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Cultural drivers of sustainable housing

A case study

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Greetings

This research is dedicated to my beloved wife and to my cherished son who have exhibited tremendous patience, support and encouragement.

I would like to extend my gratitude to:

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Résumé

En 1983, les Nations Unies ont mis en place la Commission Brundtland pour unir les pays dans la recherche conjointe d'un développement soutenable. La Commission Brundtland a inventé le concept de développement durable d'une manière assez universelle, sans considérer explicitement d'éventuelles particularités culturelles.

La présente thèse professionnelle met en évidence, par comparaison, des différences culturelles qui influencent le secteur du logement durable, en France et au Japon.

En dépit de cette influence manifeste, nous ne pensons pas que la culture puisse être envisagée comme un quatrième pilier du développement durable. En revanche, nous suggérons de veiller à ce que des échanges culturels accompagnent toujours les échanges techniques. Ceci pourrait aider à mieux comprendre les conditions de réussite des solutions durables.

Mots-clés: Culture, Développement durable, Logement, Japon, France.

Abstract

In 1983, the United Nations set up the Brundtland Commission to unite countries in pursuing sustainable development together. The Brundtland Commission coined the concept of sustainable development in a universal way, without explicit consideration of potential cultural specificities.

This professional thesis highlights, comparatively, some cultural differences that influence the sustainable housing sector in France and Japan.

Despite undeniable influence, we do not think it is appropriate to see culture as the fourth pillar of sustainable development. However, we suggest ensuring that cultural exchanges always accompany technical exchanges. This would help to understand better the conditions for the success of sustainable solutions.

Keywords: Culture, Sustainable development, Housing, Japan, France.

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« Mais l'inadéquation qui oppose l'homme de notre temps aux logements qu'on lui fournit est d'une autre nature et ne se résout pas en cette mutuelle et incessante quête de l'autre; ses conséquences méritent qu'on y réfléchisse. Elle ne suscite pas seulement le danger, puis le problème, de nous laisser "vivre" sans exister vraiment — déraciné peut-être — mais encore celui de nous désapprendre à demeurer, de nous habituer à être étranger au monde, à la contrée, à la région, à la collectivité où il nous faut demeurer. Sans pouvoir, ni surtout désirer, y pousser des racines. »

Jacques Pezeu-Massabuau,
Demeure mémoire - Habitat: code, sagesse, libération.

1. Introduction

1.1. Context and objectives

In 1983, the United Nations established the Brundtland Commission to unite countries to pursue sustainable development together. In the report called 'Our Common Future', the Brundtland Commission defines sustainable development as the "*development that meets the needs of the present without compromising the ability of future generations to meet their own needs*" (United Nations, 1987, p. 54).
This universal definition of 'sustainable development', without explicit mention of culture, was used as a reference for the Earth Summit, held in Rio de Janeiro from 3 to 14 June 1992.
Twenty years later, 'The future we want', the outcome document of the United Nations' Conference on Sustainable Development, officially acknowledges a possible contribution of cultural diversity to sustainable development (United Nations, 2012, p. 8).

Nevertheless, a recent international research report on cultural sustainability concludes that "*Yet, 30 years after the Brundtland report 'Our Common Future' the incorporation of culture into sustainability debates seems to remain a great challenge, both scientifically and politically*" (Dessein et al., 2015, p. 8).
Later in the same report, the group of experts argues that "*the three-pillar model [the economic, the environmental and the social] is proving to be fundamentally flawed by the absence of culture*" (Dessein et al., 2015, p. 15).

This work is intended to bring out this influence and understand where and how this influence occurs. It does not seek to make a comprehensive outlook on the matter. It will solely try to find some factual evidence and draw conclusions about how to value culture in the implementation of sustainable development.

1.2. Methodological considerations

Our aim is to seek for pieces of evidence of the specific influence of culture regarding the way sustainable housing is perceived, monitored, and implemented. Stemming from an analytical work, we will investigate the influence of the French and Japanese cultures on these country-specific matters. Even a single difference that cannot be justified by economic, social or environmental conditions but by culture would prove this influence.

In this chapter, we will explain why, according to Peter Lor's classification (Lor, 2011), we adopted a qualitative few-country case study with Most Similar Systems Design.

Why focusing on housing?

We assume that houses are designed to fit people's behaviours. Homes are the place of the utmost privacy. Protected from the judgement of the others, people can forthrightly express their cultural identities.

By contrast, workspaces must accommodate multicultural staff and customers. A cultural levelling can be even more important in international organisations and companies where multiculturalism could be overriding.

Thus, although likely to produce results as well, non-residential buildings would certainly make a weaker case for the purpose of our work.

We considered that the housing sector was the best sector to start with for the sake of this work.

Why a qualitative cross-country comparison?

Cross-country comparison offers the opportunities to establish the singularities of a country by reference to the other.

Another option consists of a single country in-depth review. In this case, the identification of singularities is made upon the subjectivity of the author (or upon the subjectivity of the reader if the information is presented factually). We believe that this approach would have rendered conclusions more difficult to draw. At least, statements could have been discounted as biased.

Why a qualitative study?

Quantitative comparison supposes to make sure that data are comparable. Common datasets, including on housing, are available, e.g. provided by OECD or IMF. Our assumption is that

such international agreements to provide common data can stifle the differences, i.e. go against the aim of this work to look for the manifestation of subjective differences. This is why we adopted a qualitative approach.

Is it relevant to consider the country-level?

In E.B.Tylor's definition, a man is a member of a society based on its culture (Tylor, 1871). There is no consideration of a specific scale (national, regional, etc.) for the 'society' Taylor is speaking about. There is not even an obligation for the society to share a bounded piece of land. Therefore, choosing the national level as a study field assumes relatively high levels of cultural homogeneity across a country.

At first, we grounded this assumption on the fact that both France and Japan are stable unitary states. In addition, as demonstrated in 2000 by Naohiko Jinno, professor of Economy at the University of Tokyo, both France and Japan are centralised states, although in different manners (Jinno, 2000).

In addition, we found that Maseland et al. established that a country-level culture exists and can be meaningfully measured (Maseland et al., 2017). This point, further detailed below, comforted the possibility to consider the country-level and build upon national observation, legislation and frameworks.

Why France and Japan?

Our work seeks pieces of evidence that there can be differences in the housing sectors that cannot be solely justified by economic, environmental and social context. It is sensible to believe that this work will be all the more efficient as the two benchmark countries are relatively close within the three-pillar model. This is why we considered a Most Similar Systems Design approach.

Of course, France and Japan do not make a perfect match as illustrated in Table 1.

Table 1: Indicators relevant to the housing sector in France and in Japan (IHHWC 2017)

	France	Japan
Land area (km²)	544,000	377,971
Population (million persons)	65.91	127.1
Population density (person/km²)	121	336
GDP per capita (USD)	37,675	34,522
Total households (million households)	29.95	53.30
Average number of persons per households (persons)	2.20	2.33
Population over 65 years-old (%)	19.2%	26.7%
Number of existing housing (million units)	35.3	60.6
Ratio of ownership (%)	58.0%	61.8%
Number of housing units per household (unit)	1.24	1.16
Average space floor area of existing housing units (m²)	87.5	94.42
Number of newly built housing units in the past 12 months (units)	363,000	974,000
Average space floor area of new housing units (m²)	81.0	78.7

However, in the community of nations, from an economic and social point of view, France and Japan somehow play in the same league.

For instance:

- France and Japan have a similar level of development. Taking the Inequality-adjusted Human Development Index as a reference, France and Japan rank respectively 21 and 17 out of 188 countries (UNDP, 2016).
- On the social side, the most recent common benchmark Gini index value for distribution of household income is 32.1 for Japan, 33.1 for France (World Bank, 2008).
- Many environmental differences can also be claimed. Considering the climate as one of the key environmental drivers for the building design, both countries are dominated by temperate climates under Köppen-Geiger climate classification: Cfb for France (Climate-Data.org, 2017a) and Cfa for Japan (Climate-Data.org, 2017b). Regarding natural disasters, France is also exposed, although to a lesser extent compared to Japan.

2. Culture(s)

2.1. Introduction

Before seeking for evidence of the influence of national cultures into the housing sector, we have to agree on words and concepts. In this part, we will address the following questions:

- Can we define culture in a simple manner?
- Can national cultures be established?
- If that is the case, can we say that Japanese and French cultures are different?
- If so, what is the significance of these differences?
- Can we say that national cultures are evolving? In particular, is globalisation leading to cultural standardisation?

2.2. Definitions and culture general frameworks

Excluding dictionary definitions related to culture in biology, dictionaries still provide for several definitions of culture that are relevant in our context:

- According to the Oxford dictionary[1], culture can be "*1. The arts and other manifestations of human intellectual achievement regarded collectively*" or "*The ideas, customs, and social behaviour of a particular people or society*";
- The Collins dictionary[2] also provides for three relevant definitions: "*1. Culture consists of activities such as the arts and philosophy, which are considered to be important for the development of civilization and of people's minds. 2. A culture is a particular society or civilization, especially considered in relation to its beliefs, its way of life, or its art. 3. The culture of a particular organization or group consists of the habits of the people in it and the way they generally behave*";
- As a third example, the Meriam Webster dictionary[3] equally provides for several definitions: "*a: the customary beliefs, social forms, and material traits of a racial,*

[1] https://en.oxforddictionaries.com/definition/culture (Accessed on 06/04/2018).
[2] https://www.collinsdictionary.com/dictionary/english/culture (Accessed on 06/04/2018)
[3] https://www.merriam-webster.com/dictionary/culture (Accessed on 06/04/2018).

religious, or social group; also: the characteristic features of everyday existence (such as diversions or a way of life) shared by people in a place or time. b: the set of shared attitudes, values, goals, and practices that characterizes an institution or organization. c: the set of values, conventions, or social practices associated with a particular field, activity, or societal characteristic. d: the integrated pattern of human knowledge, belief, and behaviour that depends upon the capacity for learning and transmitting knowledge to succeeding generations".

These few examples show the wide spectrum of the concept and the difficulty to provide a simple unambiguous definition.

Many scholars worked on the concept and attempted to define culture:

- Amongst others, the definition of Edward Burnett Tylor, a British anthropologist tried to give an integrated definition. His definition is commonly used, notably by UNESCO. Edward Burnett Tylor defines culture as a "*complex whole which includes knowledge, beliefs, arts, morals, laws, customs, and any other capabilities and habits acquired by man as a member of society*" (Tylor, 1871, p. 1);
- As another example, Alfred Kroeber and Clyde Kluckhohn gave more insight into culture's dynamics. For them, culture consists of "*patterns, explicit and implicit of and for behaviour acquired and transmitted by symbols, constituting the distinctive achievement of human groups, including their embodiment in artefacts*". They add that "*the essential core of culture consists of traditional (historically derived and selected) ideas and especially their attached values. Culture systems may, on the one hand, be considered as products of action, and on the other hand, as conditioning elements of future action*" (Kroeber & al., 1952).

Other scholars tried to develop frameworks to describe cultures. For example, Dennis O'Neil identifies three layers (O'Neil, 2006):

- The first layer includes the cultural traditions that identify you as being part of a particular society;

- The second layer is the subculture. Here, complex societies can be labelled even further as having a cultural tradition, within which one may identify oneself as a part of that group with further defining characteristics;
- The third layer contains human cultural traits. These traits are shared among all cultures. O'Neil gives 12 examples of such traits:

  "*1. communicating with a verbal language consisting of a limited set of sounds and grammatical rules for constructing sentences,*

  2. using age and gender to classify people (e.g., teenager, senior citizen, woman, man),

  3. classifying people based on marriage and lineal relationships and having kinship terms to refer to them (e.g., wife, mother, uncle, cousin),

  4. raising children in some sort of family setting,

  5. having a sexual division of labour (e.g., men's work versus women's work),

  6. having a concept of privacy,

  7. having rules to regulate sexual behaviour,

  8. distinguishing between good and bad behaviour,

  9. having some sort of body ornamentation,

  10. making jokes and playing games,

  11. having art,

  12. having some sort of leadership roles for the implementation of community decisions.

  While all cultures have these and possibly many other universal traits, different cultures have developed their own specific ways of carrying out or expressing them. For instance, people in deaf subcultures frequently use their hands to communicate with sign language instead of verbal language. However, sign languages have grammatical rules just as verbal ones do" (O'Neil, 2006).

2.3. National culture frameworks

The notion that countries could have a distinctive culture emerged in the eighteenth century. Up to the 40s, studies on this matter were partly misguided to fuel nationalism and colonialism. After two devastating world wars, the idea that nationality and character are

associated became highly controversial. After the 50s, studies of national character were rare. In 1980, Geert Hofstede's 'Culture's consequence' rekindled the interest in national culture and in its measurement (Maseland & al., 2017).

Accelerated globalisation since the late 80s and the necessity to understand each other in commercial relations have probably influenced the regain of interest in the matter and the success of Hofstede's work. Hofstede's framework remains today the most widely used national culture framework (Maseland & al., 2017). It was recently implemented in a mobile application: CultureMee.com.

In the preface of 'Culture's consequence', Geert Hofstede presents his work as follow: "*The survival of mankind will depend to a large extent on the ability of people who think differently to act together. International collaboration presupposes some understanding of where others' thinking differs from ours*" (Hosftede, 1980).

Hofstede's national cultures' framework[4] develops in six dimensions:

- The 'Power Distance Index' expresses the degree to which the less powerful members of a society accept and expect that power is distributed unequally.
    - People in societies exhibiting a large degree of 'Power Distance' accept a hierarchical order in which everybody has a place and which needs no further justification.
    - In societies with low 'Power Distance', people strive to equalise the distribution of power and demand justification for inequalities of power.
- The 'Individualism versus Collectivism' index.
    - The high side of this dimension, called 'Individualism', can be defined as a preference for a loosely-knit social framework in which individuals are expected to take care of only themselves and their immediate families.
    - Its opposite, 'Collectivism', represents a preference for a tightly-knit framework in society in which individuals can expect their relatives or members of a particular in-group to look after them in exchange for unquestioning loyalty. A society's position on this dimension is reflected in whether people's self-image is defined in terms of 'I' or 'we'.

[4] Available at https://www.hofstede-insights.com/models/national-culture/ (Accessed on 06/04/2018).

- The 'Masculinity versus Femininity' ('tough versus tender') index.
  - The 'Masculinity' side of this dimension represents a preference in society for achievement, heroism, assertiveness, and material rewards for success. Society at large is more competitive.
  - Its opposite, 'Femininity', stands for a preference for cooperation, modesty, caring for the weak and quality of life. Society at large is more consensus-oriented.
- The 'Uncertainty Avoidance' index expresses the degree to which the members of a society feel uncomfortable with uncertainty and ambiguity. The fundamental issue here is how a society deals with the fact that the future can never be known: should we try to control the future or just let it happen?
  - Countries exhibiting strong 'Uncertainty Avoidance' maintain rigid codes of belief and behaviour, and are intolerant of unorthodox behaviour and ideas.
  - Societies with low 'Uncertainty Avoidance' maintain a more relaxed attitude in which practice counts more than principles.
- The 'Long-Term Orientation versus Short-Term Normative Orientation' index.
  - Societies with a high score take a pragmatic approach: they encourage thrift and efforts in modern education as a way to prepare for the future.
  - Societies with a low score prefer to maintain time-honoured traditions and norms while viewing societal change with suspicion.
- The 'Indulgence versus Restraint' index.
  - Indulgence stands for a society that allows relatively free gratification of basic and natural human drives related to enjoying life and having fun. Restraint stands for a society that suppresses gratification of needs and regulates it by means of strict social norms.

Hofstede's work is not isolated. Founded by Robert House in 1991, the GLOBE (Global Leadership and Organizational Behavior Effectiveness) is another research program that examined the interrelationships between societal culture, societal effectiveness and organizational leadership. For the purpose of the GLOBE project culture is defined as 'Shared motives, values, beliefs, identities, and interpretations or meanings of significant events that

result from common experiences of members of collectives that are transmitted across generations'.

GLOBE identifies nine cultural dimensions:

"*1. Performance Orientation: The degree to which a collective encourages and rewards (and should encourage and reward) group members for performance improvement and excellence.*

2. Assertiveness: The degree to which individuals are (and should be) assertive, confrontational, and aggressive in their relationship with others.

3. Future Orientation: The extent to which individuals engage (and should engage) in future-oriented behaviours such as planning, investing in the future, and delaying gratification.

4. Humane Orientation: The degree to which a collective encourages and rewards (and should encourage and reward) individuals for being fair, altruistic, generous, caring, and kind to others.

5. Institutional Collectivism: The degree to which organizational and societal institutional practices encourage and reward (and should encourage and reward) collective distribution of resources and collective action.

6. In-Group Collectivism: The degree to which individuals express (and should express) pride, loyalty, and cohesiveness in their organizations or families.

7. Gender Egalitarianism: The degree to which a collective minimizes (and should minimize) gender inequality.

8. Power Distance: The extent to which the community accepts and endorses authority, power differences, and status privileges.

9. Uncertainty Avoidance: The extent to which a society, organization, or group relies on (and should rely on) social norms, rules, and procedures to alleviate the unpredictability of future events. The greater the desire to avoid uncertainty, the more people seek orderliness, consistency, structure, formal procedures, and laws to cover situations in their daily lives" (House, et al., 2004).

2.4. Comparison between the Japanese and French societies

Before presenting results for France and Japan in the Hofstede's and the GLOBE's model, the below disclaimers are necessary and are adapted from Hofstede's website[5].

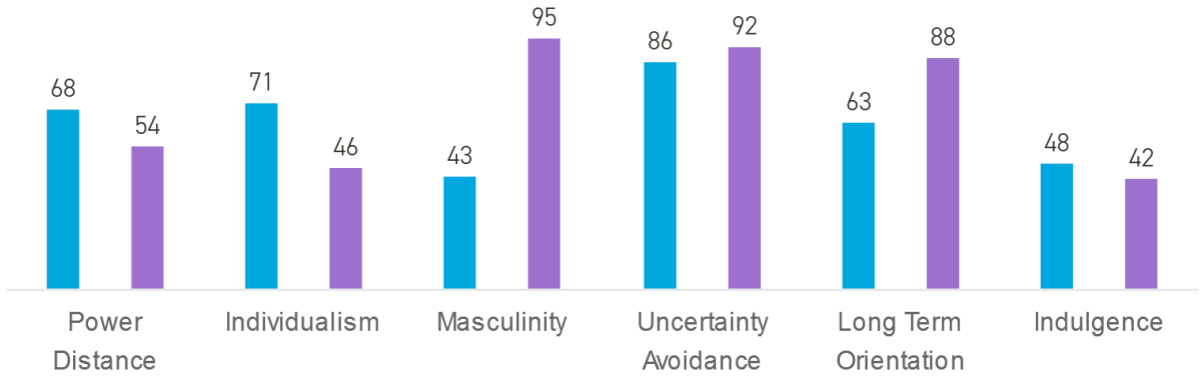
The cultural dimensions represent independent preferences for one state of affairs over another that distinguish countries (rather than individuals) from each other. We are all human and simultaneously we are all unique. All statements applicable, on average, at country-level certainly does not apply at an individual level. Relationships between national culture and individual behaviours are anything but complex (Maseland & al., 2017). To give an order of magnitude, a typical decomposition is that between 5-15% of total values diversity is between countries and that the remaining 85-95% of total variation in values is between individuals from the same country. Though this latter number is inflated and the former number deflated because both total variation and within-country variation comprise invalid variance that is due to measurement error (van Hoorn, 2015).

In addition, country scores are relative. These have no best value in absolute term. A 100 is not 'better' than any lower value. It is just 'different'. In other words, culture can only be used meaningfully by comparison.

As a first example, Chart 1 presents rated index under Hofstede's framework for France (Blue) and Japan (Purple). Biggest differences are observed on the 'Masculinity' dimension, followed by the 'Long-term orientation' and 'Individualism' dimension. Further country-specific interpretations are given in Annex 1.

[5] https://www.hofstede-insights.com/product/compare-countries/ (Accessed on 06/04/2018)

Chart 1: National culture comparison under the six dimensions of Hofstede's framework (Source: www.hofstede-insight.com) (Legend: France: Blue bars on the left, Japan: Purple bars).



As a second example, Table 2 and Chart 2 present the results for France and Japan in the GLOBE's model. The table also displays the international average/median value and the range of observed values in 62 countries.

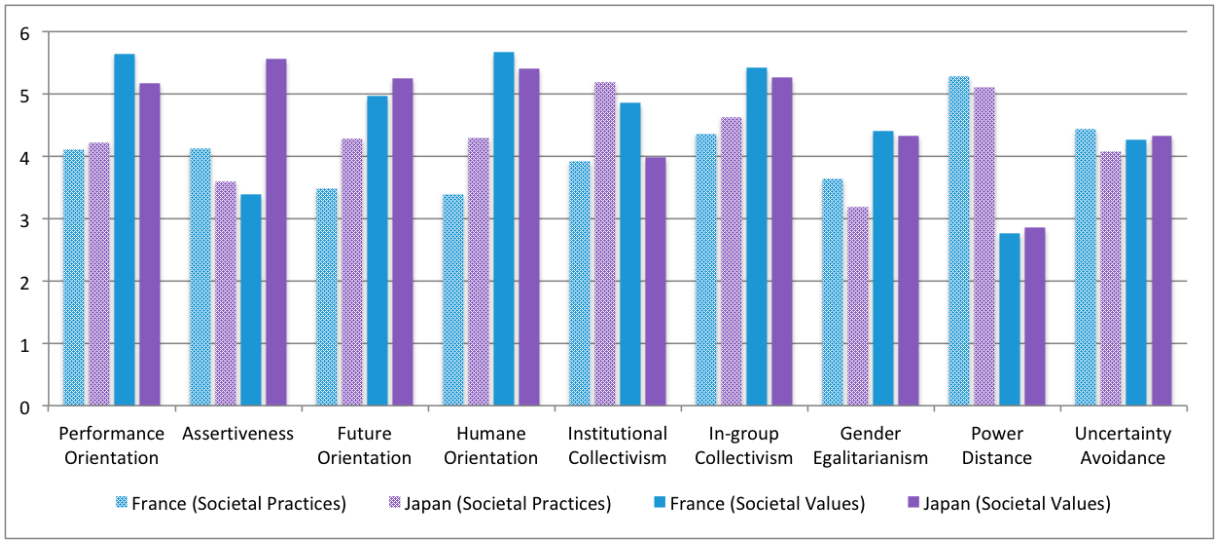
For each dimension, the framework distinguishes between societal culture practices ('as people report it is') and societal culture values ('as people report it should be'). For example, based on this work, French people tend to be more assertive than Japanese people in reality, whereas Japanese Values put assertiveness at a much higher rank than French Values.

Table 2: National culture comparison under GLOBE's societal culture framework (Established with data from http://globeproject.com/data/GLOBE-Phase-2-Aggregated-Societal-Culture-Data.xls)

		Societal Practises								
		Performance Orientation	Assertiveness	Future Orientation	Humane Orientation	Institutional Collectivism	In-group Collectivism	Gender Egalitarianism	Power Distance	Uncertainty Avoidance
Statistics	Maxima	4,94	4,89	5,07	5,23	5,22	6,36	4,08	5,80	5,37
	Average	4,10	4,13	3,84	4,09	4,24	5,10	3,38	5,14	4,17
	Median	4,11	4,10	3,81	4,08	4,21	5,39	3,38	5,20	4,12
	Minima	3,20	3,38	2,88	3,18	3,25	3,18	2,50	3,59	2,88
Values	France	4,11	4,13	3,48	3,40	3,93	4,37	3,64	5,28	4,43
	Japan	4,22	3,59	4,29	4,30	5,19	4,63	3,19	5,11	4,07
Rankings (under 62)	France	32	30	48	58	46	49	18	28	19
	Japan	26	59	10	20	3	45	41	39	34

		Societal Values								
		Performance Orientation	Assertiveness	Future Orientation	Humane Orientation	Institutional Collectivism	In-group Collectivism	Gender Egalitarianism	Power Distance	Uncertainty Avoidance
Statistics	Maxima	6,58	5,56	6,20	6,09	5,65	6,52	5,17	4,35	5,61
	Average	5,88	3,83	5,44	5,39	4,71	5,64	4,50	2,77	4,61
	Median	5,97	3,76	5,52	5,46	4,72	5,70	4,58	2,70	4,68
	Minima	2,35	2,66	2,95	3,39	3,83	4,06	3,18	2,04	3,16
Values	France	5,65	3,38	4,96	5,67	4,86	5,42	4,40	2,76	4,26
	Japan	5,17	5,56	5,25	5,41	3,99	5,26	4,33	2,86	4,33
Rankings (under 62)	France	51	47	55	7	26	46	39	28	45
	Japan	60	1	40	35	57	52	41	19	44

Chart 2: National culture comparison under GLOBE's societal culture framework (Established with data from http://globeproject.com/data/GLOBE-Phase-2-Aggregated-Societal-Culture-Data.xls)



Because each framework comes with its own definitions, topics sharing the same label (e.g. 'Power Distance', 'Uncertainty avoidance') cannot necessarily be compared from one to the other.

2.5. National cultures and globalisation

Once agreed that national cultures can be distinctly characterised, the question asked is whether cultures are changing. If so, the question extends to whether, with the ongoing economic integration of nations, national cultures are changing to become more similar (cultural convergence) or whether national cultures exhibit persistent differences (cultural divergence).

After a literature review, Maseland and van Hoorn raised some points still debated (Maseland & al., 2017):

- The temporal stability of national cultures and cultural differences is not agreed amongst culture researchers,
- The answer may vary depending on which dimension of culture one considers,
- One challenge is to separate genuine shifts in cultural values from temporary changes due to, for instance, random fluctuations over time.

We can add on the later based on Brigitte Steger's observation following the 2011 earthquake, tsunami and Fukushima disaster, staying alongside evacuees and survivors. She testified that, during this period, "*traditional gender roles were re-emphasised, even in the setting of a disaster shelter - particularly in the family-like household of the temple shelter where it was taken for granted that women had the main responsibility for cooking and cleaning. Men did the jobs that required physical strength and were often group leaders; women only taking a leading role after men started returning to their jobs*" (Gil & al., 2013).

Pezeu-Massabuau makes another observation that confirms a form of cultural resilience. In 'Construire l'espace habité: l'architecture en mouvement', Pezeu-Massabuau describes how the Japanese and French architecture relates to symmetry. He observes that the architecture can deviate from its natural inclination and come back to it after a while. In the case of France, he takes the example of the English landscape garden that temporarily replaced the strictly symmetrical French landscape garden. For Japan, he takes the example of the Heian period architecture which deviated from the Japanese taste for natural asymmetry (Pezeu-Massabuau, 2007).

In the end, Maseland and van Hoorn come to the conclusion that "*Overall, the question of the relevance both of cultural change and of cultural convergence/divergence as phenomena affecting national culture is still very much unanswered and one of the main empirical questions*" (Maseland & al., 2017).

2.6. Conclusion

As the many existing definitions show, culture is a particularly polysemic term that cannot be easily grasped.

Because it can feed in nationalism, the eventuality of national cultures with distinctive traits is a sensitive matter and has been polemic for some time in the past.

Though, in a globalising world, some academics recently reinvested the topic with the view to better understand one another in commercial relationships. Their work proved that it was possible to characterise country-specific cultures and subsequently confirmed the existence of cultural differences between countries, including between France and Japan.

However, these academics insisted on precautions of use to avoid simplistic approaches:

- There is no 'ideal' national culture benchmark. The assessment of national culture can only be done in relative terms, comparing one country to another;
- Statements about national cultures cannot apply to individuals without resorting to caricature.

Finally, the question of the evolution of national cultures and the potential influence of globalisation in such evolution remain much debated amongst specialists. There is no agreement on a potential national cultures' convergence coming along with globalisation.

This being said, Hofstede's work highlights three dimensions with significantly different upper-end indexes:

- A stronger 'Masculinity' index for Japan (95 compared to 43 for France),
- A stronger 'Long-term orientation' index for Japan (88 compared to 63 for France),
- A stronger 'Individualism' index in France (71 compared to 46 for Japan).

Interestingly, for these three dimensions, the other country comparatively holds a less clear-cut position.

In the following, we will use these markers to see whether these can serve as explanatory factors for cultural differences that would be observed.

3. Individual perspective

3.1. Introduction

From an individual perspective, culture can practically influence dwellings in various manners, for example in the way dwellings are:

- used, i.e. designed with respect to their use,
- perceived as assets.

In this part, we will explore these different elements by:

- describing some details of the popular culture and traditions associated with dwellings,
- observing how dwellings are presented in real estate advertisements,
- depicting a typical dwelling,
- looking at factors influencing the property valuation.

3.2. Details of popular culture and traditions

Two gentle little starters…

• *Petit cochon, petit cochon, laisse-moi entrer.* • *Non. Par le poil de mon petit menton.* • *Alors, je vais souffler et ta maison s'envolera en morceaux.*	• *Little pig, little pig, let me come in.* • *Not by the hair on my chinny chin chin.* • *Then I'll huff, and I'll puff, and I'll blow your house down.*

When it comes to building a house, French people remain somehow influenced by the 'Three little pigs' popular tale. The story was told to children far before The Walt Disney Company made a movie out of it.

The story begins with three little pigs being sent out into the world by their mother.

The first little pig builds a house of straw, but a wolf blows it down and devours him.

The second little pig builds a house of wood. The wolf also blows it down, and the second little pig is also devoured. The third little pig builds a house of bricks. The wolf fails to blow it down and the little pig gets safe. This tale may have something to do with the fact that, from

these three materials (straw, wood, bricks), heavy materials remain the most commonly used for structure in French houses. With the industrialisation, wood stud wall construction, common in some regions in the middle-age, have been replaced by bricks and concrete blocks.

第五十五段 家の作りやうは、夏をむねとすべし。冬は、いかなる所にも住まる。暑き比わろき住居は、堪へ難き事なり。	Section 55. When building a house, it should be designed to suit the summer. In winter, one can live anywhere but, in the hot weather, an uncomfortable house is indeed trying.

These words are extracted from the Tsurezuregusa (徒然草), a collection of essays written by the Japanese monk Yoshida Kenkō (吉田兼好) between 1330 and 1332. The Tsurezuregusa is considered a gem of medieval Japanese literature. It was already popular in the 15th century and was considered a classic from the 17th century onward. Nowadays, it is part of the Japanese high school curriculum.

This text was taken as a reference by the Japanese architect Ashizawa Keiji to explain why Japanese people were rather considering local space heating than central heating (Snow, 2008).

Hot and humid summers are still feared by Japanese people and they have various strategies to feel cool: First, the use of a screen made of bamboo or reed (簾: Sudare) that is hung under the eaves or at the window side; Second, water sprinkling over the street or the garden contributes to moderating the temperature rise by heat evaporation in addition to limiting dust generation; Third, wind-bell that brings the cool through the sense of hearing (IHHWC2017).

With the good behaviours, traditional Japanese houses, with very bad insulated envelope and a very simple structure can become comfortable in Japan (Sdei, 2006).

Big cleanings

In France, people are familiar with the concept of Spring Cleaning. Spring is considered as the season of renewal: the first flowers come out, days get longer, the sun gets warmer and we come out of a long winter period. The change of season makes you want to clean your house and especially to put away the winter clothes for the benefit of those who will put in summer.

The better weather is also an advantage to open the windows, shake the carpets outside, chase the dust accumulated in winter, etc.

In Japan, houses all around the country are thoroughly cleaned during the New Year's holidays, one of Japan's longest holidays of the year. This tradition is called Osoji (大掃除), the big cleaning.

Whereas Spring Cleaning in France has a practical ground, Japan's Osoji custom is not just a lifestyle choice. It is intertwined with traditional customs and religious beliefs. Originally, the Ōsoji custom derived from yet another custom that was done in the middle of December: Susuharai (煤払い). This term refers to sweeping out the soot and over time this very practical custom has turned into a more symbolic one to greet the Shinto deities of the New Year. The people of Edo would perform purification rituals for a certain time to ward off any evil or disaster that might befall them and their homes. In other words, the Japanese prepared to greet the New Year's deities with a clean house, a clean body, and a clean mind. Therefore, Osoji is not just about getting rid of dirt but, first and foremost, it is a polite act to greet and invite these deities into one's home.

This tradition is still lively. Macromill, a Japanese company, recently conducted a survey dealing with the question of 'how to spend New Year's holidays', and out of 7,500 answers, both male and female between 20 and 60 years old, a total of 6,070 people said that they plan to do Osoji during this period (Live Japan, 2017).

Ceremonies

Various traditions have to deal with specific times of construction or occupation of dwellings. Housewarming party (or 'Pendaison de crémaillère' in French) is a custom of inviting friends to one's new home. In the true sense, the 'crémaillère' is a metal rod with notches thanks to which one could formerly hang the pots over the fire. So, when we were hanging the 'crémaillère', it meant that we were able to prepare the meal, i.e. that the house was liveable[6].

In Japan, the ground-breaking ritual (**地鎮祭**: Jichinsai) is a ceremony to be performed before the construction of a new building. Jichinsai literally means the pacification of the grounds. The local deities (**神**: Kami), which are seen as guardians of the area, are invited to be present

[6] Translated from http://www.linternaute.com/expression/langue-francaise/912/pendaison-de-cremaillere/.

in an evergreen tree - or its symbolic paper form (神籬: Himorogi) - and to commune their blessings and benefits with the people who are gathered on the purified place (Japanese Dutch Shinzen Foundation, s.d.).

Commencing construction without a Jichinsai ceremony would be unthinkable for most Japanese people. Although for many it may be more of a societal custom than a religious rite, not having one would seem odd.

Some people choose to have another ceremony, called Jotoshiki (上棟式), just before the framework of the building goes up — but this is much less common than the Jichinsai.

In Japan, neither of these ceremonies preclude Western-style housewarming parties once the building is complete — a trend that seems to be growing in Japan (Finn, 2017).

3.3. Practical typology for real estate advertisements

In France, to simplify the layout description in real estate advertisements, the acronym ‘Tx’ is used, where T stands for ‘type’. ‘x’ is the number of rooms (living room, dining room and bedrooms). The kitchen and bathrooms come on top of the ‘x’ rooms.

Eventually, a ‘bis’ can be added to the ‘Tx’ (e.g. ‘T3bis’) to indicate that one of the rooms is larger and can potentially be separated in two distinct rooms.

Forms like ‘Tx/x+1’ can also be encountered in similar situations. ‘T3/4’ would typically mean that, in a dwelling that was originally a ‘T4’, a partition wall was torn down to make one big room out of two rooms. Compared to a ‘T3bis’, the transformation of the ‘T3’ into a ‘T4’ would be easier to achieve because ‘T4’ was the initial layout.

Sometimes ‘F’ is used instead of ‘T’ (e.g. ‘F3’ instead of ‘T3’). The ‘F’ stands for function. Although there is no legal text to clarify the difference between the 'F' and 'T', ‘F’ formerly tended to be used in the social housing context. The ‘T’ was therefore assimilated to more comfortable dwellings with larger rooms. Nowadays, both are used in practice, although the ‘F’ tends to disappear.

Finally, a ‘Studio’ is a special case of ‘T1’ or ‘F1’ where the kitchen is completely part of the main room. Thus, it is configured as a single-room apartment with a kitchenette. The bathroom remains separated.

In France, Decree n°2002-120 of 30 January 2002 defines the mandatory elements of a decent dwelling. A dwelling that would not comply with Decree n°2002-120 cannot be rented out.

Regarding the size, a dwelling must at least include one main room of 9 m² minimum with a height under the ceiling of at least 2.20 meters, and a habitable volume at least equal to 20 cubic meters. Thus, 9 m² is commonly reckoned as the minimum size of any countable room of a dwelling.

Japanese dwelling layout description is typically abbreviated with one figure followed by letters. The figure represents the number of rooms in the dwelling. The letters are related to different functions of the dwelling: R for 'Room', S for 'Storage', L for 'Living', D for 'Dining' and K for 'Kitchen'. These are combined as follow:

- '1R' refers to dwellings with a single room from where an open kitchenette and a closed bathroom are directly accessed;
- 'xK' stands for dwellings with 'x' rooms and a kitchen that is not suited for dining;
- 'xDK' means for a dwelling with 'x' rooms and a 'dining-kitchen' area;
- an 'xLDK' is a dwelling that has a 'living, dining, kitchen' area and 'x' bedrooms;
- finally, 'xS(L)DK' refers to an (L)DK dwelling with an extra smaller storage or service room.

This way to describe dwellings appeared with the government-sponsored multifamily housing projects known in contemporary Japan as *Danchi* (団地). The kitchen-type is a central component of this description.

According to Laura Neitzel, *Danchi* were connected with images of what it meant to aspire to the middle class in Japan in the 1950s and 1960s. The use of Roman letters indicating English is, for her, an obvious suggestion of an aspiration for "Westernization" in the *Danchi* apartment design (Neitzel, 2016).

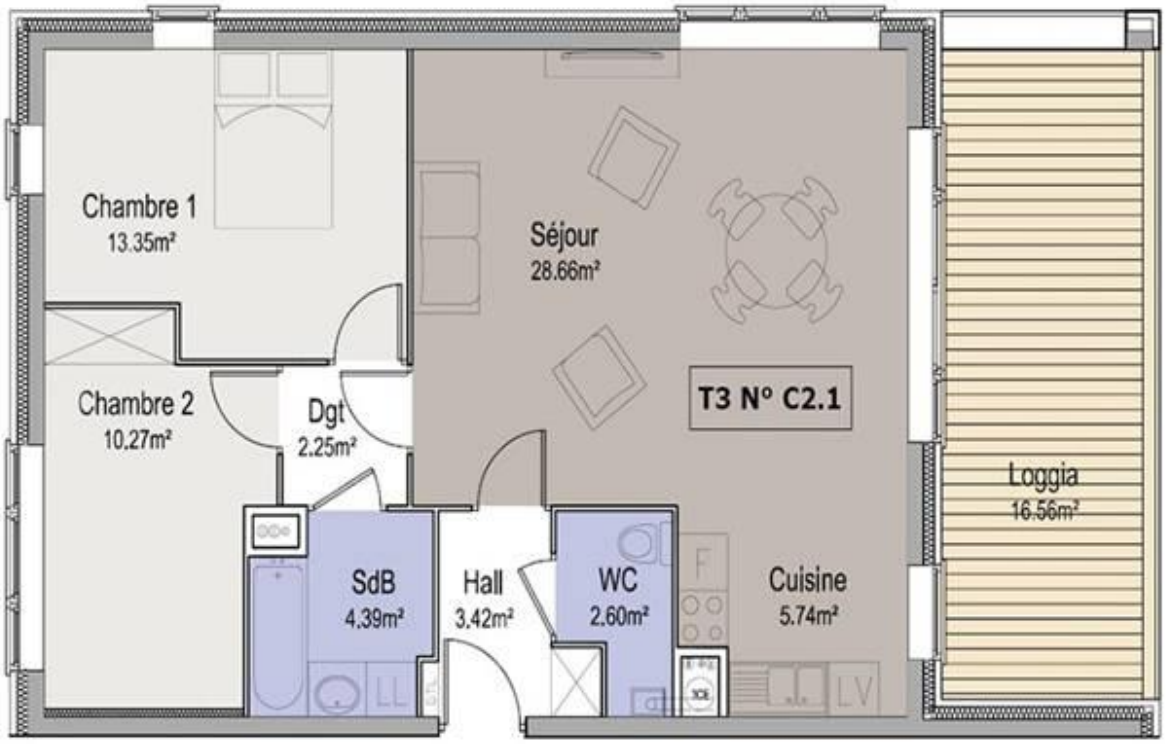
3.4. Description of a typical dwelling

Chart 3 provides an example of a typical recent French dwelling. This example is an opportunity to describe how French dwellings are generally designed.

This example presents a dwelling with a living room, two bedrooms and a bathroom. It is, therefore, a T3.

French dwellings will tend to separate a more private 'night part', consisting of at least bedrooms and bathroom(s), and a 'day' part, more directly accessible from the entrance and consisting of the living and the dining spaces, often combined into a single room.
In this example, the kitchen is combined with the living room. This is more and more the case in modern dwellings. A more traditional setting would separate a kitchen, often sufficiently large to enable daily dining use for the household, and a living-dining room for more exceptional receptions of the family and friends. When the kitchen is incorporated in the living room, the setting will try at least to establish a distinction with a physical element (e.g. a counter) or with a change of material/colour.

Chart 3: Example of a French 'T3' dwelling (Source: KIC - Kieken Immobilier Construction)



In the case of Chart 3, the entrance hall opens directly on the living-dining-kitchen room. A variant would be for the entrance hall to be part of the corridor serving all rooms; each room closing with doors.
WC should be easily accessible from both ('night'/'day') spaces. Should the dwelling be distributed in two levels, the WC would typically remain downstairs with the 'day' part and a bathroom would stand upstairs with the 'night' part, possibly with a second WC inside the bathroom.

The example includes a loggia. This is optional and could be replaced by a smaller balcony or even be totally absent. Most apartments, in particular, those built in the 60-70s do not have exteriors. However, all bedrooms and living rooms should normally have windows.
This example also incorporates a built-in closet in the second bedroom. These are totally optional and could be replaced by pieces of furniture.
Additionally, dwellings can have a separate cellar and/or parking space. These can lay at basement level.
Finally, in multi-apartment buildings, all dwellings are generally accessed through closed common staircase and corridors, making a transition with the outside.

In the West, the Japanese house has reached iconic status in its architecture, decoration and style (Daniels, 2010). This neat and carefully constructed version of Japanese life is an idealized version of the Japanese house, even for Japanese people.
Though, if the design of the Japanese house may have undergone some serious transformation over the years, the typical home remains a uniquely Japanese space, with traditional elements and modern inventions (Croxley-Baxter, 2018).
Chart 4 provides an example of a typical recent Japanese dwelling. Chart 5 further illustrates some common dwelling elements.

Chart 4: Example of 3LDK dwelling layout (Source: http://roomclip.jp/photo/gdAy)

Chart 5: Illustration of dwelling elements (Sources: various)

The example of Chart 4 has 3 rooms and a living-dining-kitchen. It is, therefore, a 3LDK.

The entrance (Genkan: 玄関) lies below the rest of the dwelling. Japanese people would never cross the step without leaving their shoes off and putting slippers on. Japanese people would also exchange slippers before entering the WC.

Studying Japanese vernacular architecture, Gözde Uyar found that although Japanese houses can be considered 'flexible' in terms of the interconnectivity and the number of possible linkage between interior spaces, transition areas between the interiors and exteriors suggest 'traditional' Japanese houses to be 'introverted' and hard to access from the exterior (Uyar et al., 2017).

Except in the smallest dwellings, WC is separated from the bathroom. The bathroom is divided into two parts one for the wash basin (Senmenjo: 洗面所), the other for the bathtub (Yokushitsu: 浴室). This layout is due to the tradition of cleaning completely before soaking in the bathtub. Despite taking up a substantial amount of space in small apartments, this bathroom layout is quintessentially Japanese and is rarely ever westernized (Crossley-Baxter, 2018a).

In older dwellings, the Senmenjo can be located as an open space in the serving corridor. In the example of Chart 4, the square in the Senmenjo is a receptacle for a washing machine.

On Chart 4 the living room is sufficiently large to be considered as a living-dining-kitchen (LDK).

In addition to the LDK, there are three rooms. Two are western style (Yōshitsu: 洋室), one is Japanese style (Washitsu: 和室) with tatami flooring.

In Japanese houses, while the bathroom and kitchen are fixed, the living spaces are fluid, with bedrooms, living rooms, studies and guest rooms all interchangeable (Crossley-Baxter, 2018a). Medical researchers noted a specific Japanese sleep culture, partly due to the variety of bedroom environments in Japan (Yoshizaki et al., 2017).

Room size is indicated in tatami mats (Jō: 帖 or 畳, around 1.8m²). In our example, the smallest room is 4.5 Jō, i.e. 8.1 m², which is the minimum size for a room according to the Construction Standard Law.

One of the western style rooms has a little storage (Shūnō: 収納). The Japanese style room would typically have a deeper storage (Oshiire: 押入) for folded mattresses and sitting cushions. Bigger Japanese style rooms would also typically have a built-in recessed space

(Tokonoma: 床の間) of 2 Jō size, slightly elevated above the tatami floor, to display artistic items. This is not the case in Chart 4 but one picture on Chart 5 shows how it looks like.

Aeration and light are important elements for Japanese houses. In the collective housing, the apartment on the corner facing East and South is traditionally considered the best. When building a house, it is generally considered important to build the building so that the air goes from north to south.

Moreover, in traditional Japanese houses, there was often an outside corridor that protects from the summer sun and allows the sun to enter in the winter time. This traditional houses' feature is less common, especially in large cities with high land costs.

Finally, Japanese dwellings will generally have an exterior (Baruconī: バルコニー when it is not covered or Beranda: ベランダ when covered). This outdoor space is considered vital for airing futons and having outdoor space, they often hold washing machines and usually attached to living spaces with sliding glass doors (Crossley-Baxter, 2018a).

Multi-unit blocks can be divided into two categories Apāto (アパート) or Mansion (マンション). The former is a usually a smaller building with open entry and external doors to each house, while the latter are larger buildings with elevators, internal hallways and secured entrance points (Crossley-Baxter, 2018a).

As houses and low-rise apartment buildings are generally built with wooden structure laying on superficial foundations, these generally do not have a basement.

3.5. Factors influencing the property valuation

Hedonic regressions of dwelling market prices are made use of to provide estimates of the contribution of dwellings constituent characteristics in dwellings' value.

Based on his extensive studies and experience, Stephen Malpezzi identifies the characteristics, that he would consider part of a full dataset when developing a hedonic regression model (Malpezzi, 2002). These are reproduced in Table 3.

Table 3: Malpezzi's list of housing characteristics. Extracted from (Corsini, 2009)

Malpezzi's List of Housing Characteristics	
1	Rooms, in the aggregate, and by type (bedrooms, bathrooms, etc.)
2	Floor area of the unit
3	Structure type (single family, attached or detached, if multifamily the number of unites in the structure, number of floors)
4	Type of heating and cooling systems
5	Age of the unit
6	Other structural features, such as the presence of basements, fireplaces, garages, etc.
7	Major categories of structural materials, and quality of finish
8	Neighborhood variables, perhaps an overall neighborhood rating, quality of schools, socioeconomic characteristics of the neighborhood
9	Distance to the central business district, and perhaps to sub-centers of employment; access to shopping, schools and other important amenities
10	Among characteristics of the tenant that affect prices: length of tenure (especially for renters), whether utilities are included in rent; and possibly racial or ethnic characteristics (if these are hypothesized to affect the price per unit of housing serviced faced by the occupant)
11	Date of data collection (especially if the data are collected over a period of months or years)
(Taken from "Hedonic Pricing Models: A Selective and Applied Review" Stephen Malpezzi. Prepared for Housing Economics: Essays in Honor of Duncan Maclennan. April 10, 2002)	

In 2005, Sirman et al. analysed 125 different Hedonic Pricing Models. They identified the most common housing characteristics that were used in hedonic pricing equations as well as whether or not those particular factors had positive or negative effects on the overall pricing for that study (Sirman et al., 2005). Table 4 provides the 20 characteristics most often found in hedonic modelling studies.

Table 4: The 20 characteristics appearing most often in hedonic pricing model studies. Extracted from (Corsini, 2009)

The 20 Characteristics Appearing Most Often in Hedonic Pricing Model Studies				
Variable	Appearances	# Times Positive	# Times Negative	# Times Not Significant
Lot Size	52	45	0	7
Ln Lot Size	12	9	0	3
Square Feet	69	62	4	3
Ln Square Feet	12	12	0	0
Brick	13	9	0	4
Age	78	7	63	8
# of Stories	13	4	7	2
# of Bathrooms	40	34	1	5
# of Rooms	14	10	1	3
Bedrooms	40	21	9	10
Full Baths	37	31	1	5
Fire place	57	43	3	11
Air-conditioning	37	34	1	2
Basement	21	15	1	5
Garage Spaces	61	48	0	13
Deck	12	10	0	2
Pool	31	27	0	4
Distance	15	5	5	5
Time on Market	18	1	8	9
Time Trend	13	2	3	8
** reproduced from Sirman, Macpherson and Zietz (2005)*				

Since then, several studies analysed and have evidenced that green buildings command a small but significant premium on housing prices, both in France – e.g. (Notaires de France, 2017) – and in Japan – e.g. (Fuerst et al., 2014).
Theoretically, all these factors can be considered and studied anywhere. In practice, some factors are discarded upfront because considered negligible in a given context.

In France, real estate is considered to be a golden investment. According to a survey, real estate is on a par with life insurance (34%) in investments considered the most interesting by the French to grow their savings (Groupe Atland, 2017). In practice, this means that French people would expect that their property, at least, keeps its rental and market value over time. According to Les Echos, the eight key points affecting the value of properties in France are the location, the surrounding amenities, the floor in the building, the internal layout, the view and orientation, the condo fees, and the energy performance (Les Echos, s.d.).

In Japan, the building age is playing a key role in property valuation. With buildings routinely ruined by earthquakes, tsunamis and fires, a permanent structure was historically not considered feasible, and thus the positive focus on new developments has been encouraged.

After World War II, a priority given on quantity over quality led to new homes being built in record time, without too much thought for how long they might last. While this was what was needed at the time, it led to a general consensus that houses were poor quality and wouldn't last, an impression that was never truly changed. In many cases, demolition of older buildings opens up space for taller buildings with smaller apartments, meaning it is more financially rewarding to demolish than renovate. Even shrines today are re-built on average every 20 years, allowing for a sense of renewal as well as maintaining the skills of Shrine builders (Croxley-Baxter, 2018b).

This situation not only affects market values but also rental values. Tokoyo Kantei showed that in Japan, more specifically in Tokyo's 23 wards, Osaka City and Nagoya City, apartment buildings' age actually has a larger influence on rent in comparison to a buildings' distance to the nearest train station. The difference in rent between an apartment that is less than 3 years old and an apartment that is over 30 years old, is between 30 to 40%. In comparison, the difference in rent between apartments less than a 3-minute walk from a station compared to a location 15 minutes away is around 20% (Tokyo Kantei, 2014).

Because houses' market and rental values are anyway expected to depreciate, homeowners have little interest in maintaining their properties. The construction ultimately has no value. Only the land supports the asset value.

This depreciation does not discourage young Japanese people to homeownership. Despite narrowing opportunities, mortgaged homeownership in contemporary Tokyo remains the eminent choice among young families. The superior material qualities of owner-occupied homes, as well as practical and emotional factors, shape home purchase decisions, despite the increasing struggle to maintain the asset value of homes and land (Druta & al., 2018).

Low lifespans ease the implementation of tighter regulatory requirements because these are generally easier to implement on new buildings. But there are at least three reasons for the Japanese government to see this as an issue and take action.

First, with the Japanese population shrinking, new homes keep being built as the number of abandoned houses is dramatically increasing. This is even more so in the case of Japan's rural regions, the greatest of them having a decreasing and ageing population which has led to, in extreme cases, the desertion of entire villages.

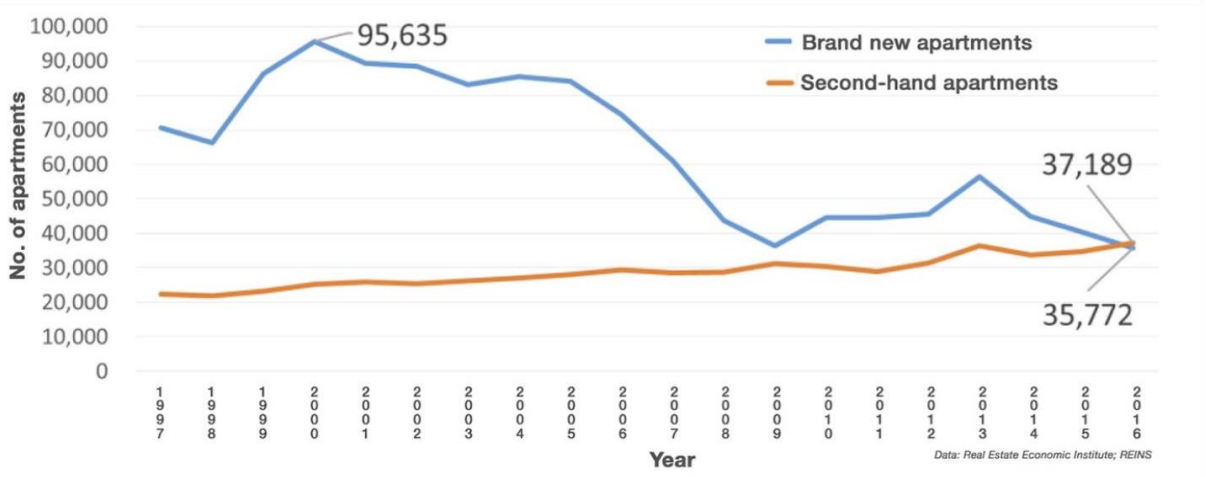
Second, the higher construction standards, in particular, those related to earthquakes, make houses less and less look like disposable goods. Their demolition generates a big amount of

waste to deal with. Construction-generated waste, such as concrete blocks, asphalt-concrete blocks, and construction-generated wood, accounts for approximately 20% of all industrial waste (FY1995) and approximately 70% of waste illegally disposed of (FY1999) (Japanese Ministry of the Environment, 2014).

Third, developers are having more and more difficulties in obtaining sites for residential development due to rising land prices, short supply and a preference for building hotels or office buildings. As a result, residential properties on offer by top real estate developers are decreasing and sales volumes are falling.

Things are moving and, as illustrated by Chart 6, the number of second-hand apartments sold in greater Tokyo exceeded the number of brand new apartments for the first time in 2016. This shows a shift in attitude towards existing stock. This has continued throughout 2017. The high price of new apartments has encouraged buyers to consider older properties. Professional flippers have also been active in the market, refurbishing older apartments to make them look new inside (Japan Property Central K.K., 2017).

Chart 6: Sales of brand new and existing apartments in greater Tokyo (1997 - 2016) (Japan Property Central K.K., 2017)



By contrast in France, the existing dwelling market is 6 times more active than the market for new dwellings. For the year 2017, 986,000 transactions for existing dwellings were registered in total (FNAIM, 2018), and 157,827 new dwellings were sold (FPI, 2018).

3.6. Conclusion

French and Japanese dwellings present typical differences in relation to particular cultural behaviours. These can be forthrightly observed in dwelling internal layouts and in technical

equipment. Despite some elements of westernization, the typical Japanese home remains a uniquely Japanese space. This is particularly visible at the entrance and in the bathroom.
Several cultural practises associated with dwellings (related e.g. to annual cleaning and ceremonies) are also observed, without visible incidences on building design.
Differences in perception of the dwellings' value are also observed with implications on individuals' investment decisions and on the ability to adapt the national housing stock to societal and environmental challenges.

Trying to find elements of explanation for these differences in the Hofstede's framework:

- Nothing stark could be found in relation to the stronger 'Masculinity' index for Japan;
- The fact that Japanese people focus on land value rather than on buildings value can be seen as a manifestation of the stronger 'Long-term orientation' index for Japan. In fact, the land is somehow the only permanent real estate asset, especially in the Japanese context of exposure to natural disasters;
- The fact that French people consider that owning one's home is an important asset for their retirement, earmarked for their heirs could be related to the stronger 'Individualism' index in France.

4. Statistical observation of the housing sector

4.1. Introduction

This part explores the French and Japanese national statistical frameworks related to housing conditions.

This exploration is based on the assumption that the specific set of indicators in use at the national level could reflect a peculiar national perspective on the housing stock and on its transformation. The purpose of this part is, therefore, to bring to light differences in the national datasets. Cross-country comparisons like those performed by international bodies (e.g. UN, OECD, or Eurostat) are bound to discard cultural differences. For these reasons, this piece of work discarded cross-country comparison of data values in common datasets and is directly based on information stemming from the French and Japanese national statistical bodies.

Each country has many data collection processes. Looking at the cultural content of the statistical framework, the focus was given on statistical work that is run regularly and that is aiming at the utmost comprehensive coverage. Our assumption was that considering the cost of data collection, the decision to regularly survey the whole housing stock is deemed to imply a careful selection of topics that have high significance at the national level. In France, the 'housing conditions part' surveyed together with the general population census qualifies to this criterion. So does the 'Housing and Land survey' in Japan.

4.2. French statistical framework

General overview

In France, housing conditions are surveyed together with the general population census, operated by Insee, the French statistical institute. The 'housing form' questionnaire that relates to dwelling characteristics and comfort elements includes a description of the household composition. Separate individual forms are to be filled in for each household member. Since 2004, the census is based on annual sampled data collection. The sampling ensures the survey of all the municipal territories over a five-year period (Insee, n.d.).

It has to be noted that the 'housing form' exists in two versions, one for the French metropolitan territory and one for overseas territories. Surveyed topics are common in both versions, with differences in the multiple answer choices. For the purposes of this study, we decided to keep up with the results of the metropolitan territory.

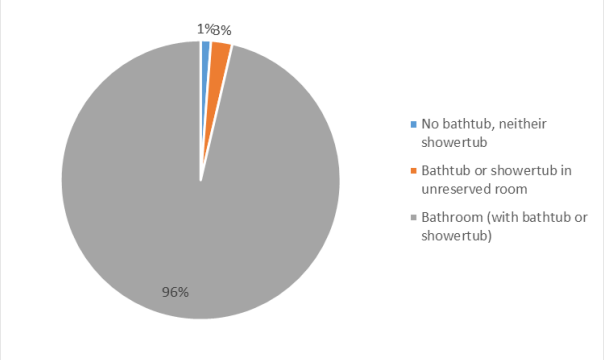
The original full questionnaire and its translation can be found in Annex 2. In the following sections, we will highlight four elements appearing very specific to the French statistical framework compared to the Japanese survey. These four elements involve 6 of the 13 questions of the questionnaire.

Sanitary installations

The level of sanitary comfort is surveyed in the metropolitan territory since 1946. It evolved with the rate of equipment over time. For example, the question related to the running water disappeared in 1990 and the question on WC disappeared in 2004.

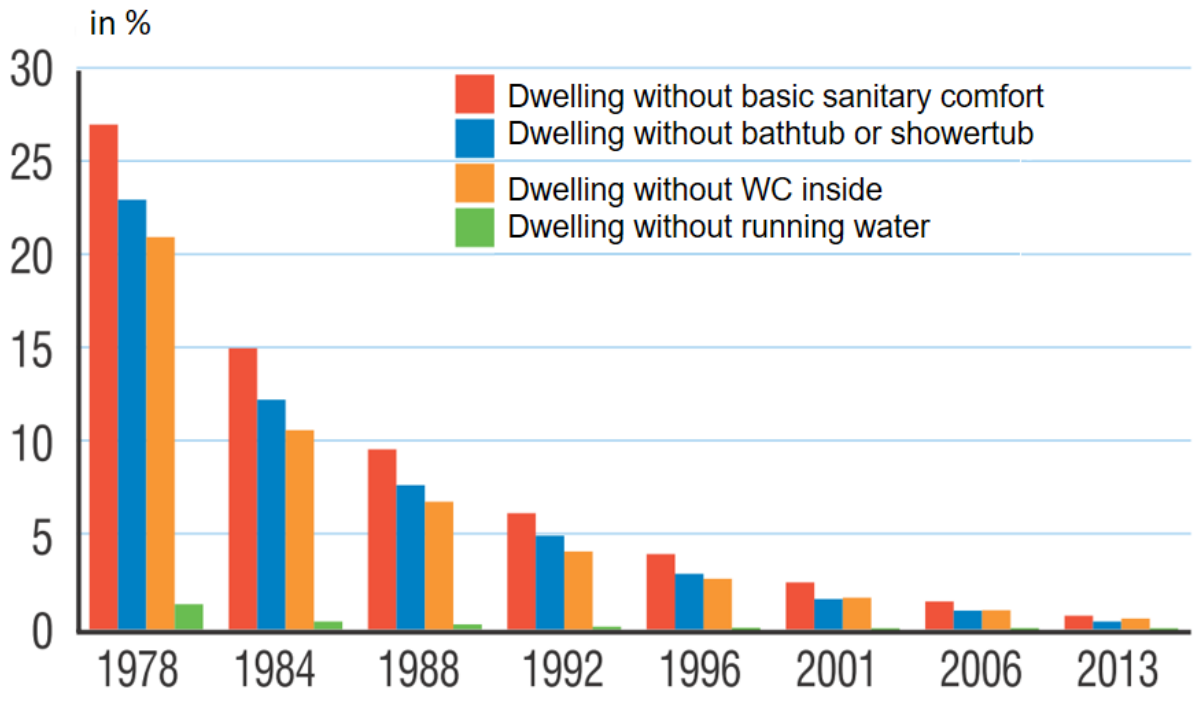
As shown in Chart 7, the level of equipment is nowadays very high, with 96% of dwellings having a separate bathroom.

Chart 7: Distribution of sanitary installations in dwellings of the French metropolitan territory (Source INSEE, 24/10/2017)



These very high figures put into question the relevance of the topic. But, as shown in Chart 8, this has not been always the case. In 35 years, between 1978 and 2013, the situation has dramatically improved.

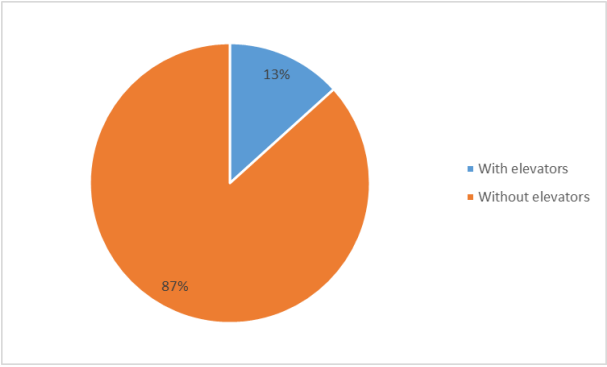
Chart 8: Evolution of the share of dwellings without basic sanitary comfort (Source: (Insee, 2017))



Elevators

The question of whether a dwelling is served by an elevator appeared in 1999 and is intended to localise buildings equipped and calculate the rate of equipment. 13% of dwellings are declared to be with elevator (Chart 9). Insee specifies that ground floor dwellings in multi apartment-blocs are declared without elevator whereas single-family houses of several floors can have a private elevator.

Chart 9: Share of dwellings with elevators in the French metropolitan territory (Source INSEE, 24/10/2017)



According to the French ministry of ecological and inclusive transition, elevator stock is estimated at around 480,000 elevators, half of which are over 25 years old, and the oldest

dating back to the end of the 19th century. Almost 65% of these elevators are installed in apartment buildings.

In the early 2000s, nearly 2 000 user and maintenance staff accidents were recorded each year, 10% of which were serious and some very serious or fatal. The government decided in 2003 to put in place specific measures to improve the safety of existing lifts, to ensure the control and maintenance of the lifts of the French stock. These included the obligation to carry out by June 2018 safety work on elevators installed before 24 August 2000, the date of entry into force in France of the European Directive on lifts.

Space heating equipment and fuel

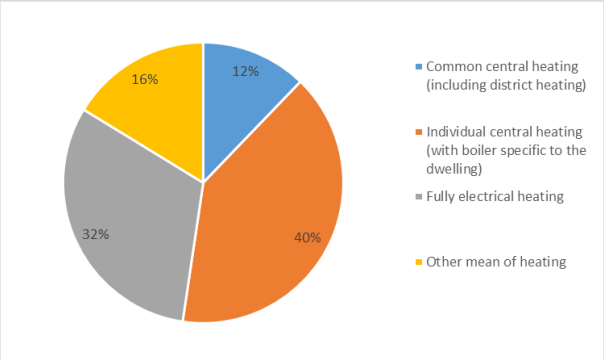
In the 'housing conditions' survey, two questions are related to energy, focused on space heating: one on space heating equipment and the other on the main fuel being used.

According to ADEME, 67% of energy consumption in residential buildings in 2013 was dedicated to space heating. Although still important, this figure has dropped significantly since the 1990s when it accounted for 77% of household energy consumption. Space heating consumption shows the greatest decrease with a drop of 33% since 1990 when total consumptions decreased by only 19% (ADEME, 2016).

The energy transition supposes an understanding of the structural factors of energy demand for space heating and for potential system/fuel switching.

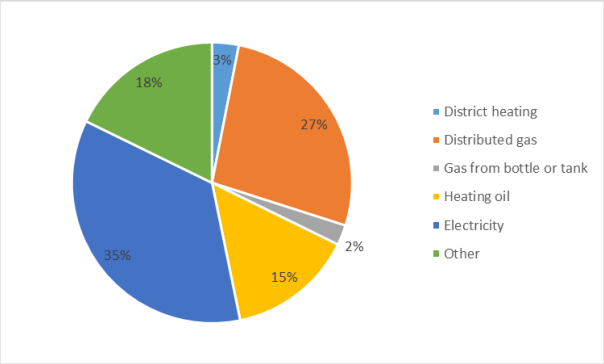
The type of space heating equipment is surveyed since 1954. It evolved over time. The option 'fully electrical' appeared in 1999 although, as shown in Chart 10, it covers 32% of dwellings.

Chart 10: Distribution of heating system in dwellings of the French metropolitan territory (Source INSEE, 24/10/2017)



Regarding the main fuel, the question is surveyed since 1968. Chart 11 shows the distribution as of 2017.

Chart 11: Distribution of main fuel in dwellings of the French metropolitan territory (Source INSEE, 24/10/2017)



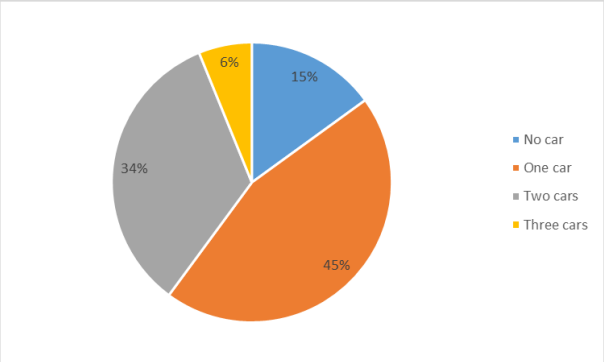
Cars and parking space

In a recent publication, the Montaigne Institute reports on the importance of automobile in the daily life of French people and on the societal, economic and environmental challenges at stake (Institut Montaigne, 2017).

This may explain why two questions of the 'housing conditions' survey relate to mobility, with focus on cars and car parking spaces.

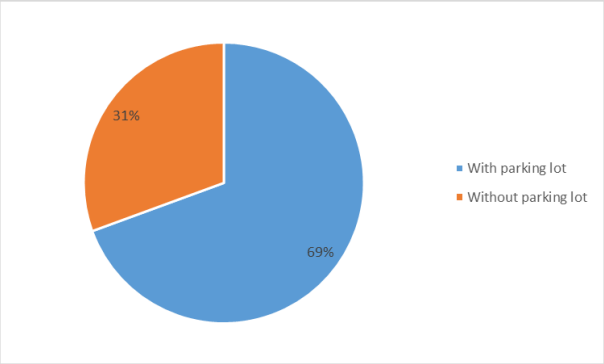
The question of the number of cars by household is surveyed since 1968. The categories evolved, increasing the number of cars per households over time. Nowadays, 85% of households have one car or more (Chart 12).

Chart 12: Distribution of cars for households in the metropolitan territory (Source INSEE, 24/10/2017)



The question of parking spaces appeared in 1999. 69% of dwellings have an attached parking lot (Chart 13).

Chart 13: Share of dwellings with a parking lot in the French metropolitan territory (Source INSEE, 24/10/2017)



4.3. Japanese statistical framework

General overview

The Housing and Land Survey is operated by the Statistics Bureau of the Ministry of Internal Affairs and Communications. It investigates the living environment, dwelling performance including earthquake resistance, fire-safety, and energy conservation, etc. It is regularly adapted in consideration of the recent diversified living situations of people and changes in social and economic circumstances, such as the declining birth rate and the ageing of society. The 2013 edition expanded its scope to include actual conditions of moving and construction due to the Great East Japan Earthquake. The Housing and Land Survey has been conducted since 1998 in succeeding the former Housing Survey, which had been conducted every five years since 1948. The 2013 Survey marks the fourteenth of its kind (Japanese Statistics Bureau, n.d.).

More detailed description and information about the survey form and of the final results are given in Annex 3.

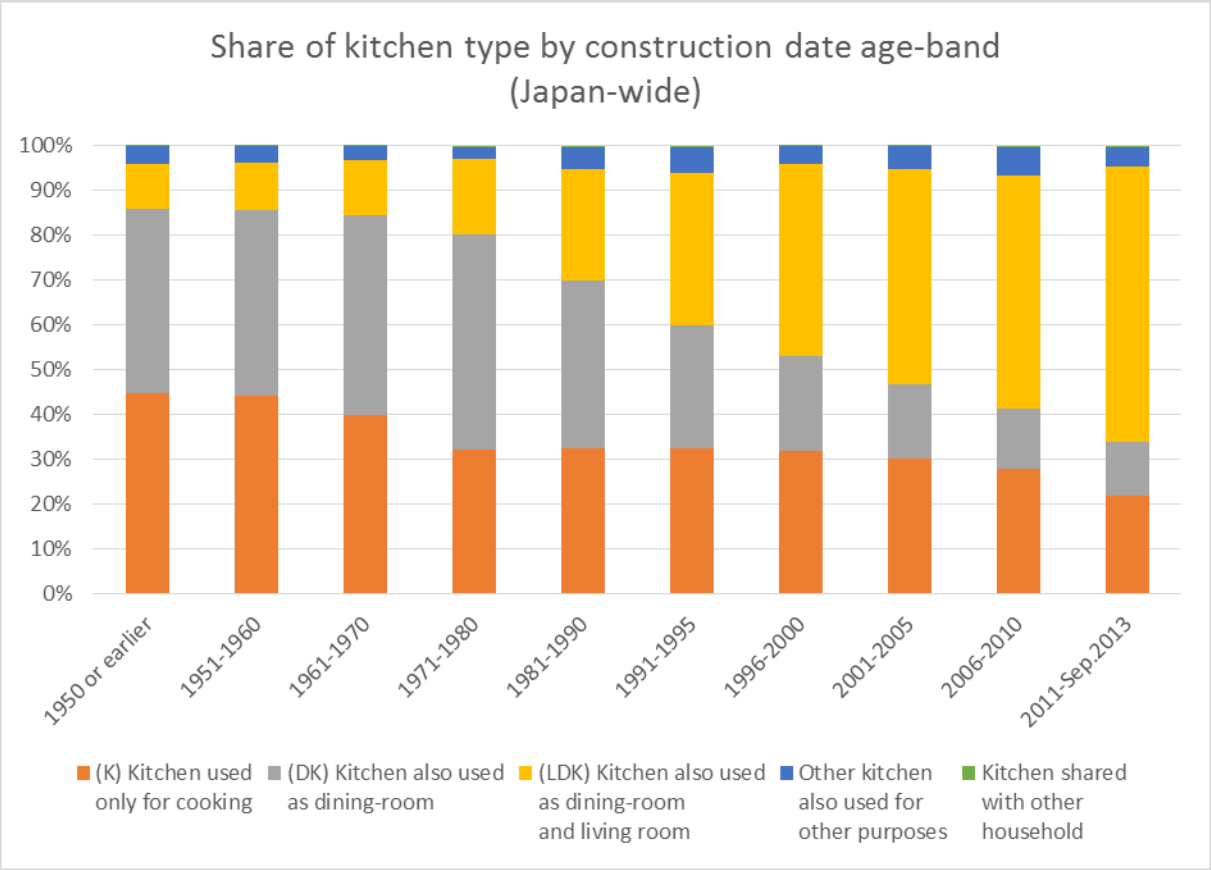
In the following sections, we will highlight five elements appearing very specific to the Japanese statistical framework.

Kitchen type

The kitchen configuration is a central key parameter of the acronyms in use for real estate advertisements. As shown on Chart 14, the share of kitchen type varies with construction dates. In particular, in recent buildings, the share of LDK dwellings increases as the share of DK dwellings decreases.

Professor Mieko Hinokidani describes how LDK dwellings, replacing the traditional family room (‘chano-ma’), have penetrated the design of newly built houses without completely transforming the design and value system associated with Japanese houses. She wrote that *‘The enlargement of dwelling size has made it easy to realize a dwelling containing both modern living and spacious traditional Japanese-style room used for guests and family events’* (Hirayama & Ronald, 2007, sec. 6 ’Housing, family and gender’).

Chart 14: Share of kitchen type by construction dates (Japan-wide) (Source: 2013 Housing and Land Survey)



Adaptation to the ageing of society

According to Professor Muramatsu, with the highest proportion of older adults in the world, the Great East Japan Earthquake, tsunami, and nuclear power plant disaster of March 2011 has highlighted current and emerging issues of a “super-aging” Japanese society, especially the need for community-based support systems (Muramatsu & Akiyama, 2011).

The Cabinet office forecasts that Japan’s population aged 65 years or over will reach about 40% in 2060 (Cabinet office, 2016).

This “agequake” will turn the age pyramids upside down. This will happen first in Japan, but will ultimately happen throughout the world.

Because people aged 70 years or more spend on average about 83% of their time in their houses (NHK Broadcasting Culture Research Institute, 2016), it is legitimate that the Housing and Land survey closely looks at the state (Chart 15) and the transformation (Chart 16) of dwelling stock regarding their adaptation to aged persons.

Chart 15: Facilities for aged persons in households with members aged 65 and more (Japan-wide) (Source: 2013 Housing and Land Survey)

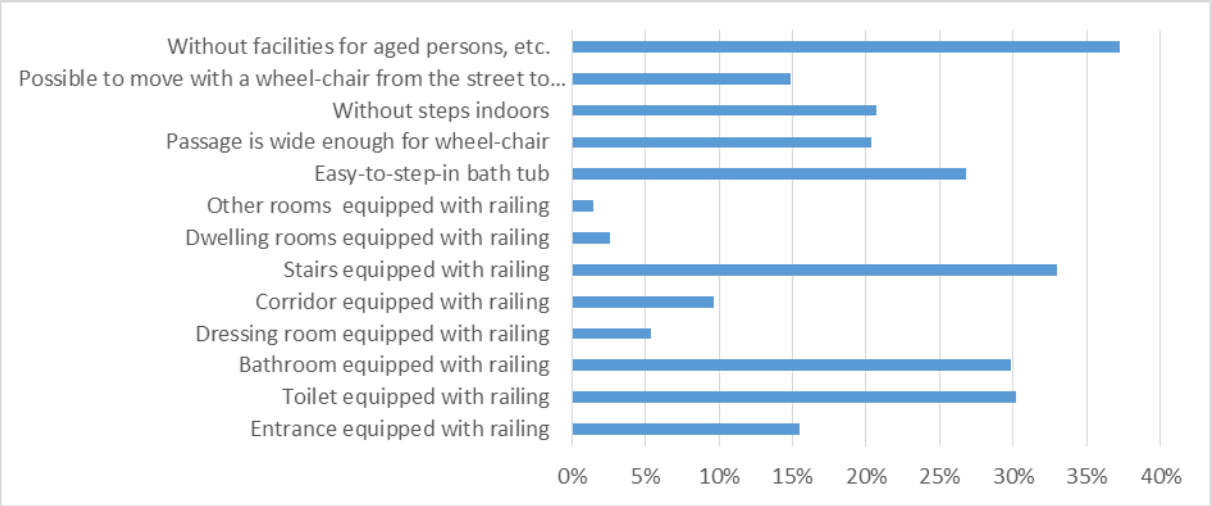
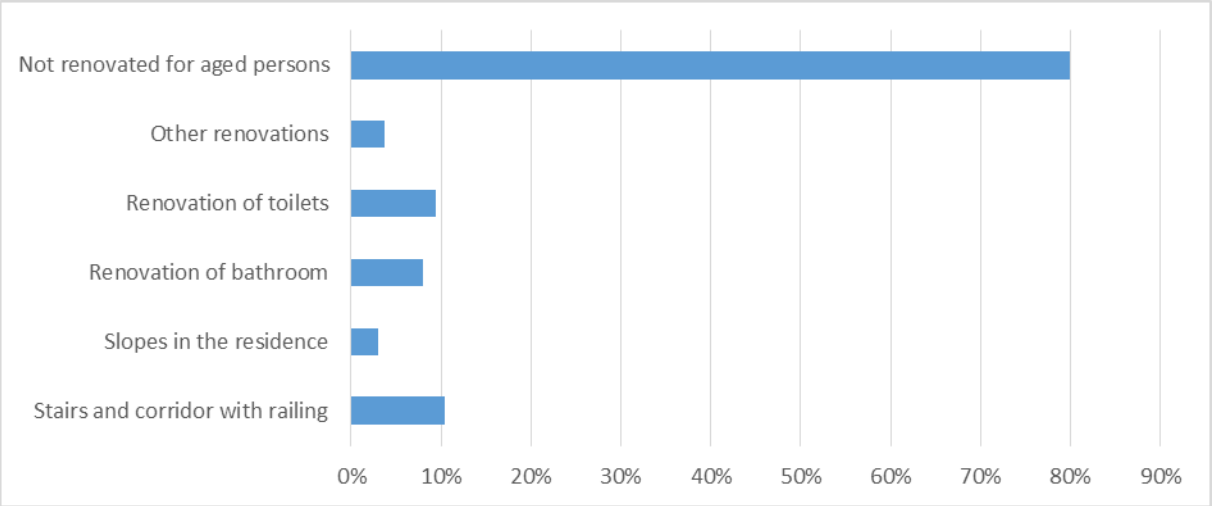


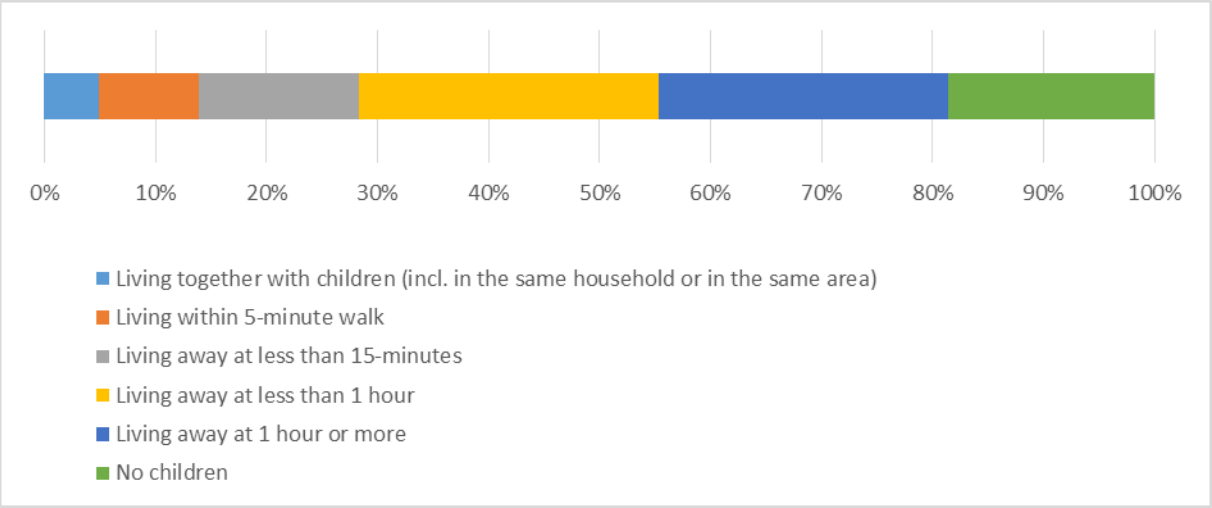
Chart 16: Number of renovation for aged persons since 2009 in an owned house with household members aged 65 and more (Japan-wide) (Source: 2013 Housing and Land Survey)



But beyond the adaptation of dwellings, the results of the Housing and Land Survey also report on topics related to social environment: the distance to children’s residence (Chart 17) and to the nearest facilities (medical center, park, public hall/meeting place, nearest

emergency refuge site, day services center for aged, post office or bank and railroad station or bus stop).

Chart 17: Distance to children's residence for ordinary households of aged persons (Japan-wide) (Source: 2013 Housing and Land Survey)



Dwelling occupancy/vacancy and dilapidation

With an ageing society and the perspective of a declining population, the vacancy and the dilapidation of dwellings are also looked at.

The share of unoccupied dwellings, mainly vacant dwellings, is 14% of the total number of dwellings (Table 5). According to Nomura Research Institute (NRI), vacant dwellings will double to over 20 million units (30%) in 2033 (NRI, 2016).

Table 5: Distribution of dwellings in number and percentage (Japan-wide) (Source: 2013 Housing and Land Survey)

			Total	%
Occupied dwellings			**52 102 200**	**86%**
Unoccupied dwellings	Temporary occupants only		242 800	0%
	Vacant dwellings	As second dwelling	412 000	1%
		For rent	4 291 800	7%
		For sale	308 200	1%
		Other	3 183 600	5%
	Under construction		88 100	0%
	Total unoccupied		**8 526 500**	**14%**
Total number			**60 628 700**	

26% of the vacant dwellings are considered dilapidated (up to 33% for dwellings neither used, for rent, nor for sale) (Table 6)

Table 6: Situation of dilapidation of vacant dwellings (Japan-wide) (Source: 2013 Housing and Land Survey)

		Dilapidated	%
Vacant dwellings	As second dwelling	51 400	12%
	For rent	972 200	23%
	For sale	52 000	17%
	Other	1 054 800	33%
Total		**2 130 400**	**26%**

Adaptation to natural disasters, earthquakes in particular

The adaptation of the stock to earthquakes is another point of attention in the 2013 Housing and Land survey. Final results report on the performance of seismic diagnosis and earthquake-resistance work since 2009 (Table 7)

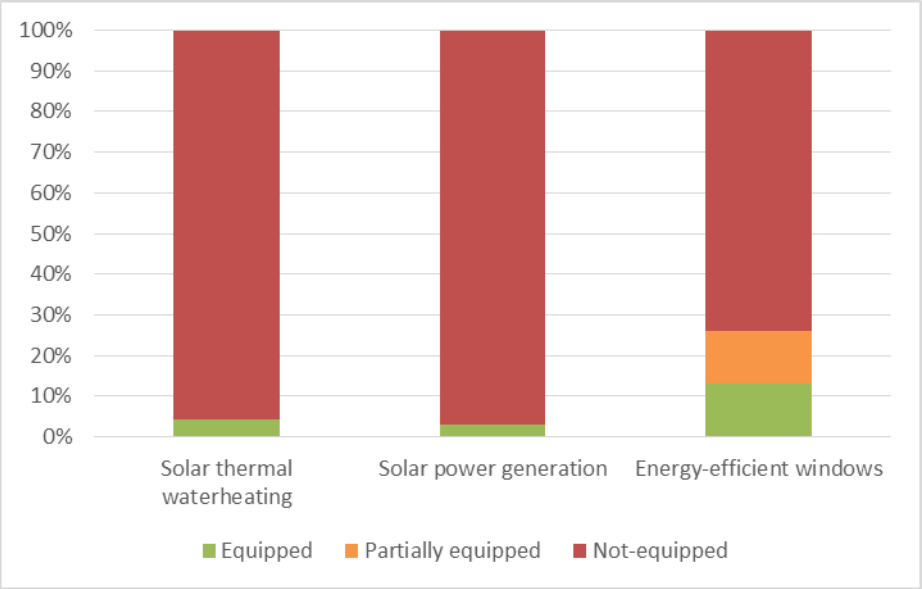
Table 7: Number of owned dwellings by situations of seismic diagnosis and situation of Earthquake-resistance renovation since 2009 (Source: 2013 Housing and Land Survey) NOTE: Numbers cannot be added up as houses can have undergone several renovations.

		The house was renovated to make it earthquake-resistant					**The house was not renovated for earthquake resistance**
		Newly-built or reinforced wall	Instalment of diagonal bracing	Reinforcement of foundation	Reinforcement by bolts	Other	
Seismic diagnosis was conducted	Earthquake resistance has been secured	100 900	90 700	101 100	91 100	39 500	2 129 500
	Earthquake resistance has not been secured	76 100	67 300	49 700	69 700	18 800	261 900
Seismic diagnosis was not conducted		138 900	81 200	92 700	130 200	84 900	29 083 400

Adaptation to energy conservation

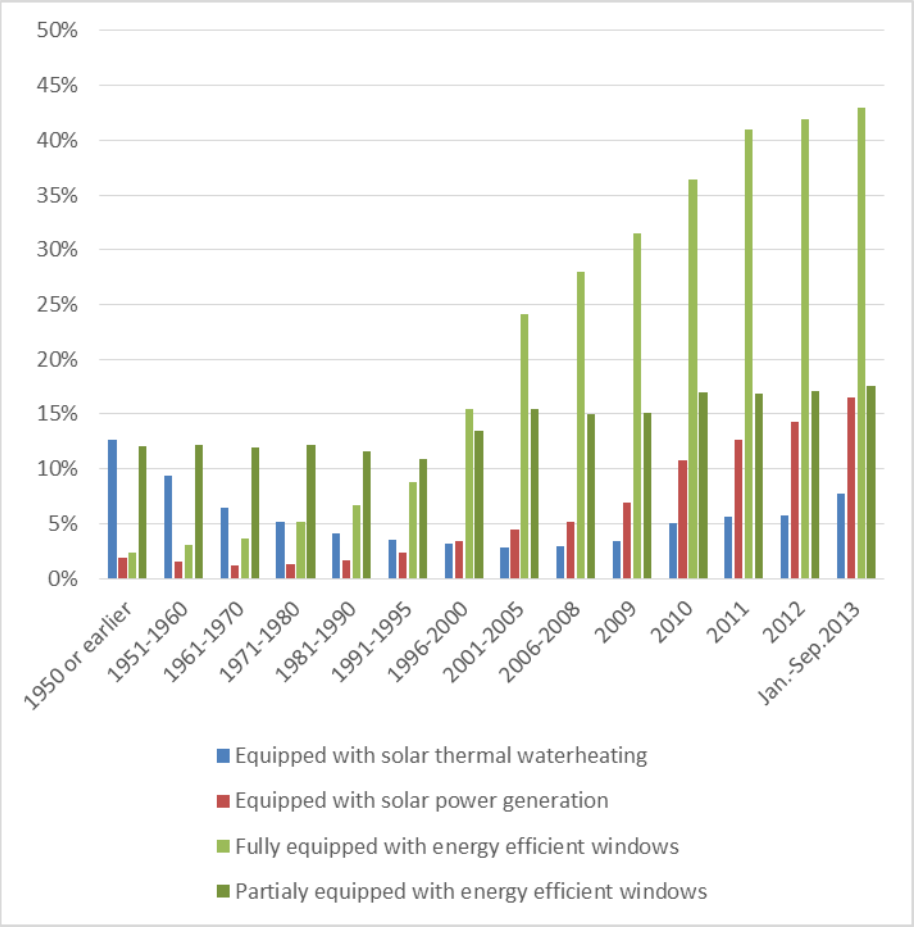
Adaptation of the building stock to energy conservation is monitored through three main components: water heating unit using solar energy, electricity generator using solar energy, double-sash/double-glass windows (Chart 18).

Chart 18: Level of equipment with energy conservation components (Source: 2013 Housing and Land Survey)



These figures can be crossed with other information, e.g. by date of construction (Chart 19).

Chart 19: Level of equipment with energy conservation components, by date of construction (Source: 2013 Housing and Land Survey)



4.4. Conclusion

French and Japanese national statistical frameworks show differences regarding the topics that are surveyed.

It is, however, difficult to tightly link these topical differences with national cultures because the surveyed topics seem justified by the social, economic and/or environmental context.

The French survey shows little change over time whereas the Japanese survey appears to be more regularly reviewed and adapted to circumstances.

Even if the topics appear to be generally sound and relevant in their respective national context, the sets of answers reveal different approaches to a given issue. For instance, it is not obvious whether the distance to children's residence for ordinary households of aged persons would be surveyed in the French context to address the issue of ageing society. More generally, some of the question-answer wordings of the Japanese survey are very detailed and would probably appear too intrusive to be included as such in the French census.

Trying to vet these differences in the Hofstede's framework:

- Though it is not directly linked to sustainable housing, because it points out one family member, the focus given to the head of the family in the Japanese census could probably be seen as a manifestation of the stronger 'Masculinity' index for Japan;
- The regular adaptation of the Japanese survey form to circumstances seems to contradict the stronger 'Long-term orientation' index for Japan. At the same time, many topics of the Japanese survey are designed to cover long-term environmental, economic and societal challenges;
- The self-limitation of the depth of possible answers in the French census, resulting of a certain unwillingness to let the public bodies enter in their private sphere, could be linked to the stronger 'Individualism' index in France.

5. Urban planning and building regulation

5.1. Introduction

The inviolable nature of property is recognised in both Japanese and French Constitutions. Japanese and French people have in principle the right to own and freely enjoy their own property.

In theory, peoples' culture should, therefore, express freely in the way they behave with their real estate properties, the way they use their land and the way the build upon these lands.

In practice, the fundamental human right on properties can be altered by Law in the public interest. As a result, besides the spontaneous shared cultural practises that a nation may have, the legislation can crystallise cultural practices opposable to individuals by setting legal requirements on urban planning and architecture.

Regarding the land use, McGill School of urban planning defines urban planning as a technical and political process concerned with the welfare of people, control of the use of land, design of the urban environment.

Urban planning is fed upon urbanism, science born as an autonomous discipline with the '*General Teoría de la urbanización*' (1867) of the Spanish architect-engineer Ildefonso Cerdá (1816-1876). Urbanism develops according to two great currents stemming from utopias of the nineteenth century:

- Progressive urbanism, whose values are social and technical progress, efficiency and hygiene, develops a model of classified, standardized and fragmented space,
- Culturalist urbanism, whose values are, on the contrary, the richness of human relations and the permanence of cultural traditions, elaborates a circumscribed, closed and differentiated spatial model.

Many variants originate from these two currents of thinking. Observing this variety of currents of ideas, Françoise Choay concludes that "*twentieth-century urbanism is, for the most part, a resumption, repetition, of unconscious discursive configurations"* (Choay, 2004). Added to the fact that the realisation of urbanism is the result of collective actions, this observation supports the idea that urbanism is anyhow an expression of culture.

Regarding constructions, Encyclopedia Britannica defines architecture as "*the art and technique of designing and building, as distinguished from the skills associated with construction*". Encyclopedia Britannica adds that "*the practice of architecture is employed to fulfil both practical and expressive requirements, and thus it serves both utilitarian and aesthetic ends [...that] cannot be separated*". Utilitarian and aesthetic ends are intertwined and a requirement to serve one end influences the other.

Democratically consented, national legislation is built upon the national culture at a certain point in time. At the same time, national legislation formats the expression of culture for the duration of its application period. This justifies the interest to explore the way both Japanese and French legislations bind the freedom of use of real estate properties. Legal obligations can either target the real estate property itself (e.g. define rules on geometry, minimum quality level, etc.) or set procedural obligations (e.g. impose a consultation, an authorisation, etc.). Legal obligations can arise on the land usability (e.g. conditions of constructability) and/or on the constructions built upon the land.

Looking for sample evidence about how legislation infers national culture, it would be undue to describe in all details the applicable legislation. Though, in addition to a legal overview, we will look into more detail the influence of behaviours in the setting of a specific minimum requirement.

5.2. Japanese legislation on urban planning, construction and housing

As we will only provide a general overview of the Japanese legislation applicable to the housing sector, the reader interested in getting more details can refer to publications available in English:

- *Introduction of Urban Land Use Planning System in Japan*, Published in January 2003 by the City Planning Division, City and Regional Development Bureau, Ministry of Land, Infrastructure and Transport (http://www.mlit.go.jp/common/000234477.pdf)
- *Introduction to the Building Standard Law*, Tomohiro Hasegawa, July 2013, Published by BCJ (https://www.bcj.or.jp/form/mail.cgi?id=bslintroduction2009),

- *Overview of the Act on the improvement of Energy Consumption Performance of Buildings*, April 2015, Ministry of Land, Infrastructure and Transport (http://www.mlit.go.jp/common/001134876.pdf)
- *A quick look at housing in Japan*, Building Center of Japan (BCJ), June 2017 (https://www.bcj.or.jp/form/mail.cgi?id=quicklook02).

Urban planning in Japan

Modern Japan was significantly shaped by the unique characteristics of the Meiji revolution. The reforms achieved to enter the international arena were essential in order to repeal the unequal treaties and protect the nation. At the same time, the phrase 'Japanese spirit, Western technology' (wakon yōsai) represents the idea of moving towards a culturally acceptable modernisation.

This rhetoric was also observed in the import of modern planning system to Japan from the West. In order to demonstrate 'modernity' to the Great Power, one of the prime purposes of Japanese planning became remodelling feudal cities, especially the capital city of Japan, into a 'modern' one. Sent to the United States and to Europe by the Emperor, the members of the Iwakura Mission (1871-3) were impressed by the beauty of Paris, which Georges Eugène Haussmann had remodelled from a crowded medieval city into a city with wide streets, broad vistas, parks, and avenues radiating from focal points. In England, they saw a forest of factory chimneys emitting smoke in big cities and regarded them as proof of England's economic prosperity (Shibata, 2008).

The first Japanese general law of city planning that was institutionalized after the western modern planning model was the City Planning Act of 1919, often called the 'Old Act'. It inherited many elements of its predecessor of the Tokyo urban Improvement ordinance of 1888. The urban Improvement program tried to physically remodel the town of Edo into the modern imperial capital Tokyo, just like Haussmann did for Paris (Watanabe, 2016).

After World War II, the Japanese economy went through tough times for about 15 years, and then entered the high-growth period in the 1960s. This rapid economic growth produced a serious urban sprawl problem in the metropolitan peripheries. For the main purpose of controlling this problem, the half-century aged 'Old Act' was drastically amended to become the City Planning Act of 1968, also called the 'New Act'. As a land-use control tool, the New

Act introduced the Area system but kept the Centralized Bureaucracy of the old Act system (Watanabe, 2016).

In the early 1980s, the Nakasone administration started the general policy of vitalizing the market economy through privatization and deregulation, which were also extended to urban policy. The central government directly intervened in the planning process of local governments in order to facilitate urban redevelopment by private developers (Watanabe, 2016).

At present, with ageing society and depopulation, Japan is facing an unprecedented situation. The main focus of Japanese urban planning has already turned from "stock building" to "stock management" (Murayama, 2016).

In contrast to the traditional clear separation of the rural and urban landscape components in the morphology of European cities, the historical landscape of Edo Japan consists of mixed rural and urban land uses. This integrated rural-urban landscape is ideal for increasing urban resilience to natural disasters. It could, ironically, function as an urban-planning model that ensures the functional connectivity needed for food security and simultaneously ensures the provision of adequate, accessible green spaces. (Yokohari et al., 2017).

Construction standards in Japan

In parallel to the 'Old Act', the 1919 Urban Building Law regulated building construction in six major Japanese cities.

In 1924, the year following the great Kanto earthquake that devastated Tokyo, enforcement regulations were revised and became the first in the world to require that structural calculations consider seismic forces.

After World War II, Japan needed important reconstruction. A series of laws were adopted:

- The Building Standard Law (1950) aimed at securing safety, livability and other performances of buildings by establishing minimum standards for construction of buildings,
- The Architect Law (1950) defined the qualification of engineers who can design buildings and supervise construction work,
- Construction Trade Law (1949) improved the quality of those engaged in the construction trade and to promote fair construction contracts.

As for technical standards for buildings, the Building Standard Law prescribes 'building codes' and 'zoning codes'. The building codes are technical standards for all buildings in order to ensure building safety with regards to structural strength, fire prevention devices, sanitation, etc. The zoning codes are technical standards to ensure rational and safe utilization of land and to improve the environment. Such utilization is required by towns and cities where buildings are concentrated.
Since 1950, the Building Standard Law was revised several times. The 1998's revision introduced a major change, shifting from prescriptive type of the provisions to the performance-based one.

Energy efficiency in buildings is addressed in a separate Act. In 1979, after the 1973 oil crisis, Japan adopted the Act on Rational Use of Energy. Under this law, Energy Conservation Standards were developed in 1980 and further amended in 1992, 1999. In 2013, new Energy Conservation standards were adopted to introduce primary energy consumption as a reference in the calculation methodology.
In 2015, the Act on the Improvement of Energy Consumption Performance of Buildings (Building Energy Efficiency Act) was established, with gradual entry into force schedule from 1 April 2016 on. This Act provides for regulatory measures for mandatory compliance with energy efficiency standards for large-scale non-residential buildings, and incentive measures such as a labelling system displaying compliance with energy efficiency standards and exception of floor-area ratio regulation for certified buildings.

Housing conditions in Japan

Adopted in 1966, 'The Housing Construction Planning Act' resulted from the necessary stronger impetus for housing construction under comprehensive long-term plans based on cooperation among the central government, local governments and the people.
Since then, eight Housing Construction Five-Year Programs have been adopted, the first beginning in 1966 and the eighth ending in 2005.
The years covered by eight Housing Construction Five-Year Programs can be broadly divided into the quantitative expansion period (first and second programs) and the qualitative improvement period (third through eighth programs).

The first two programs were implemented at a time when the number of dwellings was below the number of households, so the aim was to alleviate this housing crisis.

The first program aimed at increasing the number of dwellings to one per household and the goal of the second program was to ensure that there was one room for every person. The goal of providing one dwelling per household had been achieved by 1973.

Under the Third Housing Construction Five-Year Program, which began in 1976, the focus shifted to the qualitative improvement of the housing stock, and the government defined minimum housing standards that should be ensured for all households and average housing standards that should be attained by average households.

In the recent housing situation, quantitative needs have been met, and new priorities have arisen as a result of social and economic changes that include rapid demographic ageing, a declining birth-rate and increasingly serious environmental problems. In response, the 'Basic Act for Housing' was enacted in 2006 and replaces the 'Housing Construction Planning Act'.

Aiming at the promotion and the materialization of the fundamental philosophy of the 'Basic Law on Housing', the 'Basic Housing Plan' was formulated in 2006 and revised in 2016 for the next 10 years. From the three perspectives of 'residents', 'housing stock' and 'industry and region', the New Basic Housing Plan indicates the eight targets:

- Residents' perspectives
    - Target 1: Realization of housing life that young households desiring marriage/childbirth and households raising children can live self-assuredly
    - Target 2: Realization of housing life that enables the aged to live independently
    - Target 3: Ensuring the stability of living for those who require special consideration in securing housing
- Perspectives from housing stock
    - Target 4: Building a new housing circulation system that surpasses the property ladder
    - Target 5: Renewal to housing stock that is safe and of high quality by means of rebuilding and remodelling
    - Target 6: Pursuance of utilization and removal of vacant houses the number of which is increasing rapidly
- Perspectives from industrial and regional considerations

- Target 7: Growth of living life industries that contributes to the realization of strong economies
- Target 8: Maintaining and improving the attraction of residential areas

5.3. French legislation on urban planning, construction and housing

Following the Declaration of the Rights of Man and the Citizen of 1789 and the 'inviolable and sacred' nature of natural rights on properties, the legislation on urban planning remained for a long time limited to prescriptions of administrative police imposed by the local authorities. Urban planning only became part of the contemporary perspective of planning and development after the First and Second World Wars, when the reconstruction of a devastated landscape and the fast-growing urbanisation required a global reconstruction.

On 14 March 1919, the 'Cornudet' law tried to put an end to the anarchic land use by requiring cities of more than 10,000 inhabitants to set in place a plan for organisation, beautification and extension.

On 17 July 1924, the 'Cornudet' law was amended to introduce administrative authorization prior to land subdivision. Prior authorization was mainly intended to guarantee purchasers of lots that their lands would be properly serviced (water and power supply, sewing systems, pavements).

During World War II, the Vichy Regime generalized the building permit the law on urbanism dated 15 June 1943. It is noticeable that this regulation was maintained after the Liberation.

On 26 July 1954, Decree No. 54-766 codified all legislative texts concerning urbanism and housing.

Although building permit was in the hands of the national administration, the planning was still dealt with at local level. To overcome the lack of local regulation, Decree n°55-1164 of 29 August 1955 set in place minimal rules applicable to the national territory: the National Urban Regulation (RNU: Règlement National d'Urbanisme).

In the 70s, the code is divided:

- A new code of urbanism was instituted by Decrees Nos. 73-1022 and 73-1023 of 8 November 1973.
- The provisions concerning building and housing were transposed into a code of construction and housing on 31 May 1978 by Decrees Nos. 78-621 and 78-622.

This division into two codes remains today.

Beside this legislation that applies to significant work (construction and refurbishment), a specific legislation aims at protecting tenants from the lack of maintenance.

Urban planning in France

The current Code on Urbanism empowers local authorities as managers and guarantors of the French territory, common heritage of the Nation.

The Code on Urbanism still encloses an RNU, fully applicable in towns and villages that do not have a local urban planning document. On 11 July 2017, there were 18.51% local communities without specific local regulation, i.e. only subjected to RNU[7].

The RNU was last modified in 2017. Provisions to preserve public interest in urban planning, hygiene or safety and health consist of 53 articles distributed in 7 sections:

- Section 1: Location and service of buildings and developments
- Section 2: Density and reconstruction
- Section 3: Environmental and energy performance
- Section 4: Realization of parking areas
- Section 5: Preservation of elements of architectural, heritage, landscape or ecological interest
- Section 6: Camping, the development of residential recreational parks, the establishment of light recreational homes and the installation of mobile recreational residences and caravans
- Section 7: Provisions for demountable residences constituting the permanent habitat of their users
- Section 8: Provisions specific to Guadeloupe, Guyana, Martinique, Réunion and Mayotte

When a local plan of urbanism (PLU: Plan Local d'Urbanisme) has been set in place, certain provisions of Section 1 and 5 can be superseded by local provisions. In Article A. 123-2, the national urban planning code suggests a table of contents for the PLU that is followed by most cities. This gives an indication of the topics that can be expected:

- land uses allowed and prohibited,
- access and roads,

[7] 6556 town and villages under 35415(Source: http://www.observatoire-des-territoires.gouv.fr/)

- serving through by networks,
- characteristics of the land,
- implantation of constructions in relation to public roads, and to separating limits with other pieces of land,
- implantation of the constructions relative to each other on the same property,
- building footprint, the coefficient of land occupation,
- the maximum height of constructions,
- external appearance,
- parking, free spaces and plantations, classified wooded areas.

Taking external appearance and aesthetic as an example, Article R.111-27 for the RNU defines general rules and R.151-41 specifies what a PLU can additionally regulate.

Article R. 111-27 provides that a project may be refused or accepted only subject to the observance of special requirements if the buildings, by their location, their architecture, their dimensions or the external appearance of buildings or structures to be built or modified, are of nature to affect the character or interest of neighbouring places, sites, natural or urban landscapes and the preservation of monumental perspectives. This provision was first introduced by a decree of 30 November 1961. Though, the possibility of refusing a building permit for aesthetic reasons can be traced back to a Law of 13 July 1911, article 118, which conferred on the Prefect a right of opposition in the event that the project presented a monumental perspective. The current provision leaves scope for interpretation and the jurisprudence established for example that an infringement could be characterized even if the places in question were not particularly protected as for the historical monuments or the natural and picturesque sites. This article remains applicable, even in the case a PLU has been set in place.

Article R151-41 provides that, in order to ensure the integration of the construction in its surroundings, the quality and the architectural, urban and landscape diversity of the constructions as well as the conservation and the development of the heritage, the regulation: 1° can consider alternative rules in order to adapt volumetric rules to satisfy an insertion in the context, in link with the adjoining buildings; 2° can provide for architectural features of façades and roofs of buildings and fences; 3° can identify and locate the built and landscape

heritage to be protected, conserved, restored, developed or re-qualified for which works not subject to a building permit are preceded by a prior declaration, the demolition of which is conditional on the issue of a permit to demolish and, if necessary, to define the prescriptions likely to achieve those objectives.

This provision authorizes the regulation of a limited number of elements (exterior aspect and layout of the surroundings) with a view to satisfying only two objectives (harmonious integration into the surrounding environment and architectural quality). Any other element or purpose would, therefore, be unlawful since a limitation on the right of ownership can only be based on the law. These finalities remain delicate to grasp because of their subjectivity and, therefore, difficult to lay down in the regulations, except in general terms, opening the way to subjective interpretation, or on the contrary, very precise, with a limiting approach.

Construction standards in France

The Code on Construction and Housing (CCH) lays down construction rules, which intend to guarantee a minimum level of quality of construction in its essential fields. These rules are established at national level and Article L.111-4 makes clear that these prevail on possible contradicting rules that may be set at the local level, e.g. resulting from the application of the abovementioned PLU.

The CCH consists of a legislative part, adopted and amended by the Parliament, a regulatory part developed on the basis of the legislative part and non-codified Decrees (Décrets and Arrêtés), often more detailed and technical.

Overall, the rules on construction comes to prevent the negative effects for society: risk of loss of human life in case of non-compliance with safety rules (fire protection, protection against earthquakes, floods, etc.), excessive energy consumption in poorly insulated buildings, risks of intoxication resulting from lack of ventilation, housing made uncomfortable due to lack of acoustic insulation, inability to maintain elderly people at home by non-compliance with the regulations for persons with reduced mobility.

As an example of provisions, Art. R111-3 lays down some minimum characteristics that all new dwellings must fulfil regarding sanitary and cooking installations: "*All dwellings must: (a) Be provided with drinking water supply and a sewage disposal system that does not allow for any backflow of odours; (b) Have at least one washroom, with a shower or a bath and a washbasin, the shower or bath may, however, be shared with a maximum of five dwellings, in*

the case of single-person dwellings grouped together in the same building; c) Be provided with a toilet inside the dwelling, the toilet may, however, be shared with a maximum of five dwellings in the case of single-person dwellings of less than 20 square meters and provided that it is located on the same floor as these dwellings, the toilet can form a single room with the shared washroom mentioned in b; d) Have a sink with a water flow and a place to receive cooking appliances. […]".

The Grenelle for the Environnement led to the development of new texts, more demanding in terms of performance and quality. Most recent provisions come to facilitate societal changes and overcome the split incentive challenges: e.g. right to install charging points for electric vehicles in joint properties or right for the tenant to install optic fibres to access high-speed internet.

On the energy efficiency side, France adopted the first Thermal Regulation in 1974 (RT1974), following the first oil shock of 1973. Applied only to new residential buildings, RT1974 aimed at reducing the energy consumption of buildings by 25%. Thermal Regulation imposed wall insulation and the installation of an automatic regulation of heating systems.

The second oil shock of 1979 led to the publication of the 1982 Thermal Regulation with the objective of a 20% decrease of the energy consumption of buildings compared to RT1974.

The 1988 Thermal Regulation extended the regulations to tertiary buildings, with minimum performance requirements for the envelope and the systems in place.

Unlike the previous regulations, which imposed only resource requirements, the 2000 Thermal Regulation (RT2000) sees the emergence of a requirement for overall building performance, including on summer comfort. The RT2000 aims to reduce the maximum consumption of homes by 20% compared to the RT1988 and a 40% reduction in the consumption of commercial buildings.

In 2005, RT2000's consumption requirements and safeguards were tightened, aiming for a further 15% reduction in the energy consumption of new buildings and extensions.

The RT2012 is the regulation in force since January 1, 2013. With few exceptions, it applies to all construction projects in France. Overall, the regulatory requirements were divided by three between 1974 and 2012.

Today, in line with the Paris Agreement, France is engaging the building sector towards an unprecedented ambition to produce positive energy buildings with low carbon footprint through a collective and shared approach.

Housing conditions in France

Law No. 89-462 of 6 July 1989, modified in 2015, intending to improve the relationships between landlords and tenants came to clarify their respective responsibilities. In particular, the landlord is required to provide the tenant with decent housing that does not give rise to obvious risks that could affect the physical security or health, meeting a minimum energy performance criterion and having elements that make it consistent with the use of the dwelling. The landlord cannot object to modifications made by the tenant when these do not constitute a transformation of the property.

The characteristics of a decent dwelling, elements of comfort and minimum and size, are further detailed in Decree No.2002-120 of 30 January 2002. These are reflecting what can be expected as minimum standards, e.g. central heating, water and power supply, electric, etc. These characteristics are generally less stringent than those laid down by the CCH for new constructions but are the minimum characteristics that can be expected in the housing stock.

To compare with the above-mentioned provisions of the CCH, Article 3 of Decree No.2002-120 specifies minimum characteristics for sanitary and cooking installations dwellings' decency: "*The dwelling includes the following equipment and comfort elements: […] 2. A drinking water supply system providing the dwelling with adequate pressure and flow for the normal use of its tenants; 3. Sewage designed to prevent backflow of odours and effluents and syphoning; 4. A kitchen or kitchenette designed to accommodate a cooking appliance and includes a sink connected to a hot and cold water supply system and a sewage disposal facility; 5. A sanitary facility inside the dwelling comprising a toilet, separate from the kitchen and the room where the meals are taken, and equipment for body washing, including a bath or a shower, arranged in such a way as to guarantee personal privacy, with hot and cold water and sewage. The sanitary installation of a one-room dwelling may be limited to a toilet outside the dwelling, provided that this toilet is located in the same building and easily accessible.*"

Other legislation clarifies the right of the tenant to take action under certain circumstances. For example, Decree No. 2016-1282 of 29 September 2016 describe how a tenant should behave to adapt his dwelling to persons with disabilities or loss of autonomy.

Finally, Law No. 67-561 of 12 July 1967 on the improvement of housing regulates the relations between the owners and the tenants for the execution of the works intended to adapt,

totally or partially, the living quarters to standards of healthiness, safety, equipment and comfort.

Law on architecture in France

Article 1 of Law No. 77-2 of 3 January 1977 on architecture provides that:

"*Architecture is an expression of culture.*

Architectural creation, the quality of buildings, their harmonious integration into the surrounding environment, respect for natural or urban landscapes and heritage are of public interest.

The authorities empowered to issue the building permit as well as the land subdivision authorizations ensure, during the examination of the requests, the respect of this interest."

The law subsequently requires to call on the assistance of the architects as a general rule, establishes Architectural, Urban planning and Environmental Councils (CAUE) as bodies responsible for assisting and informing the public in accordance, regulates the practice of architecture and regulates the organisation of the profession.

5.4. Exploring minimum requirements: standards for domestic hot water

With enhanced insulation and efficient heating and cooling, domestic hot water (DHW) become a major driver for the overall energy consumption of residential buildings.

Energy performance calculation procedures both in France and in Japan consider conventional use scenarios as inputs.

As regards domestic hot water, these scenarios involve:

- A total amount of hot water consumed by households,
- A temperature for the delivered hot water,
- A distribution pattern over the days, weeks, months.

To be effective, conventional use scenarios should be as close as possible from reality, including for the total amount of hot water.

Conventional DHW use scenario in Japan

The standard amount of hot water was established after the conduct of an online survey of 4000 individual. The average daily use of hot water is reported in Chart 20. The survey also provided results on the frequency and schedule of bathing.

This led to the standard amount of DHW use in residential buildings as shown in Chart 21. The input parameter is the space floor area from which a number of occupants can be derived.

Chart 20: Average hot water consumption collected from an online survey of 4000 individuals (Mae, 2013)

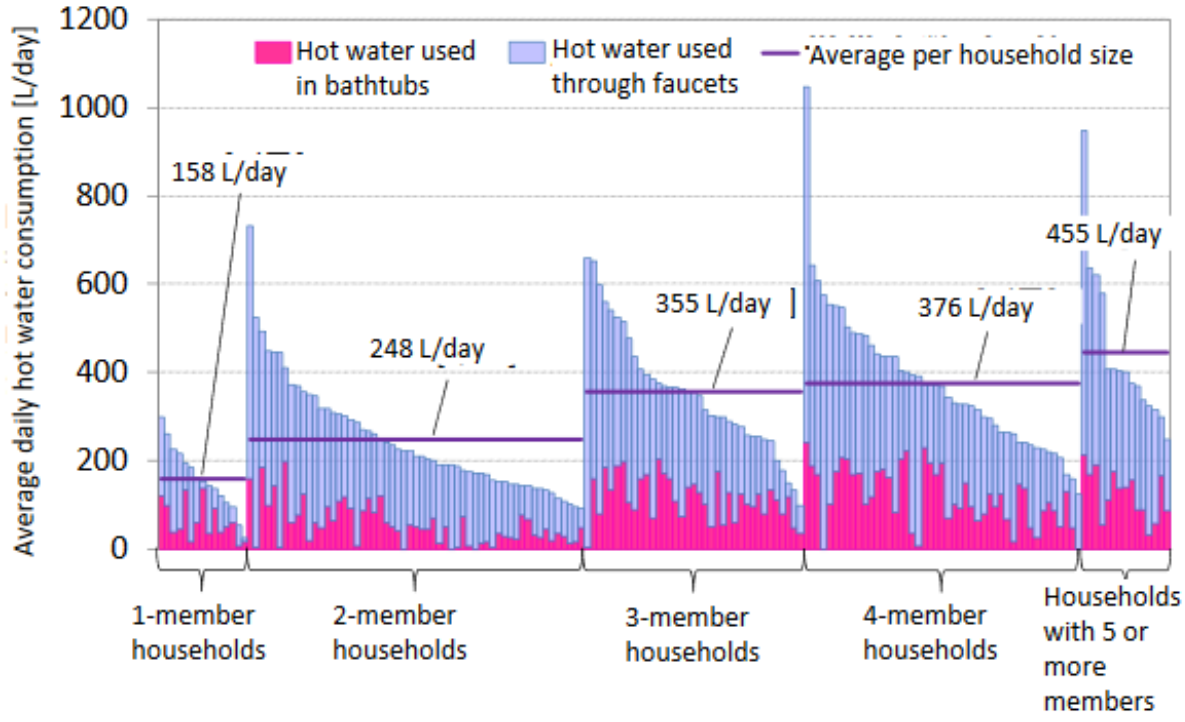
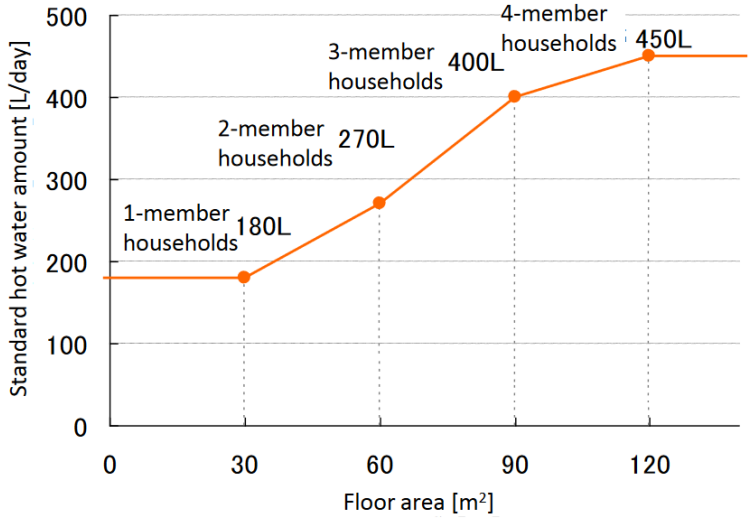


Chart 21: Standard hot water consumption for energy performance calculation (Mae, 2013)



Conventional DHW use scenario in France

According to the calculation procedures in the 2012 Thermal Regulations, domestic hot water needs, which divide into weekly profiles the weekly requirement expressed in litres of water at 40°C which corresponds to the average temperature of end use.

For uses other than 'detached or contiguous houses' and 'collective dwellings', these needs are calculated according to the number of amenities (for example, the number of rooms for a University campus or hotel).

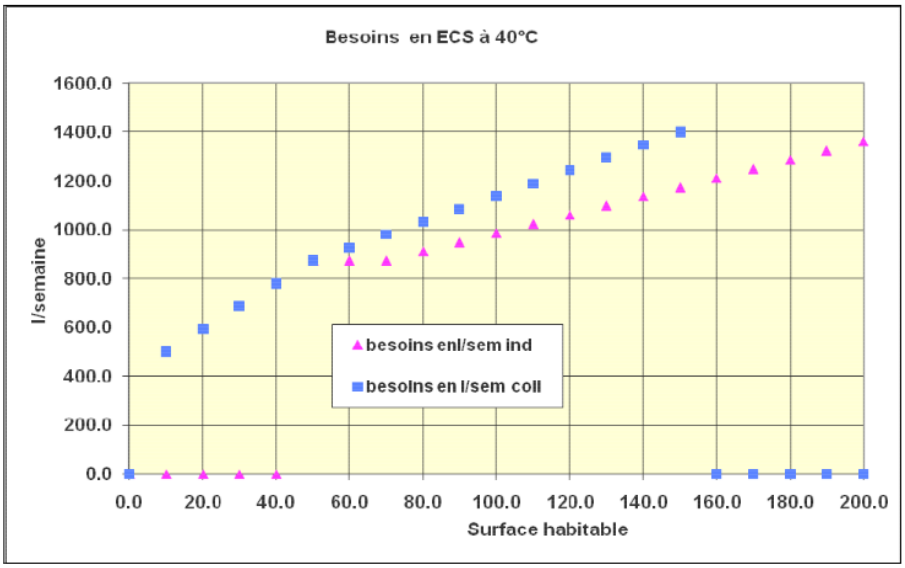
For single-family houses or row houses and multi-family dwellings, these needs are calculated based on conventional occupancy density. This need for domestic hot water is taken equal to 500 litres at 40°C/adult/week on average. It is modulated according to the occupancy/vacancy periods and the time of year (summer/winter and holiday periods).

These needs are expressed per unit area. For single-family houses or row houses and multi-family dwellings, the weekly demand is calculated by relating the density of occupancy to the living space.

In order to take into account the fact that children have a lower demand for hot water than adults, the notion of an equivalent number of adults has been introduced.

The results obtained are illustrated by Chart 22 for individual or contiguous houses (blue squares) and collective dwellings (magenta triangles).

Chart 22: Standard hot water consumption for energy performance calculation, in litre per week (CSTB, 2012, Page 21-22)



Conclusion on minimum requirements

Taking a single family house of 90 square meters, the Japanese assumption for the average daily DHW consumption is around 400 l/day when the French assumed consumption would be 1100 l/week, i.e around 157 l/day. The difference is more than the double and can only be explained on cultural grounds.

In addition to this quantity deviation, Japanese people are used to taking bath around 40°C, meaning that hot water would be heated up to 60°C and the 40°C be suitable for the temperature of the final mixed hot + cold water. In France, the hot water consumption stands for the actual DHW production.

Because these differences in input cannot be compensated by differences in DHW generators' efficiency, these differences in inputs have necessarily a direct impact on the energy that is consumed.

We previously saw that requirements on the energy performance of buildings have been tightened over time, both in France and in Japan. Such tightening has to be challenging but realistic. This means that the minimum requirements have to account for these cultural differences. The cultural element behind this phenomenon was also observed by Isaacs et al. in New Zealand (Isaac et al., 2010).

As a result, the acceptable regulatory level of energy performance has implicit cultural content because it depends on the calculation procedures that embed conventional occupation scenarios. More generally, Yohei Yamaguchi also retained culture as an element playing an indirect role in households' energy demand (Yamaguchi, 2018).

5.5. Conclusion

We observed the coincidence of dates in the chronology of the implementation of the urban planning (at the very beginning of the 20th century) and construction regulations (during the post-second world war reconstruction). These are justified by global historical events (e.g. industrialisation, world wars, oil crisis) and can hardly be attributed to culture.

References to culture and traditions were found, e.g. in the French legislation on urban planning, demonstrating a desire to ensure a certain unity of appearances. On the other hand, their concrete translation is left to the collective appreciation more than in strong objective criteria.

The import of occidental urban planning systems at the Meiji period was followed by landscape planning discourses, in both regions, aiming at a clear rural-urban separation and the limitation of urban sprawl. Interestingly, these discourses did not totally take up in Japan. Some observers see the persistent mixed urban-rural pattern of Japanese landscapes as a model, providing resilience to natural disasters, ensuring food security and the provision of adequate, accessible green spaces.

No explicit cultural reference could be observed in the construction regulations. In both cases, the reasons for its establishment and reinforcement seem motivated by a common aspiration to safety, to comfort and, more specifically in the Japanese context, a response to natural disasters.

However, the cultural background can play an implicit but actual role, as exemplified by the consumption of domestic hot water.

Due to their implicit nature, it was difficult to correlate the cultural differences we observed to the national culture characterisation in Hofstede's framework. The Japanese bathing tradition and the role this tradition plays as a cement for the family could neither be established as the result of the high 'Masculinity' index' nor as a consequence of the high 'Long-term orientation'. It appeared to us as a potential manifestation of 'Collectivism' in the Japanese society, for which Hofstede's work found some counterbalance in other fields of the Japanese society.

6. Definitions and certification frameworks for sustainable buildings

6.1. Introduction

This part examines national sustainable buildings definitions and certification frameworks to identify evidence of culture therein.

Further to national regulatory frameworks, sustainable housing certification frameworks reflect the highest level of expectation that would be accepted by frontrunners in a given context. Contrary to the national legislation, sustainable housing certification schemes are not necessarily attached to a given country and can even be designed with the view to its international dissemination. This can eventually smooth out the cultural hooks that we are looking for. Nevertheless, it happens that both France and Japan have developed their respective own definition and own framework: HQE™ and CASBEE®.

These definitions and frameworks, although more and more exported, were primarily intended to apply to their respective national market. It, therefore, remains relevant to have a look at these and check whether cultural features can be identified.

6.2. Japan

Sustainable building definition in Japan

When it comes to defining what is a sustainable building, the Institute for Building Environment and Energy Conservation (IBEC) refers to the definition by the Architectural Institute of Japan (AIJ, 2005) as the most frequently referred in Japan: "*A sustainable building is one which is designed: [1] to save energy and resources, recycle materials and minimize the emission of toxic substances throughout its lifecycle, [2] to harmonize with the local climate, traditions, culture and the surrounding environment, and [3] to be able to sustain and improve the quality of human life while maintaining the capacity of the ecosystem at the local and global levels.*"

Amongst others, this definition makes an explicit reference to local traditions and culture as elements that sustainable buildings should harmonize with. It appears at the same level as the harmonization with the local climate and with the surrounding environment.

Sustainable building certification framework in Japan

The Comprehensive Assessment System for Built Environment Efficiency usually referred to by the acronym CASBEE®, is the Japanese tool for the comprehensive evaluation of the environmental performance related to buildings, block districts, cities, etc. from various perspectives.

CASBEE® was developed in 2001 by the Japan Sustainable Building Consortium (JSBC), which is a nongovernmental organization comprising the Japanese government, academic partners, and industry (Wong & al., 2014).

The research and development of CASBEE® remain undertaken by the Japan Sustainable Building Association, and the Foundation General Foundation Building Environment and Energy Conservation Organization is engaged in activities related to the promotion of CASBEE®, the management of the Evaluator Registration System, the dissemination projects for overseas, etc.

CASBEE® is structured to have several schemes that depend on the size of a building, the main building life phases or specific topics. The general schemes for buildings are the following:

- CASBEE® for new constructions (except for detached houses),
- CASBEE® for existing buildings and renovations,
- CASBEE® for detached houses.

CASBEE® also provides supplementary rating systems for specific purposes:

- CASBEE® for newly built dwelling units. Complementarily to CASBEE® for new buildings, this tool enables to assess a specific dwelling in a multi-apartment building, so that to take into account specific features about natural lighting, ventilation, heat insulation performance, equipment specification, etc.
- CASBEE® for temporary new buildings whose use period is about 5 years or less,
- CASBEE® resilient housing checklist, to raise people's awareness and preparation regarding risks,
- CASBEE® health residence and community checklists, to raise people's awareness regarding health aspects,

- CASBEE® rehabilitation checklist, to monitor the improvements achieved regarding earthquake resistance, energy saving property, barrier-free property etc. of existing houses
- CASBEE® for real estate, which aims at making use of the results of environmental evaluation of buildings at CASBEE® during real estate evaluation
- CASBEE® for interior space, which aims at providing tools to evaluates environmentally conscious efforts by companies or organizations residing in buildings, not the entire building
- CASBEE® for heat islands,
- CASBEE® for blocks,
- CASBEE® for cities.

Evaluation manuals and tools can be downloaded on the IBEC/CASBEE® website (www.ibec.or.jp/CASBEE/index.htm). As the latest editions of the manuals are not available in English, the below analytical work was mostly performed with translations of the information available on the Japanese part of the IBEC/CASBEE website®.

CASBEE® assesses a building project using a metric called building environmental efficiency (BEE), which is given by the ratio between the two metrics built environmental quality (Q) and built environmental load (LR): BEE= Q/LR.

Q calculates the improvement in everyday amenities for the building users, within the virtual enclosed space boundary and LR quantifies the negative aspects of environmental impact that go beyond the public environment.

Q and LR range between 0 and 100 and are computed based on three subcategories each, tabulated on a score sheet:

- The scoring for Q involves:
    - Q1: Indoor environment;
    - Q2: Quality service;
    - Q3: Outdoor environment on site;
- The scoring for LR involves:
    - LR1: Energy;
    - LR2: Resources and materials;
    - LR3: Off-site environment.

Table 8 provides a detailed list of assessment items and their respective translations.

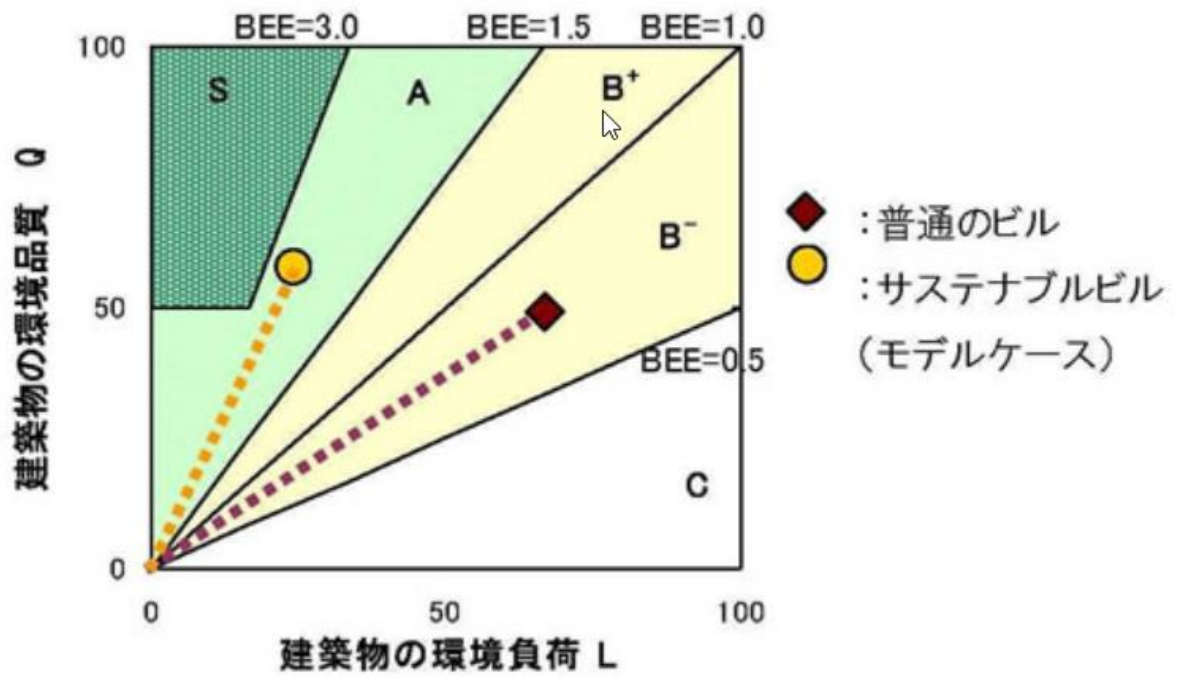
Table 8: Assessment items of the CASBEE® rating system

Ref.	Japanese	English
Q	**建築物の環境品質**	**Environmental quality of buildings**
Q1	室内環境	Indoor environment
1	音環境	Sound environment
1.1	室内騒音レベル	Room noise level
1.2	遮音	Sound insulation
1.3	吸音	Sound absorption
2	温熱環境	Thermal environment
2.1	室温制御	Room temperature control
2.2	湿度制御	Humidity control
2.3	空調方式（新築）	Air Conditioning System (Newly Built)
3	光・視環境	Optical/visual environment
3.1	昼光利用	Daylight use
3.2	グレア対策	Anti-glare measures
3.3	照度	Illuminance level
3.4	照明制御	Lighting control
4	空気質環境	Air quality environment
4.1	発生源対策	Source control measures
4.2	換気	Ventilation
4.3	運用管理	Operation plan
Q2	サービス性能	Service performance
1	機能性	Serviceability
1.1	機能性・使いやすさ	Functionality / Ease of use
1.2	心理性・快適性	Amenity
1.3	維持管理	Maintenance
2	耐用性・信頼性	Durability / Reliability
2.1	耐震･免震・制震・制振	Seismic, seismic isolation, damping, vibration control
2.2	部品・部材の耐用年数	The service life of components
2.3	適切な更新	Proper renewal
2.4	信頼性	Reliability
3	対応性・更新性	Flexibility / Adaptability
3.1	空間のゆとり	Space margin
3.2	荷重のゆとり	Load margin
3.3	設備の更新性	System renewability
Q3	室外環境（敷地内）	Outdoor environment (on site)
1	生物資源の保全と創出	Conservation and creation of biotope
2	まちなみ・景観への配慮	Consideration for townscape and landscape
3	地域性・アメニティへの配慮	Local characteristics /･Outdoor amenity
3.1	地域性への配慮、快適性の向上	Attention to local character, improvement of comfort
3.2	敷地内温熱環境の向上	Improvement of thermal environment on site

Ref.	Japanese	English
LR	建築物の環境負荷低減性	Reduction of the environmental burden of buildings
LR1	エネルギー	Energy
1	建物外皮の熱負荷抑制	Suppression of thermal load on building sheath
2	自然エネルギー利用	Natural energy use
3	設備システムの高効率化	Improvement of equipment efficiency
3.1	空調設備	Air-conditioning equipment
3.2	換気設備	Ventilating facilities
3.3	照明設備	Lighting equipment
3.4	給湯設備	Hot-water supply facility
3.5	昇降機設備	Elevator installation
4	効率的運用	Efficient operation
4.1	住宅以外の評価	Evaluation other than housing
4.2	住宅の評価	Evaluation of housing
LR2	資源・マテリアル	Resources · Materials
1	水資源保護	Water resource protection
1.1	節水	Water conservation
1.2	雨水利用・雑排水再利用	Rainwater use · Miscellaneous wastewater reuse
2	非再生性資源の使用量削減	Reduce use of non-regenerative resources
2.1	材料使用量の削減	Reduction of material usage
2.2	既存建築躯体等の継続使用	Continued use of existing building framework
2.3	躯体材料におけるリサイクル材の使用	Use of recycled materials in building materials
2.4	躯体材料以外におけるリサイクル材の使用	Use of recycled materials other than framing materials
2.5	持続可能な森林から産出された木材	Wood produced from sustainable forest
2.6	部材の再利用可能性向上への取組み	Efforts to improve reusability of parts
3	汚染物質含有材料の使用回避	Avoidance of contaminant-containing materials
3.1	有害物質を含まない材料の使用	Use of materials that do not contain harmful substances
3.2	フロン・ハロンの回避	Avoidance of CFCs / halons
LR3	敷地外環境	Off-site environment
1	地球温暖化への配慮	Consideration for global warming
2	地域環境への配慮	Consideration for the local environment
2.1	大気汚染防止	Air pollution prevention
2.2	温熱環境悪化の改善	Improvement of deterioration of the thermal environment
2.3	地域インフラへの負荷抑制	Suppression of load on the regional infrastructure
3	周辺環境への配慮	Consideration for the surrounding environment
3.1	騒音・振動・悪臭の防止	Prevention of noise, vibration and odour
3.2	風害・砂塵、日照阻害の抑制	Suppression of wind damage/dust, sunlight inhibition
3.3	光害の抑制	Suppression of light damage

The assessment results in sheet analyses and applies weights, using coefficients for each item of the Q and LR values and produces, as the last step, an overall score conveyed through the BEE index. Based on the BEE ratio, a level of performance (i.e., S (Excellent), A, B+, B−, and C) is associated with a given project. Chart 23 shows how the BEE index translates into the final rating: The red diamond gives the example of a regular building and the yellow circle gives the example of a sustainable building.

Chart 23: The BEE index rating system (Source: http://www.ibec.or.jp/CASBEE/CASBEE_outline/method.html)



The description of Q3.3 in the CASBEE® assessment manual explicitly mentions the conservation of unique local character, history and culture. This mainly involves the conservation of historically protected buildings and the use of locally produced materials, the employment of local craftsmen with explicit an explicit aim to perpetuate their specific skills.

6.3. France

Sustainable building definition in France

In France, the HQE-GBC Alliance established a reference Sustainable Building Framework (HQE-GBC Alliance, 2015). The HQE-GBC Alliance is built on a private initiative, declared of public interest.

The reference framework provides a general definition that can be translated as follow: "*Interacting with its territory, a sustainable building is a work that offers a good quality of life, respects the environment and brings energy and economic performance. It is designed, built, managed and used responsibly throughout its life cycle*".

In addition to the general definition, the reference framework consists of:

- Five principles, defined as rules of conduct to be followed in implementing the below commitments and objectives of the Sustainable Building Framework;

- Four commitments, defined as sets of objectives forming part of a pillar of sustainable development;
- Each commitment is declined in objectives (12 in total), defined as coherent groups of concrete and operational themes for which actions must be put in place to contribute to the respect of a commitment.

The five principles are the following:

- A global vision,
- Contextual answers,
- A dynamic of progression,
- Displayed performances,
- A continuous action.

Although the general definition does not make, as such, an explicit reference to culture, the second principle of the reference framework ("Contextual answers") further develops what the territorial interaction is meant to be: "*Each building is part of the history, culture and dynamics of a territory, a city, a neighbourhood and meets different needs. Therefore, the answers to the objectives defined for a sustainable building must be adapted to its context*". This development suggests that a sustainable building must be adapted to the culture of the territory.

The four commitments are the following:

- A commitment for the quality of life,
- A commitment for the preservation of the environment,
- A commitment for economic performances,
- A commitment to a responsible management.

The first three commitments are prescriptive about the building and the fourth is prescriptive about the process. Of the four commitments, the latest is the only one making explicit reference to the contextualization of the construction projects.

Sustainable building certification framework in France

The HQE™ can only be used for assessments performed according to criteria defined by the Sustainable Building Reference framework of the HQE-GBC Alliance. As for buildings, the HQE-GBC Alliance approved third-party certification schemes to use the HQE™ brand: for single-family houses (Céquami, www.cequami.fr); for multi-apartment blocks and row house

(Cerqual, www.qualite-logement.org/); for new and existing non-residential buildings and non-residential building in-use (Certivéa, www.certivea.fr); and in the international context (BeHQE, www.behqe.com).

For the housing sector, the reference certification framework declining the HQE-GBC Alliance definition since 2015 is the "NF Habitat HQE™ framework". The "NF Habitat HQE™" framework is common with the "NF Habitat framework".

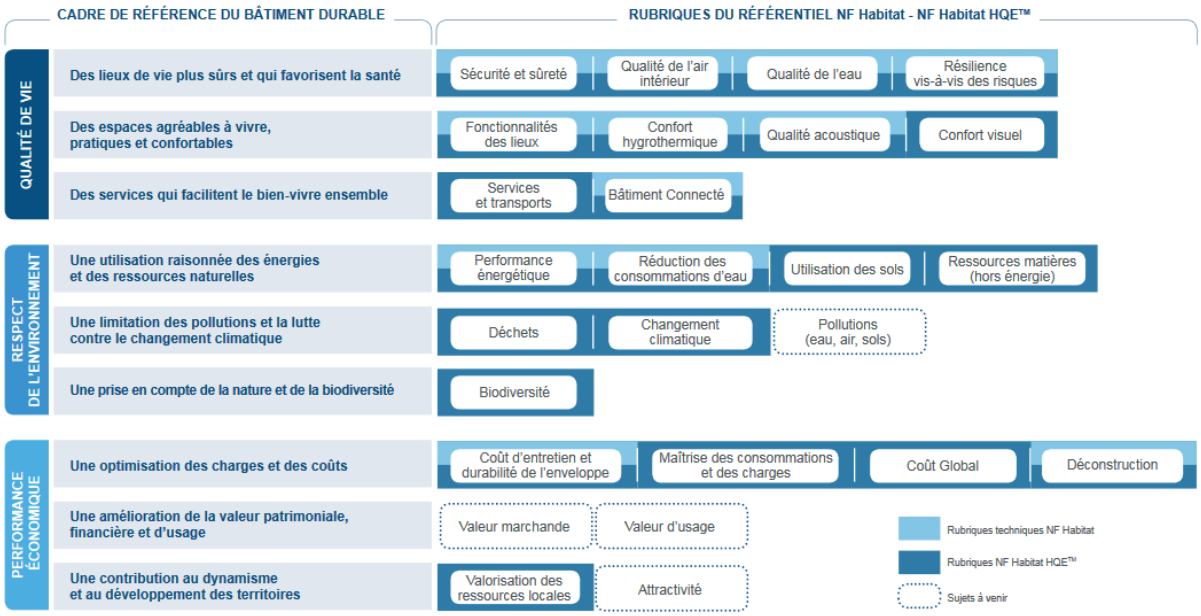
The framework is regularly updated and the latest version 3.0 is now applicable since February 2018. The 3.0 update of the NF Habitat certification was released one year and a half after the version 2.0 and, without deeply modifying its content, introduces new themes while completing the existing headings. The introduction of these new themes responds to an expectation that has become urgent with regard to the new issues that are emerging around the building such as BIM, home automation or the recurrence of climate hazards.

An outline of the framework can be accessed online[8].

Building upon the abovementioned Sustainable Building reference Framework, “NF Habitat/ NF Habitat HQE™” framework develops themes under the commitments of the Sustainable Building Framework, in particular, the three first commitments (quality of life, preservation of the environment and economic performance). 22 themes are defined in total: 12 are shared with "NF Habitat"; 10 are exclusive to the "NF Habitat HQE™". 4 themes are mentioned for future developments. The correspondence of the Sustainable Building reference Framework and the themes of the NF Habitat/ NF Habitat HQE™” framework is shown in Chart 24.

[8] https://www.qualite-logement.org/fileadmin/user_upload/documents/Referentiels_Documentation/Syntheses/Construction_Logement_et_RS.pdf

Chart 24: Correspondence of the NF Habitat/ NF Habitat HQE™ thematic organization with the Sustainable building reference framework



For each theme, minimum technical requirement levels are defined. A minimum level must be fulfilled in all case for the 12 themes applicable to “NF Habitat” (themes with a light/dark blue background on Chart 24). A point-based system (1, 2 or 3 points) is set in place for the 22 themes applicable to “NF Habitat HQE™” (themes with only a dark blue background on Chart 24). The 1-point threshold must be fulfilled to qualify to “NF Habitat HQE™”. The extra points can qualify the building to “NF Habitat HQE™ Excellent” and “NF Habitat HQE™ Outstanding”.

No explicit mention of culture could be found in the technical requirements. Having said that, culture is interacting in three ways. The certification framework:

- makes some preliminary studies mandatory in order to document the specific context. It implicitly relies on the actors in charge of the project development to apply the second principle (contextual answer) and design adapted solutions,
- cross-references the urban planning and the construction regulations as minimum standards. As a knock-on effect, the implicit incidence of culture can be inferred as established in the previous part related to the French and Japanese regulatory frameworks,
- provides for indicators and thresholds that must be viable for the users. As for regulations, the framework's indicators and thresholds have to be fitted to the users'

culture to be acceptable. Otherwise, because of its voluntary nature, the "NF Habitat HQE™" would not be used.

As such, the French Sustainable Building reference Framework covers culture by a general guiding principle, further elaborated in the way building projects should be managed, rather than on specification on the building itself.

As a result, the applicable French Sustainable Building certification frameworks mandates preliminary studies to make sure the design team is aware of the specific context of the operation. It is then up to them to apply the general guiding principle and make the rest of the way.

6.4. Conclusion

Both the Japanese definition and the French reference framework for sustainable buildings make explicit reference to local culture and traditions:

- In the Japanese case, harmonisation to the local culture and traditions is an explicit part of the definition itself, placed at the same level as the adaptation to the local climate;
- In the French case, adaptation to the cultural context of a territory is not part of the definition itself. It is given as one of the five principles for action.

More importantly, the question is about the practical implementation of the definition. Explicit reference to culture could only be found in the CASBEE® assessment framework, through a 'conservation of unique local character, history and culture' assessment item. The CASBEE® assessment manual clarifies that this item involves the conservation of historically protected buildings and the use of locally produced materials, the employment of local craftsmen with explicit an explicit aim to perpetuate their specific skills. This is consistent with the Japanese Law for the Protection of Cultural Properties that protects both material properties and the traditional skills that are indispensable for the conservation of cultural properties (Agency for Cultural Affairs, 2016). For instance, temples are regularly rebuilt, which helps to preserve highly skilled Japanese carpenters.

Trying to link these conclusions to the Hofstede's framework, nothing stark could be found in relation to the stronger 'Masculinity' index for Japan or to the stronger 'Individualism' index in France. However, the attention given to the preservation of craftsmen's skills in Japan fits in the high 'Long-term orientation' index for Japan.

7. General conclusion

In the introduction, we put forward that culture could be missing in the three-pillar model of sustainability.

We found that scholars established that country-level cultures can be meaningfully measured. They insisted on the fact that the relationship between national culture and individual behaviours are anything but complex. They also highlighted that if culture can be measured, it is only in a relative manner. Thankfully, no absolute ideal culture can be targeted. The same scholars are yet unable to conclude on the evolution of national cultures and, beyond, on an eventual convergence of national cultures with globalisation.

From an individual point of view, our analysis of housing in France and in Japan revealed specificities, in particular:

- in the way dwellings, as assets, are economically considered by people;
- in the way dwellings' internal layout is organised and dwellings are equipped and furnished.

These specificities have an influence on the implementation of sustainable development in the housing sector. These could not be attributed economic, environmental or social circumstances but can be reasonably attributed to culture.

No explicit reference to culture could be found in more formal elements, such as national statistical frameworks or national legislations. However, the influence of culture could be established. More specifically:

- Regarding the national statistical framework, the influence of culture could be observed in the way similar issues are addressed in a different manner, in particular in the set of possible answers, showing different expectations about housing;
- National legislation involves implicit cultural content that cannot be ignored, e.g. in the dwellings' standard use that is assumed to set regulations. The absence of explicit reference to culture is justified by the fact that there is no need for it. National legislations are addressed to people deemed to share the same culture.

Some explicit references to culture could be observed in the respective national sustainable building definitions and sustainable building certification schemes. Such references explicitly target adaptation of housing constructions to the local and surrounding environment and to traditional materials. However, if CASBEE® sees culture as a specific quality criterion, HQE™ sees culture as something to value in the project management.

As a common thread, we took three topics standing out of the rating for the French and Japanese culture into Hofstede's national culture framework. At the different steps of our work, we party correlated the cultural singularities with Hofstede's analysis. From the sketchy matching that we managed to establish, we can conclude that a holistic national culture rating, such as Hofstede's, can provide snatches of explanations of the influence of culture in a specific sector. However, the sectorial influence of culture can be offset in other sectors and fade out in the bigger picture.

Overall, we can conclude that even in nations having regular exchanges for 160 years this year, cultural differences exist in the housing sector area. These differences undoubtedly play a role in the way sustainability is implemented in the housing sector.

However, at the end of our journey, we must acknowledge that culture can hardly be integrated as a fourth pillar in the three-pillar model. One reason is that setting criteria for the 'culture sustainability' would be in contradiction with the living nature of culture.

With the pressing globalisation of issues, it can be tempting, in good faith even, to promote to other nations a straightforward transposition of technical solutions that are proven to be moving towards sustainability in a given national context. Our work shows that as the sustainability of a technical solution may depend on the culture of the promoting nation, it could be that it fails to be sustainable in the recipient country. This connects to the work of T. Shwe who revealed the shortcomings of international assessment tools to effectively address building sustainability in the context of a developing country (Shwe et al. 2018).

Of course, this does not call into question the benefits of technical bilateral and multilateral exchanges. Though, cultural exchanges should be an invaluable part of technical exchanges to deepen the understanding of the success factors towards a more sustainable housing.

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Annexes

Annex 1: Hoftede's interpretation of the French and Japanese cultures

This annex reports on interpretations of the French and Japanese national cultures under Hoftede's framework. These are taken from: https://www.hofstede-insights.com/country-comparison/france,japan/ (accessed on 06/04/2018).

France

Power Distance

With a score of 68, France scores fairly high on Power Distance. Children are raised to be emotionally dependent, to a degree, on their parents. This dependency will be transferred to teachers and later on to superiors. It is, therefore, a society in which a fair degree of inequality is accepted. Power is not only centralised in companies and government, but also geographically. Just look at the road grid in France; most highways lead to Paris.

Many comparative studies have shown that French companies have normally one or two hierarchical levels more than comparable companies in Germany and the UK. Superiors have privileges and are often inaccessible. CEO's of big companies are called Mr. PDG, which is a more prestigious abbreviation than CEO, meaning President Director General. These PDGs have frequently attended the most prestigious universities called "grandes écoles", big schools.

Individualism

France, with a score of 71, is shown to be an individualist society. Parents make their children emotionally independent with regard to groups in which they belong. This means that one is only supposed to take care of oneself and one's family.

The French combination of a high score on Power Distance and a high score on Individualism is rather unique. We only find the same combination in Belgium and, to some degree, in Spain and northern Italy.

This combination is not only unique, but it also creates a contradiction, so to speak. Only so to speak, because scores in the model don't influence anything. They just give a structured

reflection of reality. This combination manifests itself in France in the following ways: It is claimed that one reason why the French are less obese than people in other EU-countries is that parents still have more sway over children than in other EU-countries. Whether this is true or not is not known by us. All the same, what is true is that the family has still more emotional glue than in other Individualist cultures. This is a reflection of the high score on Power Distance with its stronger respect for the elderly. Subordinates normally pay formal respect and show deference to their boss, but behind his/her back they may do the opposite of what they promised to do, as they may think that they know better, yet are not able to express so. Another reflection of high Power Distance contrary to formal obedience is the total rejection of those in power as there is no way to change by evolution but only by strikes, revolts and revolution. Employers and trade unions don't really talk together as they look at each other as almost belonging to a separate species. The need to make a strong distinction between work and private life is even stronger in France than in the US, despite the fact that the US scores higher on Individualism. This is a reflection of the fact that employees more quickly feel put under pressure than in the US because of their emotional dependence on what the boss says and does. In cultures which score high on Power Distance and Collectivism, the "normal" combination, such dependence is welcomed. At least, if the power holders act as benevolent fathers. The French prefer to be dependent on the central government, an impersonal power centre which cannot so easily invade their private life. What is human, but more pronounced in France, is the need for strong leadership in times of crisis. In spite of that, when the crisis is resolved the president should make space for much weaker leadership. Many French have the need to become a "patron", whether as mayor of a small village or as the chairman of the bridge club. Customer service is poor in the eyes of all those Anglo-Saxons who believe that the customer is king. Not so in France. The French are self-motivated to be the best in their trade. They, therefore, expect respect for what they do, after which they are very much willing to serve you well.

Masculinity

With a score of 43, France has a somewhat Feminine culture. At face value this may be indicated by its famous welfare system (securité sociale), the 35-hour working week, five weeks of holidays per year and its focus on the quality of life. French culture in terms of the model has, however, another unique characteristic. The upper class scores Feminine while the working class scores Masculine. This characteristic has not been found in any other country.

This difference may be reflected by the following: Top managers earn on average less than one would expect given the high score on Power Distance. Married couples of high society could go public with a lover without negative consequences, at least certainly in the past. The scandal in the US about Clinton and Lewinsky has never been understood in France. In addition, "crime passionel", i.e. crimes of passion, have always been sentenced very leniently in comparison to other murder trials.

Uncertainty Avoidance

At 86, French culture scores high on Uncertainty Avoidance. This is clearly evident in the following: The French don't like surprises. Structure and planning are required. Before meetings and negotiations they like to receive all necessary information. As a consequence, the French are good in developing complex technologies and systems in a stable environment, such as in the case of nuclear power plants, rapid trains and the aviation industry. There is also a need for emotional safety valves as a high score on Uncertainty Avoidance and the combination of high Power Distance and high Individualism strengthen each other, so to speak. The French, for example, are very talkative and "engueuler", giving someone the sharp edge of one's tongue happens often. There is a strong need for laws, rules and regulations to structure life. This, however, doesn't mean that most Frenchmen will try to follow all these rules, the same as in other Latin countries. Given the high score on Power Distance, which means that power holders have privileges, power holders don't necessarily feel obliged to follow all those rules which are meant to control the people in the street. At the same time, commonners try to relate to power holders so that they can also claim the exception to the rule.

Long Term Orientation

France scores high (63) in this dimension, making it pragmatic. In societies with a pragmatic orientation, people believe that truth depends very much on situation, context and time. They show an ability to adapt traditions easily to changed conditions, a strong propensity to save and invest, thriftiness, and perseverance in achieving results.

Indulgence

France scores somewhat in the middle (48) where it concerns Indulgence versus Restraint. This, in combination with a high score on Uncertainty Avoidance, implies that the French are less relaxed and enjoy life less often than is commonly assumed. Indeed, France scores not all that high on the happiness indices.

Japan

Power Distance

At an intermediate score of 54, Japan is a borderline hierarchical society. Yes, Japanese are always conscious of their hierarchical position in any social setting and act accordingly. However, it is not as hierarchical as most of the other Asian cultures. Some foreigners experience Japan as extremely hierarchical because of their business experience of painstakingly slow decision making process: all the decisions must be confirmed by each hierarchical layer and finally by the top management in Tokyo. Paradoxically, the exact example of their slow decision making process shows that in Japanese society there is no one top guy who can take decision like in more hierarchical societies. Another example of not so high Power Distance is that Japan has always been a meritocratic society. There is a strong notion in the Japanese education system that everybody is born equal and anyone can get ahead and become anything if he (yes, it is still he) works hard enough.

Individualism

Japan scores 46 on the Individualism dimension. Certainly Japanese society shows many of the characteristics of a collectivistic society: such as putting harmony of group above the expression of individual opinions and people have a strong sense of shame for losing face. However, it is not as collectivistic as most of her Asian neighbours. The most popular explanation for this is that Japanese society does not have extended family system which forms a base of more collectivistic societies such as China and Korea. Japan has been a paternalistic society and the family name and asset was inherited from father to the eldest son. The younger siblings had to leave home and make their own living with their core families. One seemingly paradoxal example is that Japanese are famous for their loyalty to their companies, while Chinese seem to job hop more easily. However, company loyalty is something, which people have chosen for themselves, which is an Individualist thing to do. You could say that the Japanese in-group is situational. While in more collectivistic culture, people are loyal to their inner group by birth, such as their extended family and their local community. Japanese are experienced as collectivistic by Western standards and experienced as Individualist by Asian standards. They are more private and reserved than most other Asians.

Masculinity

At 95, Japan is one of the most Masculine societies in the world. However, in combination with their mild collectivism, you do not see assertive and competitive individual behaviors which we often associate with Masculine culture. What you see is a severe competition between groups. From very young age at kindergartens, children learn to compete on sports day for their groups (traditionally red team against white team).

In corporate Japan, you see that employees are most motivated when they are fighting in a winning team against their competitors. What you also see as an expression of Masculinity in Japan is the drive for excellence and perfection in their material production (monodukuri) and in material services (hotels and restaurants) and presentation (gift wrapping and food presentation) in every aspect of life. Notorious Japanese workaholism is another expression of their Masculinity. It is still hard for women to climb up the corporate ladders in Japan with their Masculine norm of hard and long working hours.

Uncertainty Avoidance

At 92 Japan is one of the most uncertainty avoiding countries on earth. This is often attributed to the fact that Japan is constantly threatened by natural disasters from earthquakes, tsunamis (this is a Japanese word used internationally), typhoons to volcano eruptions. Under these circumstances Japanese learned to prepare themselves for any uncertain situation. This goes not only for the emergency plan and precautions for sudden natural disasters but also for every other aspects of society. You could say that in Japan anything you do is prescribed for maximum predictability. From cradle to grave, life is highly ritualized and you have a lot of ceremonies. For example, there is opening and closing ceremonies of every school year which are conducted almost exactly the same way everywhere in Japan. At weddings, funerals and other important social events, what people wear and how people should behave are prescribed in great detail in etiquette books. School teachers and public servants are reluctant to do things without precedence. In corporate Japan, a lot of time and effort is put into feasibility studies and all the risk factors must be worked out before any project can start. Managers ask for all the detailed facts and figures before taking any decision. This high need for Uncertainty Avoidance is one of the reasons why changes are so difficult to realize in Japan.

Long Term Orientation

At 88 Japan scores as one of the most Long Term Orientation oriented societies. Japanese see their life as a very short moment in a long history of mankind. From this perspective, some kind of fatalism is not strange to the Japanese. You do your best in your life time and that is

all what you can do. Notion of the one and only almighty God is not familiar to Japanese. People live their lives guided by virtues and practical good examples. In corporate Japan, you see long term orientation in the constantly high rate of investment in R&D even in economically difficult times, higher own capital rate, priority to steady growth of market share rather than to a quarterly profit, and so on. They all serve the durability of the companies. The idea behind it is that the companies are not here to make money every quarter for the shareholders, but to serve the stake holders and society at large for many generations to come (e.g. Matsuhista).

Indulgence

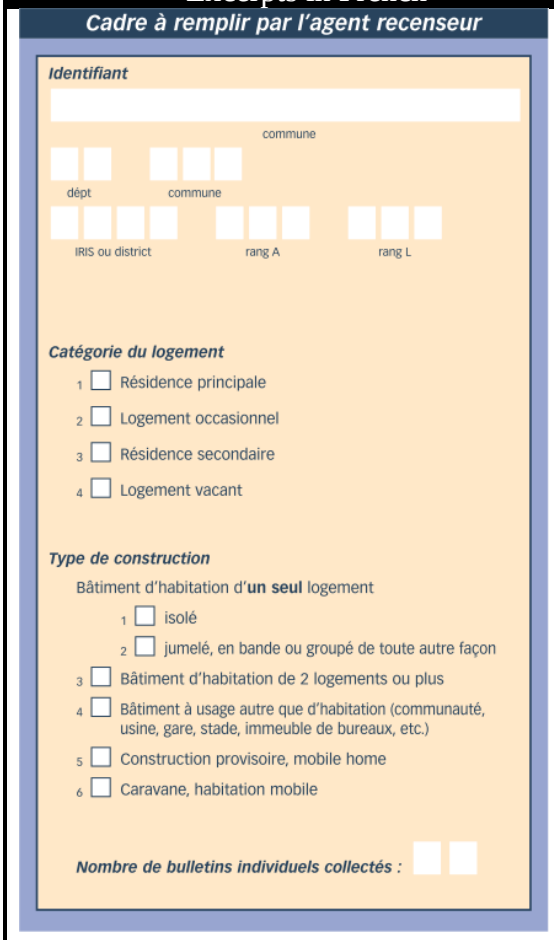
Japan, with a low score of 42, is shown to have a culture of Restraint. Societies with a low score in this dimension have a tendency to cynicism and pessimism. Also, in contrast to Indulgent societies, Restrained societies do not put much emphasis on leisure time and control the gratification of their desires. People with this orientation have the perception that their actions are Restrained by social norms and feel that indulging themselves is somewhat wrong.

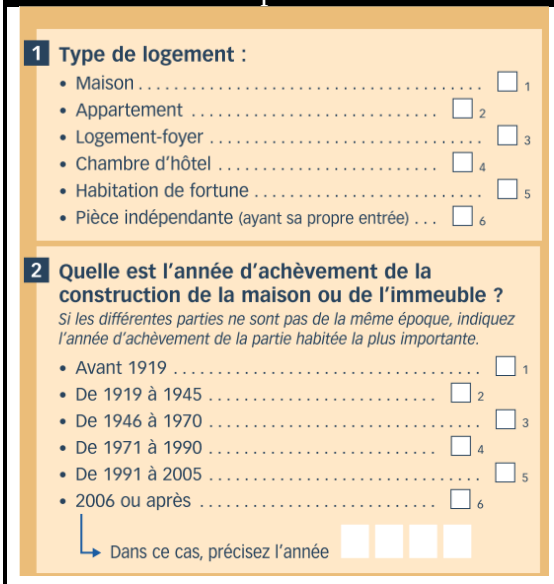
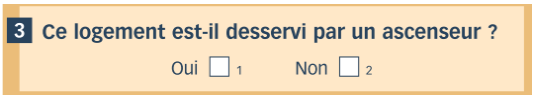
Annex 2: French housing statistical framework analysis

This annexe studies the French survey form and provides for the English translation of the questions related to housing conditions. This form is used as part of the general population census.

The official form is accessible at

https://www.insee.fr/fr/metadonnees/source/fichier/feuille_de_logement2016.pdf

Excerpts in French	English translation
	Dwelling category: *4 groups: Main residence; Occasional use; Secondary residence; Vacant dwelling* Building type: *6 groups: Building with one dwelling (separated); Building with one dwelling (twinned, in row, grouped in any other manner); Building with two dwellings or more; Building with other use than dwelling (community, factory, station, stadium, office building, etc.); Temporary building, mobile home; Caravan, mobile housing.*

Excerpts in French	English translation
	1 – Dwelling type: *6 groups: House; Apartment; Hostel; Hotel room; Makeshift housing; Separate room (having its own entrance)* 2 – What is the year of completion of the house or apartment block? *6 groups: Before 1919; From 1919 to 1945; From 1946 to 1970; From 1971 to 1990; From 1991 to 2005; 2006 or after (In this case, specify the exact year)*
	3 – Is this dwelling served by an elevator? *Yes/No*
	4 – How many rooms are there in this dwelling?

Excerpts in French	English translation
5 Quelle est la surface de ce logement ? ***Tenez compte*** *de toutes les pièces, y compris couloir, cuisine, salle de bains, WC, etc.* ***Ne tenez pas compte*** *des balcons, terrasses, caves, greniers, parkings et des pièces à usage exclusivement professionnel.* • Moins de 30 m² ☐ 1 • De 30 à moins de 40 m² ☐ 2 • De 40 à moins de 60 m² ☐ 3 • De 60 à moins de 80 m² ☐ 4 • De 80 à moins de 100 m² ☐ 5 • De 100 à moins de 120 m² ☐ 6 • 120 m² ou plus ☐ 7	5 – What is the surface area of this dwelling? *7 groups: Less than 30 m²; From 30 up to 40 m²; From 40 up to 60 m²; From 60up to 80 m²; From 80 up to 100 m²; From 100 up to 120 m²; 120 m² and more.*
6 Êtes-vous : • **propriétaire** de ce logement (y compris en accession, en indivision ou jouissance du logement par usufruit) ? ☐ 1 • **locataire** ou sous-locataire du logement, **loué vide** ? ☐ 2 • **locataire** ou sous-locataire du logement ou de la chambre, **loué(e) meublé(e)** ? ☐ 3 • **logé(e) gratuitement**, par exemple par des parents, des amis ou votre employeur (y compris les personnes occupant un logement qu'elles ont vendu en viager) ? ☐ 4	6 – Tenure status *4 groups: Owner of this dwelling (including in possibility of home-ownership, jointly held, or by usufruct); Tenant or sub-lessee of the dwelling, leased empty; Tenant or sub-lessee of the dwelling or room, leased furnished; Lodged free of charge, e.g. from parents, friends or employer (including people occupying the dwelling they have sold for a life annuity)*
7 Ce logement appartient-il à un organisme d'HLM ? Oui ☐ 1 Non ☐ 2	7 – Is the dwelling owned by a social housing company? *Yes/No*
8 En quelle année avez-vous emménagé dans ce logement ? *Si tous les occupants actuels du logement ne sont pas arrivés en même temps, indiquez la date d'emménagement du premier arrivé. Si cette personne a toujours vécu dans le logement, reportez son année de naissance.* ☐☐☐☐	8 – What year did you move in this dwelling?
9 Quelles sont les installations sanitaires de ce logement ? • **Ni baignoire, ni douche** ☐ 1 • Baignoire ou douche dans une **pièce non réservée** à la toilette ☐ 2 • **Salle(s) de bains** (avec douche ou baignoire) ☐ 3	9- What are the sanitary equipment of this dwelling? *3 Groups: Neither bathtub nor shower-tub; Bathtub or shower-tub in a room non-reserved to personal hygiene; Bathroom(s) (with shower-tub or bathtub).*
10 Quel est le principal moyen de chauffage de ce logement ? • Chauffage collectif (chaudière commune à plusieurs logements de l'immeuble ou réseau de chauffage urbain) ☐ 1 • Chaudière individuelle (propre au logement) ☐ 2 • Chauffage individuel « tout électrique » ☐ 3 • Poêle, cheminée, cuisinière, etc. ☐ 4	10 – What is the main mean of space heating of this dwelling? *4 groups: Central heating (boiler shared by several dwellings of the apartment building or district heating); Individual boiler (specific to the dwelling); Individual electric heating; Stove, fireplace, cooker, etc.*

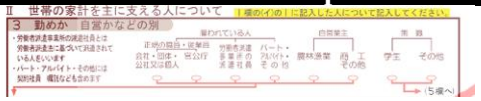
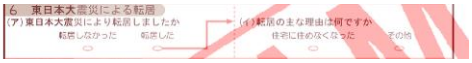
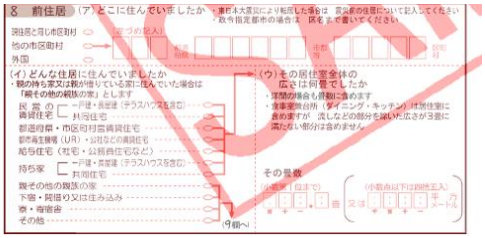
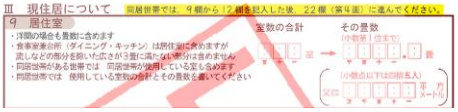
Excerpts in French	English translation
11 Quel est le combustible principal de chauffage ? • Chauffage urbain ..... ☐ 1 • Gaz de ville ou de réseau ..... ☐ 2 • Fioul (mazout) ..... ☐ 3 • Électricité ..... ☐ 4 • Gaz en bouteille ou en citerne ..... ☐ 5 • Autre (bois, solaire, géothermie, etc.) ..... ☐ 6	11 – What is the main fuel for space heating: *6 groups: District heating; Distributed gas; Oil; Electricity; Gas cylinders and gas tank; Other (wood, solar, geothermal, etc.)*
12 De combien de voitures les habitants de ce logement disposent-ils ? *Ne comptez pas les voitures ou les fourgonnettes à usage exclusivement professionnel.* • Aucune ..... ☐ 0 • 1 ..... ☐ 1 • 2 ..... ☐ 2 • 3 ou plus ..... ☐ 3	12 – How many cars are used by the dwelling occupants? *4 groups: None; 1; 2; 3 or more*
13 Disposez-vous d'un emplacement de stationnement réservé à votre usage personnel ? *Cet emplacement peut être un **garage**, un **box** ou une **place de parking** de plein air ou souterrain.* Oui ☐ 1 Non ☐ 2	13- Do you have a parking space for personal use only? *Yes/No*

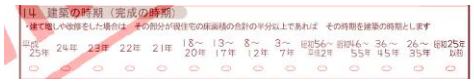
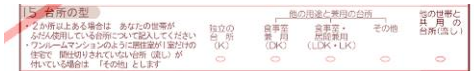
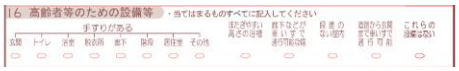
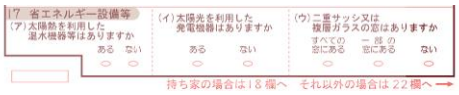
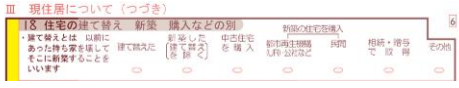
Annex 3: Japanese housing statistical framework analysis

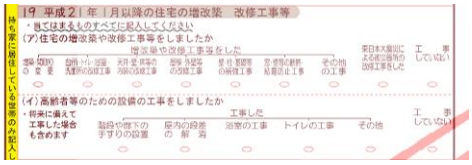
General information about the Housing and Land Survey is available at http://www.stat.go.jp/english/data/jyutaku/index.htm

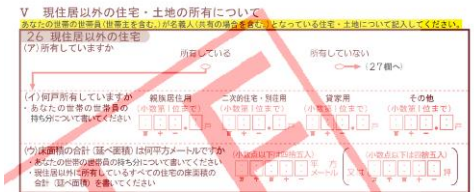
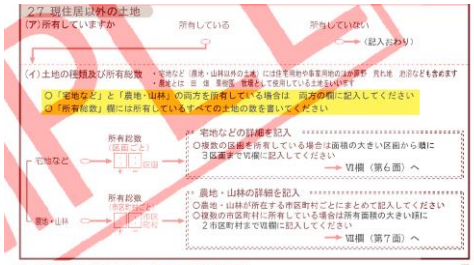
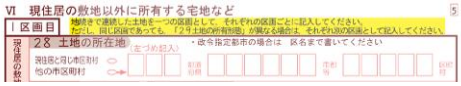
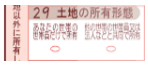
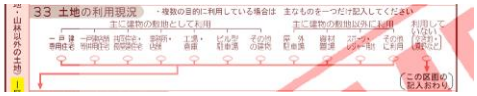
This annexe studies and provides an English translation of the 2013 Japanese survey form related to housing and land. The official form is accessible at http://www.stat.go.jp/data/jyutaku/2013/pdf/h25otu.pdf

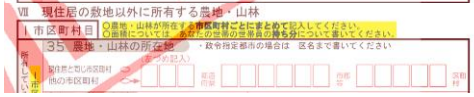
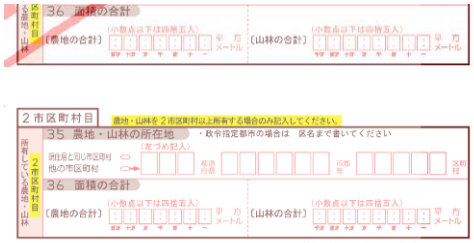
Extracts in Japanese	English translation
 秘 基幹統計調査 平成25年住宅・土地統計調査 調査票乙 平成25年10月1日 総務省統計局 I あなたの世帯について 1 世帯の構成 （ア）世帯人員の合計 （イ）各世帯員の男女の別や年齢など 世帯の家計を主に支える人 [続き柄の選択肢] 2 配偶者 3 子 4 子の配偶者 5 父母 6 配偶者の父母 7 孫 8 祖父母 9 兄弟姉妹 10 他の親族 11 その他 第2面の2欄へ I あなたの世帯について（つづき） 2 世帯全員の1年間の収入（税込み） 100 200 300 400 500 700 1000 1500 2000	**I About your household** 1 – Household composition (a) Total number of persons (b) Decomposition by sex, age, etc. *11 kind of persons: (1) The interviewed person itself; (2) Partner; (3) Child; (4) Partner's child; (5) Father/mother; (6) Partner's father/mother; (7) Grandchild; (8) Grandparent; (9) Brother/sister; (10) Other parent; (11) Other.* 2 – Total household yearly income (before taxes) *10 groups: <1M¥; 1-2M¥; 2-3M¥; 3-4M¥; 4-5M¥; 5-7M¥; 7-10M¥; 10-15M¥; 15-20M¥; >20M¥*

Extracts in Japanese	English translation
      	**II About the main earner of the household** 3 – Employment status of the main earner *3 groups (8 sub-groups):* ***Self-employed worker*** *(Agriculture, forestry and fishery owner; Commercial workers and other business owners)* ***Employed*** *(By companies, organizations, public corporations or individuals employed by individuals; By government offices; Temporary staff at worker dispatching offices; Part-time job and other)* ***Unemployed*** *(Student; Other)* 4 – Commuting hours of the main earner *8 groups: Work at home; Less than 15mn; 15-30mn; 30-45mn; 45mn-1:00h; 1:00-1:30h: 1:30-2:00h; More than 2:00h* 5 – Domicile of the main earner's children *6 groups: Living together (including the same area or household); Living within a 5 minutes walking distance; Living at less than 15 minutes; Living at less than 1 hour; Living away by 1 hour or more; No children* 6 – Moving due to the great East Japan earthquake *(a) Yes/No* *(b) If yes, the reason for moving: The house was not liveable anymore; Other* 7 – Year of last move of the main earner *14 groups: 1950 or earlier; 1951 to 1960; 1961 to 1970; 1971 to 1980; 1981 to 1990; 1991 to 1995; 1996 to 2000; 2001 to 2005; 2006 to 2008; 2009; 2010; 2011; 2012; Jan. to Sep.2013* 8 – Previous residence *(a) Last place of residence of the main earner: Same neighbourhood; Another neighbourhood; Another country* *(b) Dwelling type (10 groups): Lived in relatives' houses; Owned detached or tenement-house; Owned apartment; Rented from local government; Rented from Urban Renaissance Agency or public corp.; Rented detached or tenement-house from private; Rented by a company; Lived in shared houses or employer's houses; Lived in dormitories; Other* *(c) Size (in number of tatamis)* **III About your current residence** 9 – Rooms of the current dwelling *(a) Number of rooms* *(b) Size (in number of tatamis)*

Extracts in Japanese	English translation
	10 – Tenure status *4 groups (8 sub-groups): Owner; Rented (From local government; From Urban Renaissance or other public corporation; From private owner; From company); Borrowed; Other than residential (Rented; Owned)*
	11 – For owners, type of ownership *3 groups: Owned by members of your household; Jointly owned (Share in %); Other*
	12 – For tenant, monthly rent and expenses *(a) Rent (in yens)* *(b) Common and administrative expenses (in yens)*
	13 – Floor area *(a) Total floor area (in m² or in tsubo = 3,306m²)* *(b) Ground floor area (in m² or in tsubo = 3,306m²)*
	14 – Year of construction *14 groups: 1950 or earlier; 1951 to 1960; 1961 to 1970; 1971 to 1980; 1981 to 1990; 1991 to 1995; 1996 to 2000; 2001 to 2005; 2006 to 2008; 2009; 2010; 2011; 2012; Jan. to Sep.2013*
	15 – Type of kitchen *5 groups: Kitchen used only for cooking (K); Kitchen also used as dining-room (DK); Kitchen also used as dining-room and living room (LDK); Kitchen also used for other purposes; Kitchen shared with another household*
	16 – Facilities for elder persons and other equipment *6 groups (13 subgroups): Rooms equipped with railings (Entrance; Toilets; Bathroom; Dressing room; Corridor; Stairs; Dwelling rooms; Other rooms); Easy-to-step-in bathtub; Passage is wide enough for wheel-chair; Without steps indoors; Possible to move with a wheel-chair from the street to entrance; Without facilities for aged persons.*
	17 – Energy saving equipment *(a) Do you have solar hot water equipment? (Yes/No)* *(b) Do you have solar power generation? (Yes/No)* *(c) Do you have double-glazed windows? (All; Partly; No)*
	For building owners… 18 – Acquisition since 2009 *6 groups (7 sub-groups): Rebuilt; Newly built (excluding rebuilt); Purchased used-house;*

Extracts in Japanese	English translation
	*Purchased newly built (From Urban Renaissance or public corp; From private company); Acquired by inheritance or grant; Others* 19 – Extension or renovation since 2009 (a) *3 groups (9 sub-groups): Extended or renovated (Extension or change of room layout; Renovated kitchen, toilet, bathroom, lavatory; Renovated interior parts such as ceiling, walls, floor; Renovated roof, exterior walls, etc.; Reinforced walls, pillars, foundation, etc.; Installed insulation or condensation proofing on windows, walls, etc.; Other); Renovated following the Great East Japan Earthquake; Not extended nor renovated* (b) Renovation for elder persons since 2009 *2 groups (6 sub-groups): Renovated (Stairs and corridors with railing; Slopes in the residence; Renovation of the bathroom; Renovation of toilets); Not renovated*
	20 - Situation of seismic diagnosis of dwellings since 2009 *2 groups (3 sub-groups): Seismic diagnosis conducted (Earthquake resistance is secured; Earthquake resistance is not secured); Seismic diagnosis not conducted*
	21 – Renovation related to earthquake-resistance since 2009 *2 groups (6 subgroups): Renovated to improve earthquake resistance (Newly built or reinforced wall; Instalment of diagonal bracing; Reinforcement of foundations; Reinforcement by bolts; Other); Not renovated to improve earthquake resistance*
	**<u>IV About the site of your current dwelling</u>** 22 – Tenure status of the land *3 groups (5 subgroups): Ownership; Leasehold rights (General leasehold rights; Periodic leasehold rights); Other (Row houses; Apartment for example).*
	23 – For owners, type of ownership *3 groups: Owned by members of your household; Jointly owned (Share in %); Other*
	24 – Site area *Site area (in sqm or in tsubo = 3,306m²)*
	25 – Type of transfer of the site *6 groups: From central or local government; From Urban Renaissance Agency or public corporations; From corporation, such as a*

Extracts in Japanese	English translation
	*company; From an individual; By inheritance or grant; Others* **V About your secondary residence/land** 26 – Additional dwelling (a) Do you own additional dwellings? *Yes/No* (b) If so, the number of share into additional dwellings: *Split into 4 use groups: For relatives; As second dwellings or villas; For rent; Others* (c) Floor area (in m² or in tsubo = 3,306m²)
	27 – Additional land (a) Do you own additional land? *Yes/No* (b) Number of sections *Land for residential use* *Land for agriculture/forestry*
	**VI Description of owned land for residential use (7 questions for each section)** 28 – Location *In the same neighbourhood* *If not, provision of the location*
	29 – Type of ownership *Exclusively owned by your family; Shared with another family*
	30 – Site area (Share owned by your family) *(in m² or in tsubo = 3,306m²)*
	31 - Type of transfer of the site *6 groups: From central or local government; From Urban Renaissance Agency or public corporations; From corporation, such as a company; From an individual; By inheritance or grant; Others*
	32 – Year of transfer of site *7 groups: 1950 or earlier; 1951 to 1970; 1971 to 1980; 1981 to 1990; 1991 to 2000; 2001 to 2010; 2011 to Sep.2013*
	33 – The current state of land use *3 groups (12 subgroups): Mainly used as the site of a building (Built with a single house; Built with combined single house and shop, etc.; Joint house/apartment building; Office building/store; Factory/warehouse; Built parking lot; Other buildings); Used mainly for another use than the site of a building (Outdoor parking lot; Material deposit place; Sports and leisure use; Other use); Not used*
	34 – Main user of the land *4 groups: Members of your own household;*

Extracts in Japanese	English translation
	*Partner's parents; Other than a member of your household, such as corporation; There is no user* Questions 28 to 34 for the second section of land
	Questions 28 to 34 for the third section of land
	**VII Farmlands and forests owned outside the site of the current residence (2 questions for each section)** 35 – Location of farmland/forest *In the same neighbourhood* *If not, provision of the location* 36 – Total area (a) The total area of agricultural land (m²) (b) The total area of forest (m²) Questions 35 and 36 for the second section of land
	

In addition to the analysis of the survey form, the statistical tables of the final results of the 2013 survey were examined. 182+15 tables are available at http://www.e-stat.go.jp/SG1/estat/ListE.do?bid=000001051892&cycode=0.

These tables are clustered into 31 categories:

1. dwellings and households,
2. kind, type, year of construction, construction material and stories of the building,
3. size of dwelling,

4. the situation of facilities,
5. the situation of dilapidation,
6. site area, building area of floor space of detached and tenement-houses,
7. unoccupied building,
8. number of building,
9. type of household, family type, household members,
10. main earner of household and dwelling,
11. residential density,
12. domicile of the main earner's children,
13. housing standard,
14. purchase, construction, reconstruction, etc,
15. extended or renovated, renovating of facilities for aged persons, etc,
16. rent,
17. the situation of rented houses by owned privately used exclusively to live,
18. the situation of non-wooden apartments used exclusively to live,
19. the title deed to dwelling and site,
20. change of dwelling,
21. commuting hours,
22. the site of present dwelling,
23. dwelling environment,
24. type of city planning area,
25. aged person households,
26. the situation of household with aged persons,
27. the situation of design to accommodate aged persons,
28. tenure and use etc. of dwelling and/or land,
29. moving due to the Great East Japan Earthquake,
30. renovated of stricken place by the Great East Japan Earthquake,
31. appendix tables.

To be noticed:

- The kitchen type as a key variable
- The specific place of the “main earner”

- Considerations of family
- The monitoring of the renovation
- The monitoring of vacancy and dilapidation
- Follow up monitoring of the Great East Japan Earthquake (migration, reconstruction, prevention)
- The monitoring of adaptation to elder persons (level of equipment, upgrades)
- The monitoring of energy saving components

Interestingly, some variables used in the statistical tables are not surveyed through the "Housing and Land Survey". For instance:

- The distance to various services (aged person day service centre, elementary school, junior high school, emergency evacuation place, nursery school, post office/bank, public hall/meeting place, nearest medical institution, park, transportation) that must be reconstructed by the from the address,
- Some legal information, such as the regional classification of urban planning, the lowest and targeted local housing standards, the legal floor space ratio and the percentage of whole floor space to the whole site area,
- Some physical data, such as the number of storeys, the structural construction material, the situation of dilapidation, the connection to public sewing service, the presence of elevator, width of the road abutting the site,…