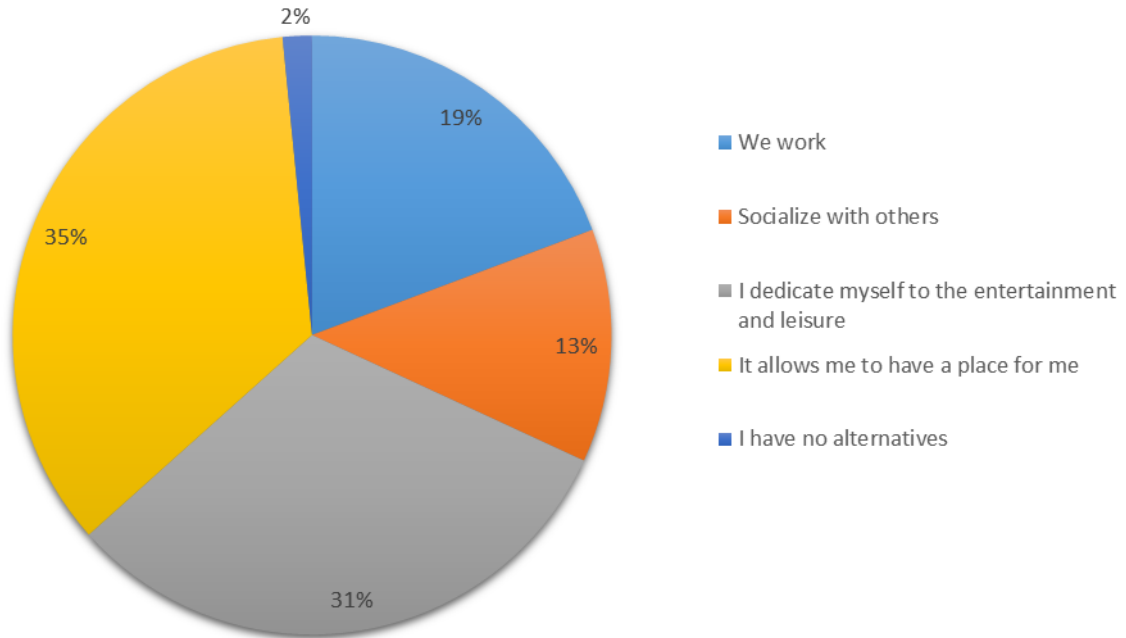
Table n. 31

DOM 27	What are the reasons that you might impede in buying products smart home? (Put in order of preference from 1 to 5)	Absolute frequency preferably n.1	Absolute frequency preferably n.2	Absolute frequency preferably n.3	Absolute frequency preferably n.4	Absolute frequency preferably n.5
A	I do not understand much of products for the home automation	24	24	41	5	8
B	They are not interested in purchasing products for the home automation	8	12	16	46	22
C	The products are too expensive	55	25	19	5	3
D	I do not see the benefits arising from the use of products smart	4	5	11	30	57
E	The products for the home automation are not sufficiently advertised	22	40	17	15	14

Order Of Preference	Reasons that hinder in the purchase of products for the smart home
1	The products are too expensive
2	The products for the home automation are not sufficiently advertised
3	I do not understand much of products for the home automation
4	They are not interested in purchasing products for the home automation
5	I do not see the benefits arising from the use of products smart

Figure n. 31
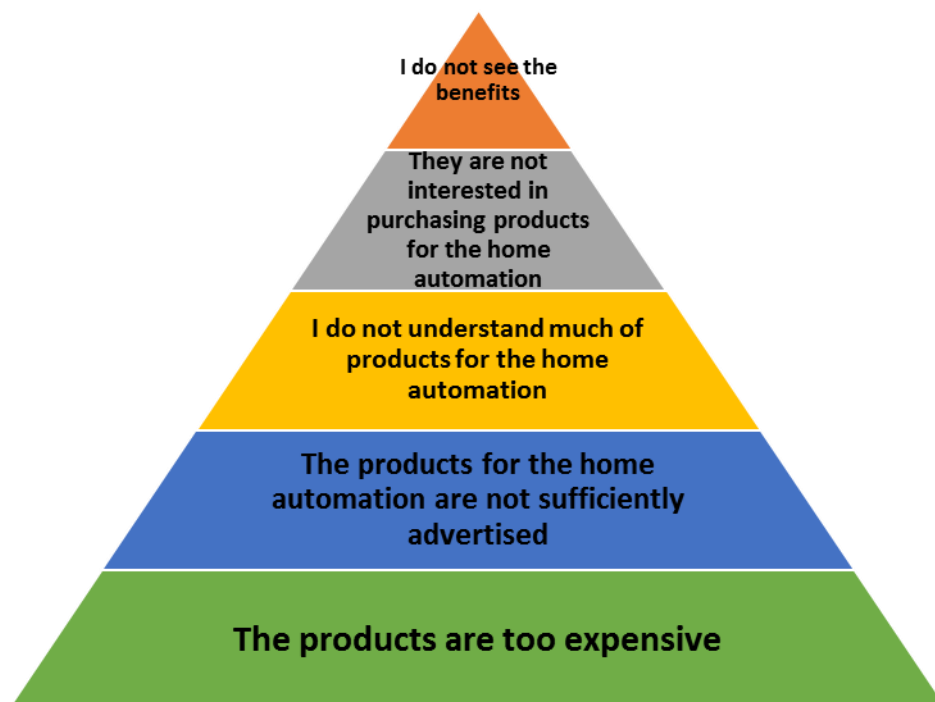
Table n. 32

DOM 28	How many products smart home you purchased in the course of the last year?	F (absolute frequency)
A	None	88
B	From 1 to 3	46
C	From 4 to 6	5
D	From 7 to 9	0
E	More than 10	0
TOT		139

Figure n. 32

How many products smart home you purchased in the course of the last year?
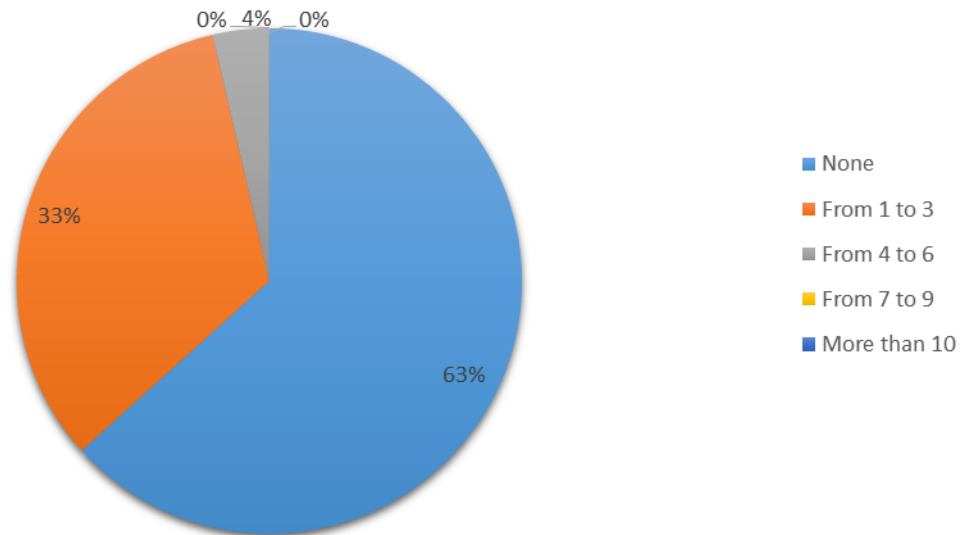
Openness towards the smart world is therefore somehow prevented by the fear of excessive expenses it would imply. If the economic availability of the interviewees were greater, they would be willing to spend even the most out of the hypothesized expenditure assumptions. The economic factor therefore plays a central role and its consideration is essential for a correct analysis of the impediments to the spread of smartness at home.

Table n. 33

DOM 29	What would you be willing/or spend for the purchase of products smart home in the coming 12 months if you had economic availability?	F (absolute frequency)
A	I am not prepared to spend	9
B	Up to 150€	14
C	Up to 250€	21
D	Up to 500€	24
E	Up to 1000€	29
F	Over 1000€	42
TOT		139

Figure n. 33

What would you be willing/or spend for the purchase of products smart home in the coming 12 months, if i had economic availability?
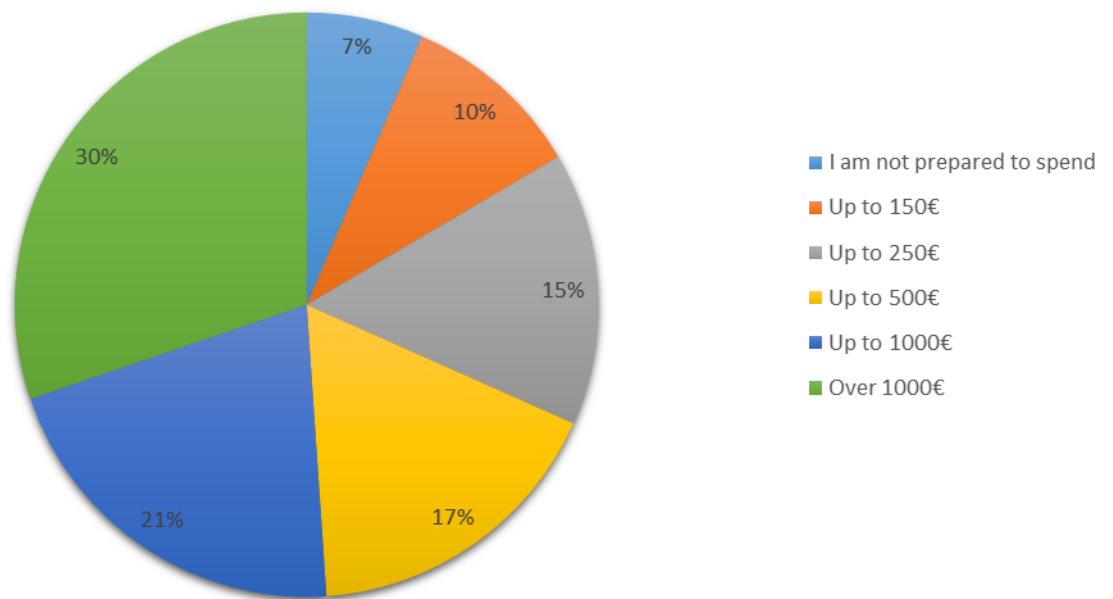
Of course, if the economic reasons which hinder so much, it is not because the smart devices are "objectively dear", but because there is little information on them.

The level of knowledge recordable on this world is not in fact such as to allow to affirm that the "no" is a choice founded, weighted, reasoned. It is feared that excessive costs, but it is also afraid because you know little and nothing about these tools and probably also on the same cost. The level of objective knowledge and understanding of its potential, which may result in the interest to buy them and a higher level of satisfaction in the use, appear still very low.

As already registered in general, also in the particular case of domotic, although young digital natives, students of architecture and that you define "smart people", there are very low levels of information and this arises from an obstacle to the diffusion of these tools, constituting "ignorance" of them and its potential between the brakes mainly indicated in the purchase of these products.

Significant noted that is the university is the main place of learning of the concept of "smart home", followed by the internet in both cases with a sharp separation from other contexts/information channels such as tv and radio, home, work, electronics stores. Not in case you would like to "that the media speak much more of these themes" and significant is also the component of who considers it useful to be able to form with specific training courses in the university sphere.

Table n. 34

DOM 23	Have you ever heard of the concept of "smart home" or "Intelligent House"?	F (absolute frequency)
A	**No**	28
B	**Yes, where? (You can choose more than one answer)**	112
TOT		140

Figure n. 34

Have you ever heard of the concept of "smart home" or "Intelligent House"?
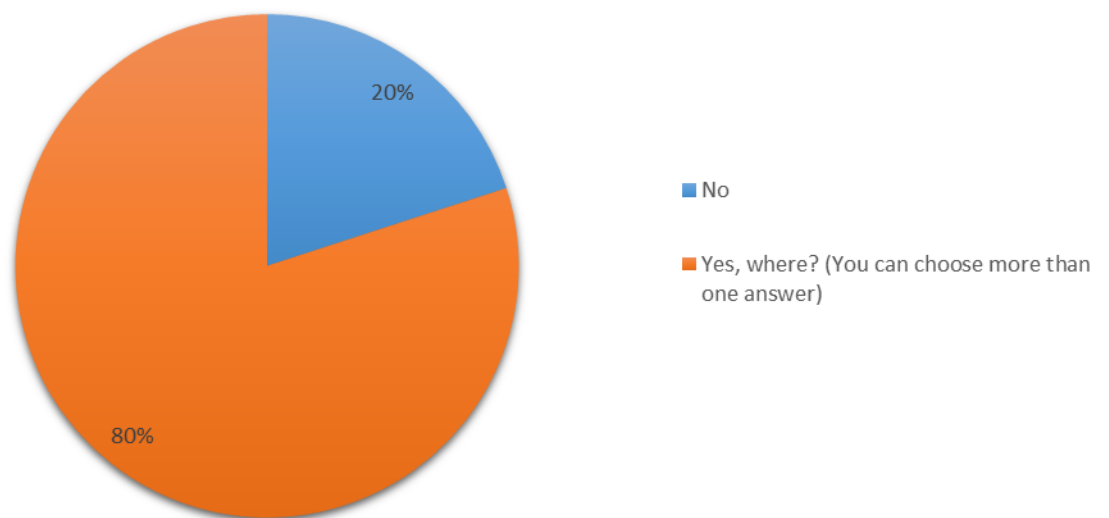
Table n. 35

DOM 23.1	Where have you heard of the concept of "smart home"?	F (absolute frequency)
A	Home	17
B	University	95
C	Work	9
D	Retail store (electronics stores)	9
E	Internet	65
F	Tv/Radio	31

Figure n. 35

Where have you heard of the concept of "smart home"?
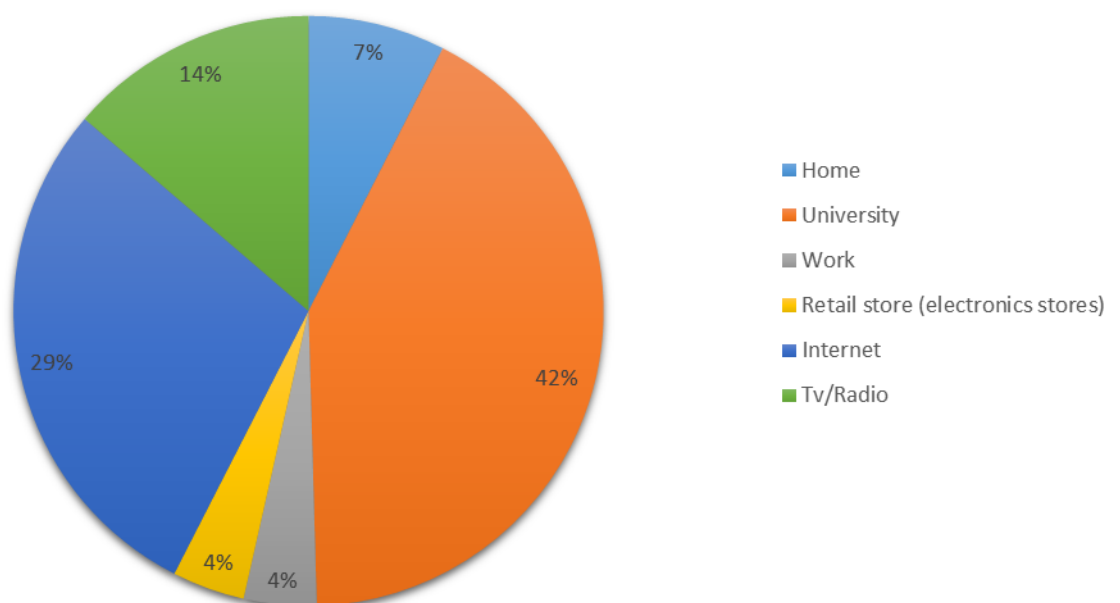
Table n. 36

DOM 35	Do you think that there is a need for more information on the topic?	F (absolute frequency)
A	Yes, I would like that the mass media were talking more of these themes	74
B	Yes, I would like to be able to form through specific training courses in the area of university	38
C	Yes, I wish I could formed through specific training courses provided by private bodies	4
D	Yes, I think it is useful that is delivered a specific training in schools	18
E	No, there is no need for specific training on the theme, the information available at the moment are sufficient	4
F	No, I don't need it because they are already formed on the theme	2
TOT		140

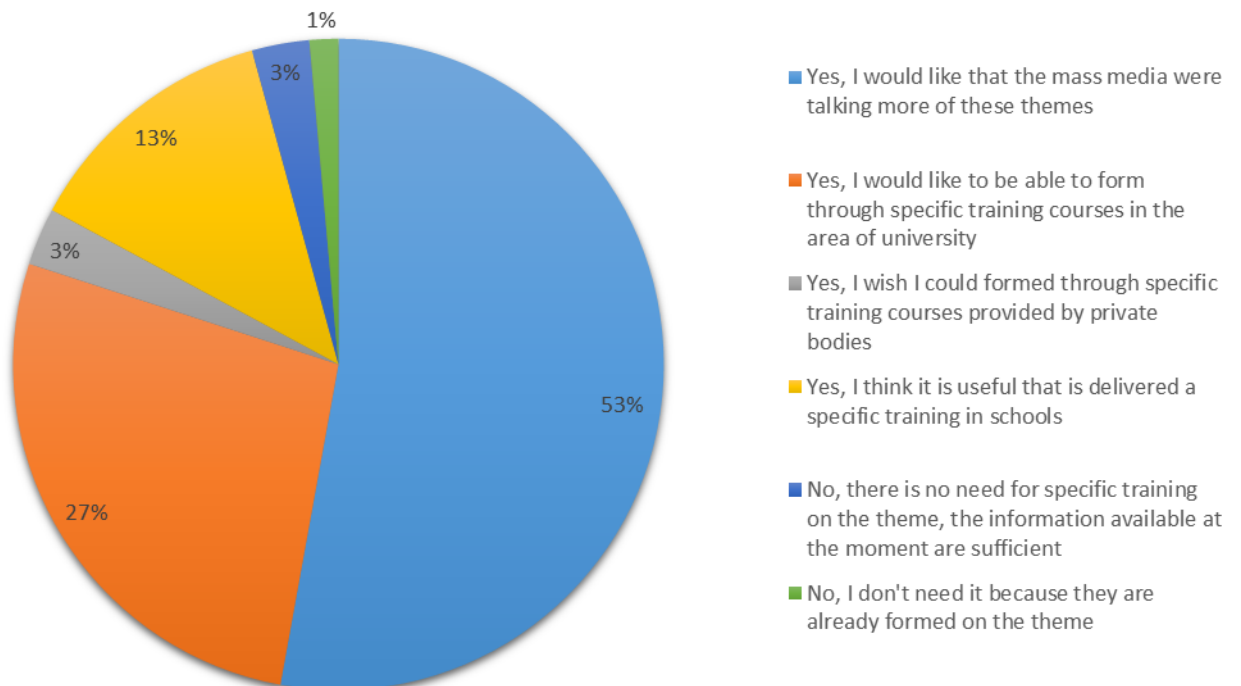**Figure n. 36**

Do you think that there is a need for more information on the topic?

Legend:
- Yes, I would like that the mass media were talking more of these themes
- Yes, I would like to be able to form through specific training courses in the area of university
- Yes, I wish I could formed through specific training courses provided by private bodies
- Yes, I think it is useful that is delivered a specific training in schools
- No, there is no need for specific training on the theme, the information available at the moment are sufficient
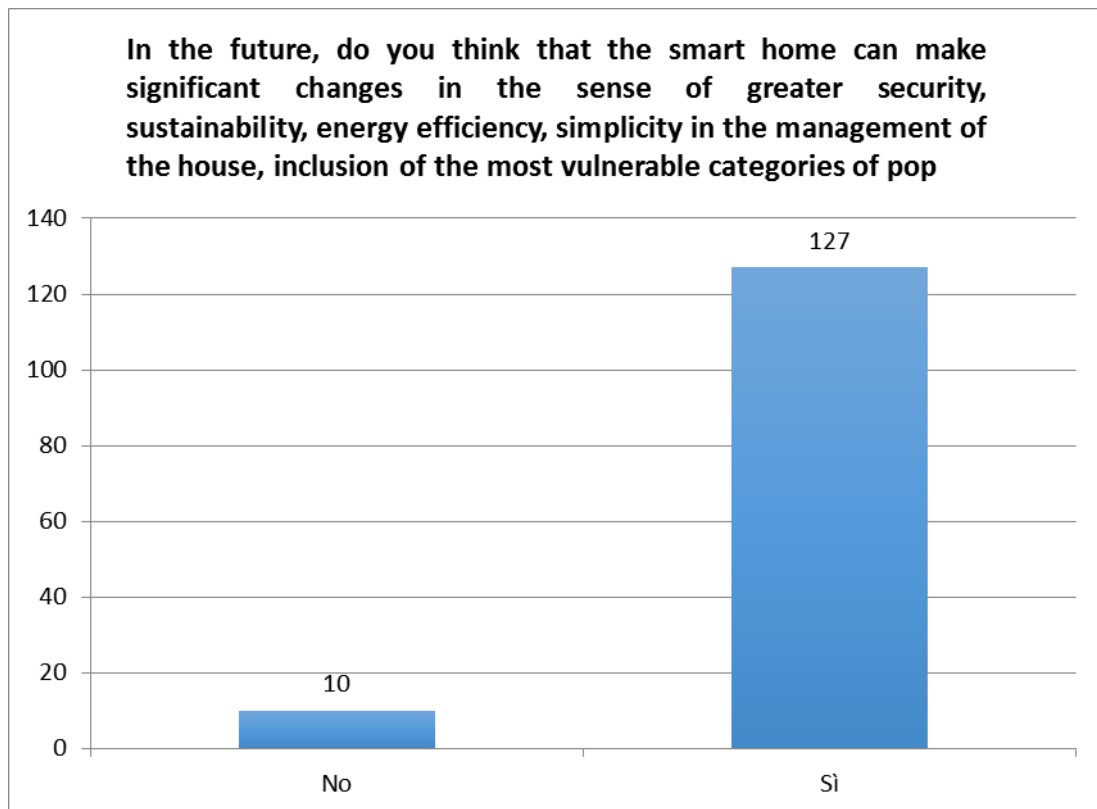- No, I don't need it because they are already formed on the theme

On the plane of the "Horizons", certainly in a future perspective there is clear faith in the fact that the smart home can make significant changes in the direction of greater security, sustainability, energy efficiency, simplicity in the management of the house and the inclusion of

the most vulnerable categories. However, there are still among the disheartened those who in the name of a healthy rejection of technological determinism, believe that technology is inadequate to ensure its promises in terms of security, sustainability, energy efficiency, etc.

Overall, the improvement of the quality of life and of daily life, with its requirements of practicality, it confirms the main reason that should lead toward certain choices and certain behaviors (34%), even more energy savings needs and more in general of sustainability, also very strong next to the first.

Table n. 37

DOM 36	In the future, do you think that the smart home can make significant changes in the sense of greater security, sustainability, energy efficiency, simplicity in the management of the house, inclusion of the most vulnerable categories of the population and why? (Motivates your answer)	F (absolute frequency)
A	No	10
B	Yes	127

Figure n. 37

In the future, do you think that the smart home can make significant changes in the sense of greater security, sustainability, energy efficiency, simplicity in the management of the house, inclusion of the most vulnerable categories of pop

Table n. 38

The motivations of the NO	F% (relative frequency percentage)
The house at the moment, is not sufficiently economic	15%
There is the risk of substitution of technology to man	15%
The preparation on the theme is insufficient to make predictions	15%
The smart home does not guarantee the inclusion because it is too expensive	15%
The technology is inadequate to ensure safety, sustainability, energy efficiency, etc.	40%

Figure n. 39

The motivations of the NO
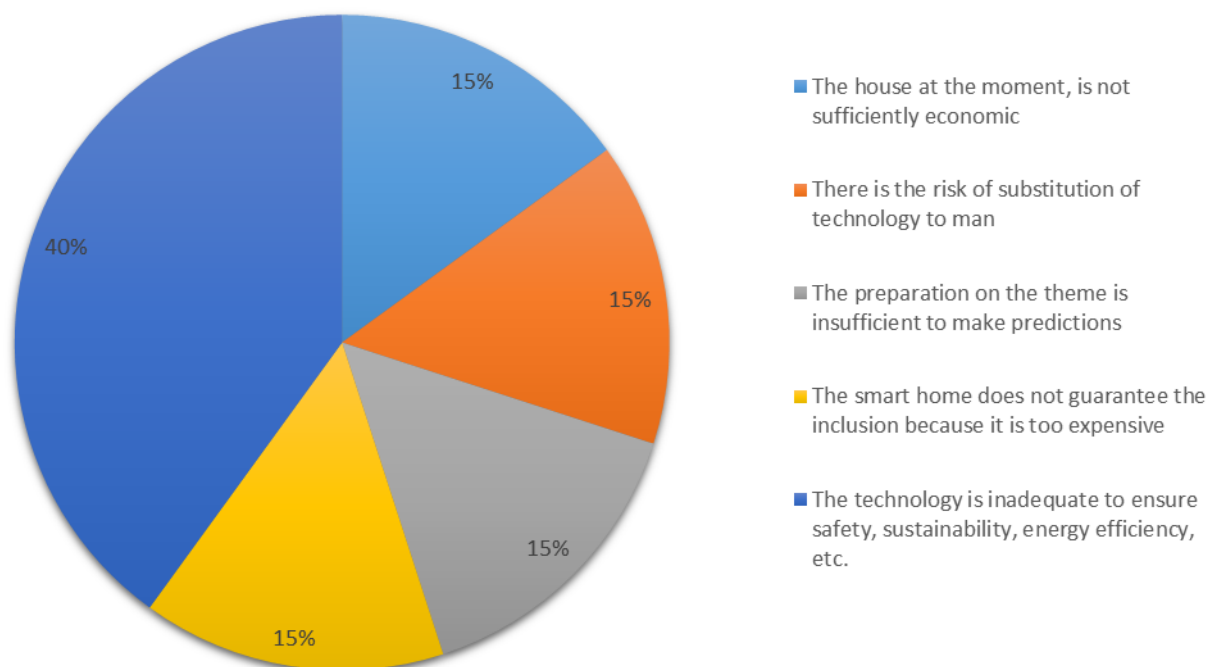
Table n. 40

The motivations of the YES	F% (relative frequency percentage)
The smart home responds adequately to a requirement environmentalist	10%
The smart home ensures a considerable economic savings	7%
The smart home responds adequately to a need sustainable energy/sustainability	24%
The smart home produces benefits provided that they do not replace human intelligence with artificial	3%
The smart home is able to improve the daily life/quality of life	34%
The smart home is able to manage what man cannot check	4%
The smart home benefits especially in terms of inclusion	6%
The smart home produces benefits as long as it is accompanied by incentives and adequate formation	3%
The smart home improves the family place	2%
The smart home ensures in particular safety	6%
The smart home helps people with disabilities	1%

Figure n. 40

The motivations of the YES

- The smart home responds adequately to a requirement environmentalist
- The smart home ensures a considerable economic savings
- The smart home responds adequately to a need sustainable energy/sustainability
- The smart home produces benefits provided that they do not replace human intelligence with artificial
- The smart home is able to improve the daily life/quality of life
- The smart home is able to manage what man cannot check
- The smart home benefits especially in terms of inclusion
- The smart home produces benefits as long as it is accompanied by incentives and adequate formation
- The smart home improves the family place
- The smart home ensures in particular safety

Table n. 41

DOM 30	Which of these factors you would push to tackle behaviors smart inside the house? (You can choose more than one answer)	F (absolute frequency)
A	**Economic Incentives**	94
B	**Energy Saving**	123
C	**Recognition and Appreciation on the part of the other**	13
D	**Make a game daily tasks**	31
E	**Bring the community**	19

Figure n. 41

Which of these factors you would push to tackle behaviors smart inside the house?

- Economic Incentives
- Energy Saving
- Recognition and Appreciation on the part of the other
- Make a game daily tasks
- Bring the community
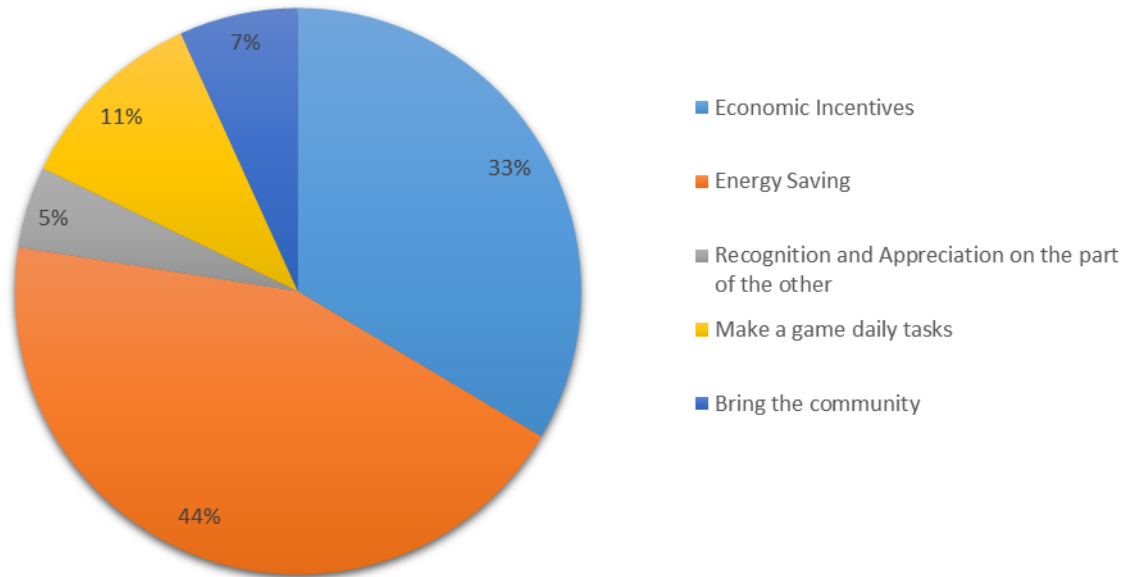
Table n. 42

DOM 31	If i had a house smart and environmentally sustainable, would you be equally flow/or to have attitudes of energy saving?	F (absolute frequency)
A	Yes, apart	120
B	Yes, sporadically	15
C	No, so the house consumes less by itself	5
D	No, I do not care be green	0
TOT		140

Figure n. 42

If i had a house smart and environmentally sustainable, would you be equally flow/or to have attitudes of energy saving?

0%
3%
11%
86%

- Yes, apart
- Yes, sporadically
- No, so the house consumes less by itself
- No, I do not care be green
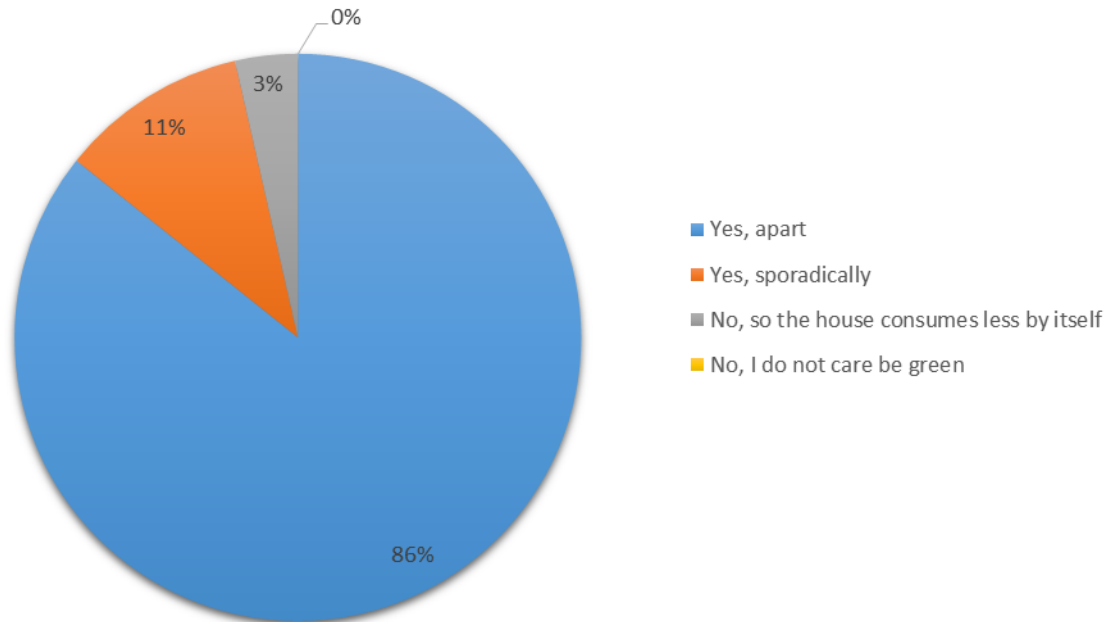
A "sustainable life quality" is therefore the fundamental expectation towards the captioned processes, and therefore the compass that should guide those who study and make smart home, albeit in awareness scholars of these issues should always bear in mind, that much remains to be done for certain assumed to become widespread. As already stated, awareness about some improvements of life is still very limited, almost niche for insiders and sometimes even for them, as the pilot survey conducted on aspiring architects well exemplifies. "It would also be interesting to understand", Casini[11] highlights, "the market penetration of these technologies in relation to age, class and to the geographical place"[12], whereas certainly this category of users.

Is destined to grow exponentially and whereas "certainly for the new generations will be discounted in the house that you can keep certain behaviors"[13].

To develop significantly is also aware of the potential that these technologies can make to the world of social inclusion, for example through the facilities in the management of disability, or in the fight against the "energy poverty". Often, in fact, "the weakest economically disadvantaged, who live in the suburbs, are to dwell in houses worse from the point of view of energy performance"[14], commented Casini. And this, he adds, "implies that paradoxically those who have less economic resources spend more in order to be able to have a comfortable home"[15]. Potential but also critical, as the new forms of social exclusion from "digital divide" well exemplify such as those linked to the complexity in the management of new technologies for the

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[11] The interview with Professor Marco Casini has been realized by Dr.ssa Melissa Sessa within the scope of the thesis in Sciences of the administration and of the organization, with the title "The smart home in its social dimension".

[12] *Ibidem.*

[13] *Ibidem.*

[14] *Ibidem.*

[15] *Ibidem.*

elderly. Or is the case of the issue of liability. "We should indeed understand", note Casini, "if these system types make the user more aware or be turned toward a lack of responsibility"[16].

Cases of social integration, and more in general of development, are therefore "possible", but certainly not in "things". Depend on a utilization of "intelligent" of new technologies. A use that to be such, can be neither ideological nor traded. On the other hand, is now really "impossible to think of having a house that is not in line with what is the behavior of the connection of the millennials"[17]. To research the task to reveal criticality and possible prospects.

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[16] *Ibidem.*

[17] *Ibidem.* For in depth information on the category of the millennials see, in particular, S. FERREIRA, *2 Billion Under 20: How Millennials Are Breaking Down Age Barriers and Changing the World*, St. Martin's Press, New York 2015; *Report Urban Millenials Survey*, disponibile al link http://media.wix.com/ugd/3a3a66_0ef21ccdc3384534a39e31720a761dce.pdf; M.B. HOLBROOK, *The Millennial Consumer in the Texts of Our Times: Exhibitionism*, in «Journal of Macromarketing», vol. 21, n. 1, pp. 81-95; N. HOWE, W. STRAUSS, *Millennials Rising: The Next Great Generation*, Vintage, New York 2000; E.S.W. NG, L. SCHWEITZER, S.T. LYONS, *New Generation, Great Expectations: A Field Study of the Millennial Generation*, «Journal of Business and Psychology», vol. 25, n. 2, 2010, pp. 281-292; J.M. TWENGE, *Generation Me: Why Today's Young Americans Are More Confident, Assertive, Entitled – and More Miserable than Ever Before*, Simon & Schuster, New York 2006.

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