

Environmental sustainability in mega-event planning and the institutional effects on the housing practice: A case study of the 2010 Vancouver Winter Olympics

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Abstract

Mega-events are often argued to be catalysts for change in order to justify the significant capital investments needed. Environmental sustainability has become an important aspect of mega-event planning and can thus have an effect on the host-city after the event. This research aims to analyse the institutional effects a focus on environmental sustainability during mega-event planning can have on environmentally sustainable housing practices. It utilizes the case-study of the 2010 Vancouver Winter Olympics, to be able to find concrete effects and generalise findings to put them in the broader field of mega-event research. Two types of institutional effects have been identified through literature research, namely human capital and policy effects. Both have also come up during the semi-structured interviews that were conducted for this research. A mega-event can provide confidence to set ambitious environmental standards and can be used to provide momentum to implement ambitious policies. In the case of the 2010 Games, it led to the implementation of the Greenest City Action Plan to ensure environmentally sustainable policies, including within the housing practice. A mega-event can thus further environmentally sustainable housing practices. However, the local narrative surrounding environmental sustainability and the role the mega-event plays in this narrative plays a crucial role in the outcomes.

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1. Introduction

1.1 Background

Mega-events are often seen as drivers or catalysts of redevelopment and institutional changes in the host city (Azzali, 2017). They can be used as a stimulant to attract investments for new constructions in building stocks and transportation networks (Taha & Allan, 2020). Due to their magnitude, they require significant amounts of capital investments and thus require careful planning (Müller, 2015a). Furthermore, seeing as events such as the Olympics Games and the FIFA world cup are viewed all over the world, they are often used to improve the economic competitiveness and global integration of a city (Short, 2008). Mega-events are thus not solely a sporting event anymore (Müller, 2015a), making it paramount that communication between the involved parties is clear to achieve the best outcome possible. However, the planning phase of a mega-event is not limited to the event itself, the legacy of the event is equally as important (Deng, et al., 2016), especially seeing as it is often used as an argument to host the event. As Müller (2015a) showed, it is important during the planning process to take into account the use of the built legacy after the event. Next to the built legacy, a mega-event can also have an intangible legacy, such as institutional effects, in the sense that the organizing institutions gain essential knowledge and experience from planning a mega-event (Malfas, et al., 2004). This can be beneficial for the institutional system of the host city and lead to advancements in specific areas of this system.

1.2 Research problem

The International Olympic Committee (IOC) decided in 1994 that environmental and sustainable development are important and should thus be included in the Olympic Charter (VANOC, 2009). Since 2001, the IOC requires all host cities to include an Olympic Games Impact study, as part of their report (Chen & Henry, 2020). Seeing as mega-event are often argued to serve as catalyst for redevelopment in host cities, it is important to study the actual effects such an event has on the city. The capital investments of an event of this scale can often only be justified through promises of the event spearheading improvement and regeneration programmes. It is thus important to research the effect a mega-event has on the host city.

The aim of this research is to analyse the institutional effect a focus on environmental sustainability during the planning phase of a mega-event can have on environmentally sustainable housing practices in the host city after the event. A focus on the housing practices has been chosen as it is an important sector of the economy as stated by Ibrahim (2020), and thus guides urban development. It can serve as an important factor in ensuring environmental sustainability within the urban planning system. The emphasis on institutional effects as opposed to physical effects has been chosen because institutional transformation is a critical aspect of bringing ideas to life (Alexander, 2005), which is a planner's goal. This is not to say that physical effects are less important to study, however, institutional effects can have a lasting impact on the way in which planning is thought about and its methodology. In order to change society, institutional changes must be made, which a mega-event can foster. To guide this research the following research question has been drawn up:

What lasting institutional effects does a focus on environmental sustainability within mega-event planning have on environmentally sustainable housing practices in the host city?

In order to answer this question, the following sub-questions have been devised:

1. How is environmental sustainability applied within mega-event planning?
2. How does a focus on environmental sustainability within mega-event planning fit in the narrative of environmental sustainability in the host city?
3. What aspects of the institutional system pertaining to housing practices, appear to be most sensitive to change because of a focus on environmental sustainability during the mega-event planning process?
4. How is the rhetoric of environmental sustainability influencing housing practices in the host city?

Section 2 will dive into previous research done about the topic and will present the most relevant theories and concepts to provide a basis for the rest of the research. The following section will explain the research method and will explain how the 2010 Vancouver Winter Olympics were chosen as case-study. This will be followed by the results, which will include an overview of the 2010 Olympics and the main findings of the interviews. Lastly, section 5 will give a conclusion of the main results and provide future research recommendations. The appendixes contain the full interview guide, the relation between the interview questions and the research questions, and a link to previous courses in the bachelor Spatial Planning and Design.

2. Theoretical Framework

2.1 Present research literature

Before discussing several concepts related to mega-events, it is important to define the concept of a mega-event, as a common understanding makes discussions about the topic easier (Müller, 2015b). Müller dedicated an article to come to a definition of the concept seeing as different researchers often use different interpretations of what a mega-event is (2015b). His definition states that a mega-event is a non-recurring event which is of a certain size that it distinguishes itself from a large event. The size an event needs to be to be able to be called a mega-event depends on four elements: large costs, a large impact on both the population and the built environment, a large number of visitors, and a large media reach. Examples of mega-events include Olympic Games, World Expos, and the FIFA World Cup.

Another important concept to discuss is that of event legacy, as this is often used to justify the bids for hosting a mega-event (Pereira, 2018). Event legacy has been gaining attention in the field of event research, and numerous attempts have been made to define the term (Liu, 2018). However, one of the most used definitions is that given by Preuss, ‘irrespective of the time of production and space, legacy is all planned and unplanned, positive and negative, tangible and intangible structures created for and by a sport event that remain longer than the event itself’ (2007, p. 211). This means that an events legacy is about the effect the event has had on the place where it was held when it is over. It can be planned for, however some of the effects are also unplanned. Furthermore, tangible and intangible structures can form the legacy of an event. The concept of event legacy is thus relevant to this research as it includes intangible structures such as institutional structures and policies. Legacy planning has gained attention over the last few years as it is an important part of sustainable development, which has become a significant aspect in urban development (Liu, 2018). As O’Brien & Chaplin (2008) concluded that to generate a legacy that extends further than the reach of the mega-event itself, the event can be used as leverage. The concept of event leveraging is about an ex-ante process of using an event to not only create change during the event, but also after the event. Events are thus not seen solely as an intervention, but as a set of opportunities that can be used to generate maximum benefits (Ziakas, 2014).

A lasting legacy can also be in the form of human capital, which can improve institutional systems in the long run (Schilirò, 2010). Human capital is “the knowledge, information, ideas, skills, and health of individuals” (Becker, 2002, p.1). During the planning and hosting of an event of significant size, knowledge and skills are developed and acquired, which can be used after the event (Kaplanidou, et al., 2019). These include adaptability, skillset at mega-event level, interpersonal skills, and network cultivation. However, human capital alone will not create a lasting legacy, making it important to realise that the quality of the institutional environment is up to par to ensure the added human capital has a positive effect (Schilirò, 2010). It is however, beyond the scope of this research to research the quality of the institutional environment of the case study, but it is important to keep in mind during this research. Human capital can be used to generate extensive networks, which is considered to be social capital (Ostrom, 2009), and gain useful expertise. Human capital is considered to be a form of institutional impact by Schilirò (2010) and is thus used as one of two types of institutional effects in this research, together with policy effects, which will be discussed later on in this section.

Sustainable development is an important criterion for certain event committees to choose a host city, such as for the International Olympic Committee (IOC) (Deng, et al., 2016). It is furthermore important as Karadakis & Kaplanidou (2012) discovered that environmental legacy was considered to be the most important aspect of legacy planning for residents of Vancouver

during the Winter Olympics of 2010. In this case environmental sustainability pertained to planning with minimal harm to the environment and ensuring that what is being built meets the needs of those intended to use it after the Olympic Games were over. Environmental sustainability thus becomes an important aspect to deal with during the planning and hosting of a mega-event. The integration of environmental sustainability in mega-events is called ‘greening’ (Wang, et al., 2019). Greening strategies are often included in mega-event plans as either a way of giving the plans an advantage to win the bid, or to satisfy stakeholders. However, these initiatives have on several occasions also been perceived as ‘greenwashing’ (Death, 2011), instead of making significant contributions to limit the environmental footprint of the event. This needs to be taken into account when analysing the results.

An important aspect for a city to become increasingly environmentally sustainable, is through policies as Glass & Newig found (2019). Coherent policies with the common goal of enhancing the environmental sustainability position of a city, can lead to further advancements of sustainable development. Policy changes are forms of institutional change (Ludvig, et al., 2021), which thus can lead to further implementation of environmental sustainability in the institutional system. The housing practice within the institutional system plays a specific role in climate change mitigation as it has been found to be the sector with the highest potential for low-cost, but effective changes (Heffernan, et al., 2021). Buildings have a significant environmental impact and thus, if reduced, can have a positive effect on environmental sustainability within a city. A mega-event can thus have an institutional effect on the housing practice through policies and human capital that can lead to significant improvements when it comes to environmental sustainability.

2.2 Conceptual model

The conceptual model in figure 1 is a visual representation of the main theories related to this research. The planning of a mega-event with a focus on environmental sustainability leads to environmental sustainability objectives. To see if the mega-event actually was environmentally sustainable, an assessment can be done to see if the objectives have been reached, and thus the beforehand discussed level of environmental sustainability has been reached. The objectives can lead to two types of institutional effects, namely policy legacy and human capital legacy. Both types of legacy can have an institutional effect on the housing practices within the host city. In this research, the aim is to analyse if this focus on environmental sustainability influences environmental sustainability within housing practices in the host city.

2.3 Expectations

The main hypothesis in this research is that the environmental sustainability objectives in mega-event planning leads to furthering environmentally sustainable development in the institutional system of building practices in the host city. This would thus imply that mega-events have certain institutional effects, such as policy changes and/or human capital improvements. Seeing as this research is qualitative, the hypothesis is a nomothetic expectation instead of a hypothesis.

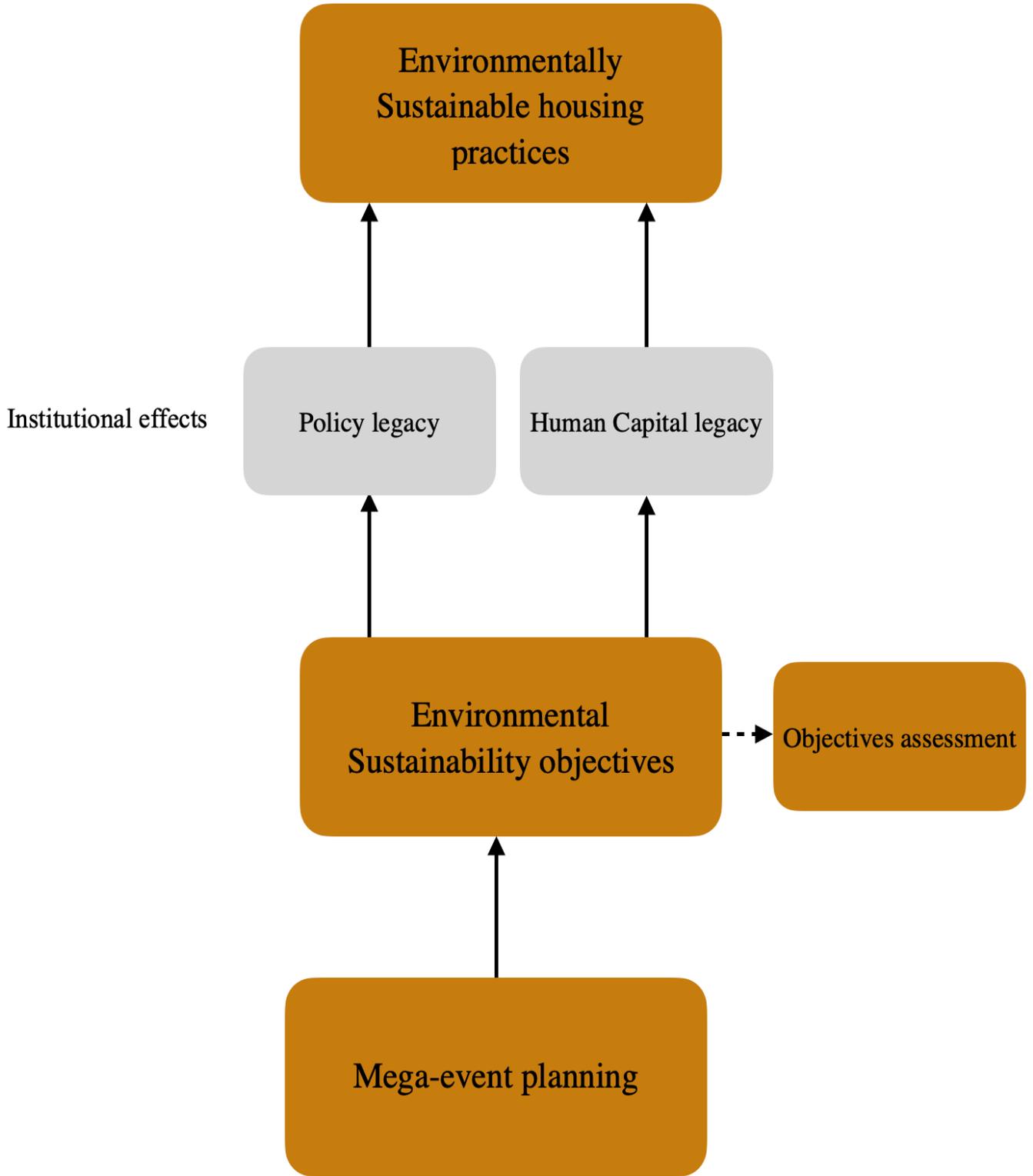


Figure 1: Conceptual Model. (Source: Author, 2021)

3. Methodology

3.1 Data collection instruments

To be able to answer the main research question an instrumental case study was used, a research method in which the case study is used not to further understanding about the case at hand, but to use it as a tool to understand a certain class (e.g., mega-events) (Cousin, 2006). This type of case study thus uses the case to be able to answer a more general research question. It was chosen for this research as the way environmental sustainability is being used in mega-event planning, and the institutional effects it has had on the host city, are context dependent. In order to generate a better understanding and be able to answer the research questions, understanding the context of a specific mega-event is important and thus a case-study approach was deemed the right fit for this study. A case study needed to be found that fulfilled several criteria:

- A mega-event with a particular focus, or perceived focus on environmental sustainability
- A host city with a clearly defined housing department
- For practical reasons, the host city preferably uses English as main language

When researching different types of mega-events, the 2010 Vancouver Winter Olympics stood out as a potential case to answer the research questions. The 2010 Olympics included environmental sustainability as one of their main objectives (VANOC, 2009), and promoted themselves as a particularly environmentally sustainable Olympics. This thus fulfilled the first criterion. Furthermore, the Vancouver municipality has a 10-year plan specifically for housing, and have specific housing policies (City of Vancouver, 2021a), thus meeting the second criterion. Vancouver, moreover, is an English-speaking city, meaning it meets the third criterion. Furthermore, the 2010 Vancouver Winter Olympics fits the description of a mega-event by Müller (2015b) and thus the 2010 Vancouver Winter Olympics were chosen as case study for this research. For this research, 5 semi-structured interviews have been conducted to try to answer the four sub-questions. A literature research has been used to put the answers of the participants into context, and to be able to go from the specific to the general. To guide the interview in such a way that the answers given can help to answer the research questions, it is needed to have an outline of the questions ready beforehand (Longhurst, 2016). The questions need to allow for open responses, such that the interviewees can express themselves in their own words. This will be valuable to answer the research questions as it will allow the discussion of issues that were not discovered through the literature research. Furthermore, it ensures in-depth answers to gain a better understanding of underlying mechanisms of institutional effects.

3.2 Recruitment of participants

Seeing as semi-structured interviews were chosen for this research, participants need to be recruited who can help with answering the relevant research questions. The participants thus need to be knowledgeable about the institutional field of housing practices, and how this changed due to the 2010 Olympics. For this research three types of possible participants have been identified:

- Participants who were involved in the planning of the 2010 Vancouver Winter Olympics and are/were active within the field of housing practices within Vancouver after the mega-event.
- Participants who were not involved in the planning of the 2010 Vancouver Winter Olympics but are/were active within the field of housing practices within Vancouver after the mega-event.
- Participants who have researched housing practices in Vancouver and/or issues relating to the environmental sustainability of the 2010 Olympics.

To recruit these participants, I used LinkedIn to identify possible participants, and searched for researchers who have published about the Olympics and the housing practice in Vancouver. After a list of possible participants had been made, I sent the list to a lecturer who has worked in the housing department of the municipality of Vancouver. This allowed for easier contact with the participants that they knew. Some of these participants referred me to other possible participants. This snowball technique has been referred to as a form of convenience sampling (Geddes, et al., 2017). The housing practice is a sector within the spatial planning sector and seeing as this research uses one city as case study, the population is relatively small. In total five interviews have been conducted. Five interviews can be deemed sufficient both due to time-constraints and because of the relatively small population, however more participants would have reduced the probability of bias in the results.

3.3 Ethics

For the use of literature research there are few ethical concerns, as I have used freely available papers and reports. As to the semi-structure interviews, it is important to first of all get informed consent from all interviewees (Whiting, 2008). The data gathered through the interviews has been anonymised in such a way that the data is still useable, but their identity cannot be recovered through the data. Once the research has been completed, the recordings, which have been stored in a secure folder, will be destroyed so that the recordings cannot be used to identify the participants. As to my positionality in relation to the research, the only connection to the Vancouver Winter Olympics of 2010 would be that I lived in Canada for two years when I was younger. This could potentially influence the way I approach the participants.

3.4 Data analysis scheme

The data coding scheme has been made deductively beforehand and represents how the interviews were analysed. The interviews have been coded with the Atlas.ti software. The scheme starts at the general theme of analysing institutional effects of environmental sustainability during mega-event planning on the housing practice. This theme can be divided into three codes, which will be used to analyse the interviews in a structured manner. Each of the three codes has been subdivided into two sub-codes, namely policy and human capital, which have both been dealt with in the questions and thus are likely to show up in the answers.

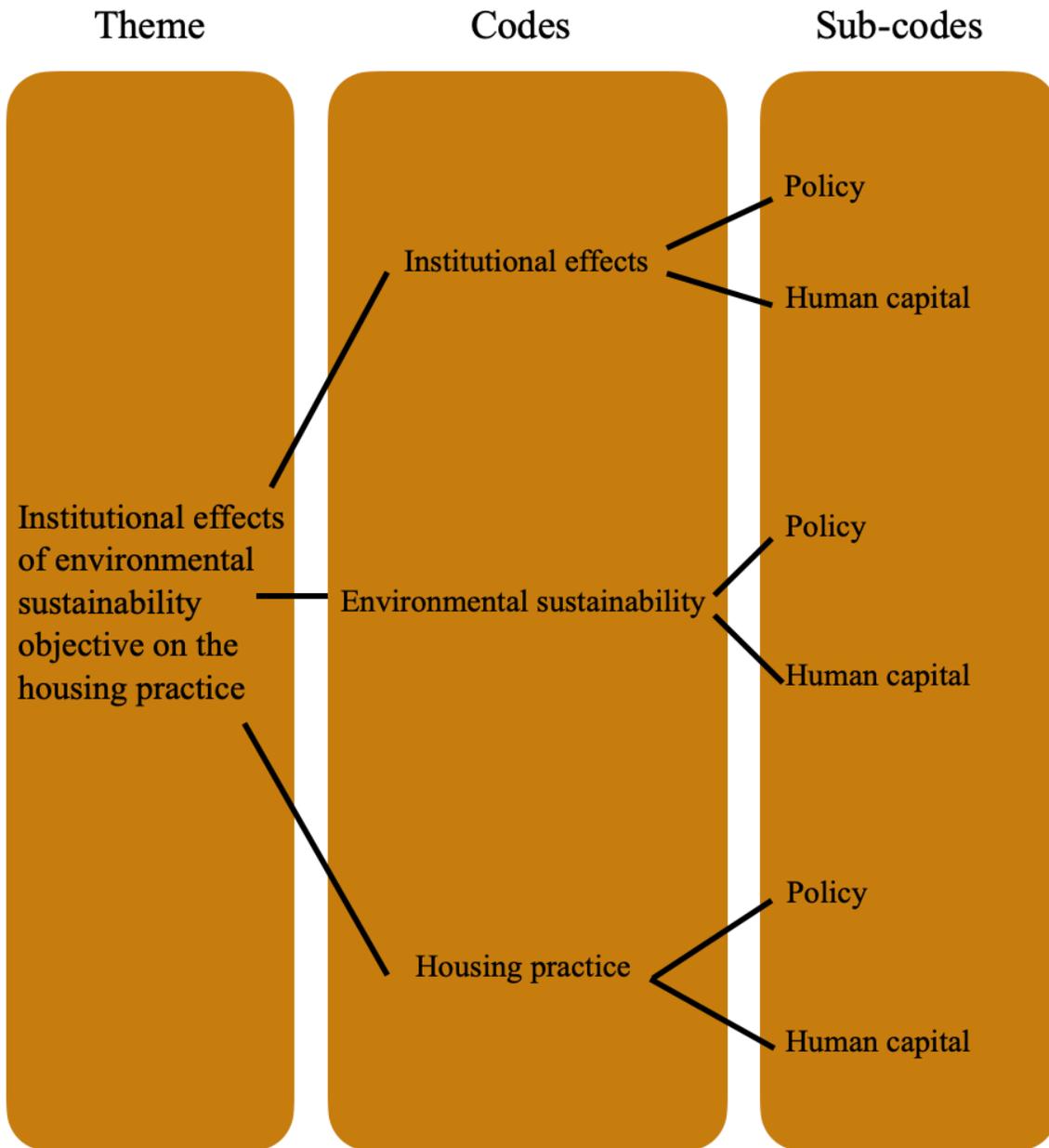


Figure 2: Data coding scheme (source: Author, 2021)

4. Results

4.1 Participants

Five individuals partook in this research as interviewees. All with diverse, yet relevant, backgrounds and relations to the topic. Table 1 showcases the relations the participants had to both the 2010 Olympic Games and the housing practice in Vancouver. The main findings of each interview are summarised in table 2.

Table 1: List of participants

Participant	Relation to the 2010 Vancouver Winter Olympics	Relation to the housing practice in Vancouver
P1	Involved in the bidding process and ambassador of the Games	Involved on the sidelines
P2	Researched the 2010 Games, involved in the Impact study, and part of impacts on communities coalition	Supervisor of research on housing, and through the impacts on communities coalition
P3	Volunteer	Housing planner at the municipality of Vancouver
P4	Involved in research about the sustainability side of the 2010 Games	Housing researcher
P5	Involved on the sidelines, but through their job involved in the planning of the Olympic Village	Works at the Green Building Programme at the Sustainability Department of the City of Vancouver

Source: Author (2021)

4.2 2010 Vancouver Winter Olympics

This research utilizes a case-study approach in order to generalize and be able to answer the research question. The 2010 Winter Olympics were the first time Vancouver hosted an Olympic Games, but it was not the first time the city tried to host either a Summer or Winter Olympics (VANOC, 2009). It is important to understand that the 2010 bid was a culmination of learning experiences from the other failed bids, as one of the participants mentioned, as the bidding process is a learning curve. Furthermore, another event is important to understand the narrative of the 2010 Games, namely the 1986 World Expo. One participant mentioned that the 1986 Expo made Vancouver realise that it could compete on a global level. This led to Vancouver investing more in making the city livable by creating denser neighbourhoods. The ambitions that came from the World Expo, and the confidence that Vancouver could be a global player eventually led to the 2010 Winter Games and adds to the narrative Vancouver has been carving for itself to be a livable and environmentally sustainable city. The 2010 Games were held in the Vancouver and Whistler area (seen in figure 3) from the 12th till the 28th of February (Small, et al., 2012). Richmond and Whistler were, together with Vancouver, the major places where the 2010 Olympics were held.

Table 2: Main results of the interviews summarised

Participant	Environmental sustainability of the event	Sensitivity of the housing sector to change	Policy effects of the 2010 Olympics	Human Capital effects of the 2010 Olympics
P1	Yes, environmental sustainability was embedded in all decisions, and LEED certification standards were used.	Limiting energy usage in housing through incorporating innovative techniques.	The Olympics were a catalyst for more ambitious policies surrounding environmental sustainability, such as reducing energy.	It gave Vancouver confidence in its abilities, created a community feeling, and expertise to work with certain technologies.
P2	The Olympics in themselves are not environmentally sustainable, but the 2010 Games were relatively environmentally sustainable.	Limiting energy usage of both the construction of houses and the heating of houses. Zoning to allow for more densification.	The Olympics had a catalytic effect and was used to leverage for more ambitious environmental policies. The event brought the <i>Greenest City Policy</i> .	Confidence in using certain sustainability models, understanding the used innovative technologies better, and created connections.
P3	They aimed to be environmentally sustainable, but the Olympics can never be environmentally sustainable in their current form.	The usage of houses has gotten more attention to become environmentally sustainable, including energy usage, through new design principles (e.g., passive design).	Stricter building codes to achieve more environmentally sustainable construction, and more stringent design guidelines (LEED), including dense zoning.	It created more awareness within the institutional system of the importance of environmental sustainability, knowledge of new solutions, and better connections.
P4	Not necessarily environmentally sustainable, but there was a lot of innovation and attention being paid to environmental sustainability.	The main focus of change has been on the construction side of housing.	The event pushed the <i>Greenest City Policy</i> , which is still used to push for environmental sustainability. It also showed that urban development policy and environmental policies can work together.	Showed that ambitious standards and goals can work out (confidence), but most knowledge building of technologies was outside of the country.
P5	It was an ambition that was engrained in the 2010 Games, but such a mega-event is difficult to be called environmentally sustainable.	Several aspects have changed: reducing energy usage both through new technology and design principles, densification, and connect new housing with slow transport modes.	The event pushed for stricter energy regulation, more densification through zoning, the use of LEED certification and later on new standards. The event could be used as leverage.	It created better connections, and because of the event a network of experts and staff was created that could depend on each other and understand how to utilize each other's expertise.

Source: Author (2021)



Figure 3: Map of the 2010 Vancouver Winter Olympics built legacy (Source: BIV, n.d.)

4.3 Environmental sustainability in the 2010 Olympic Winter Games

Since 2001 every host city of an Olympic Game is required to conduct an Impact Study (Chen & Henry, 2020) to analyse the impact the Games have had on the host city, as well as the larger region and country. The Olympic Impact study is based on 126 indicators around socio-cultural, environmental, and economic aspects (Perks, 2015). Environmental and sustainable development were seen as crucial by the IOC to include in the Olympic Charter, thus giving more attention to these aspects in future bids (VANOC, 2009). Vancouver promised to host the first sustainable

Olympics, including environmental sustainability. As VANOC (Vancouver Organising Committee) stated, environmental sustainability was a crucial part of the bid and of hosting the 2010 Games (2009). Environmental stewardship was seen as fundamental to hosting the Games and one of the main themes of the bid. However, several participants have called into question how environmentally sustainable an event of this size can be, with one participant stating:

“I mean, no, strictly speaking you can't really have a quarter of a million people flying into your city for a party and call it environmentally sustainable.”

But compared to previous Olympic Games all participants stated that the 2010 Games focused more on environmental sustainability. This thus in part reflects the commitment to the environment in VANOC's plans.

When it comes to how the 2010 Games incorporated environmental sustainability in the event, several participants mentioned how Vancouver made use of innovative technologies surrounding energy and building practices. As one participant mentioned:

“There was a lot of interesting innovation that was incorporated into the [physical] design of the buildings.”

The main aspect in which innovative technologies were used seem to be the Olympics Village and the competition venues, of which six were newly built (VANOC, 2009). This ambition for the use of new technologies is reflected in the aim to meet LEED (Leadership in Energy and Environmental Design) standards at the time. LEED has since been replaced by other tools, but as one participant mentioned, the Olympics pushed for the use of ambitious standards. However, as mentioned before, not all participants viewed the 2010 Games as environmentally sustainable, but no one mentioned greenwashing in this context. This is important to highlight as one participant mentioned that solely because the event was not environmentally sustainable does not mean the efforts can be called greenwashing. If the efforts were to be called greenwashing it would mean that the aim was to use sustainability merely as a way to win the bid, but not aim to incorporate it in the event. This, however, was not the case according to the participant. Nonetheless, it will be difficult to generalize this perception of greenwashing as the intent of involving environmental sustainability in a mega-event is case-specific.

4.4 Environmentally sustainable housing

As mentioned in section 2.1, the housing practice is a critical sector for a city to become more environmentally sustainable (Heffernan, et al., 2021). This has been reflected by several participants, who deem the housing practice to play an essential role in reversing climate change. The two aspects that came up during the interviews in which the most change has happened when it comes to housing in Vancouver, are the energy usage of homes and zoning. When it comes to energy in housing heating and cooling systems are a major part in limiting emissions (Priemus, 2005), which is reflected in the responses of several interviewees. The housing sector in Vancouver is aiming to limit energy usage through the use of smarter building practices such as *passive house design*, as mentioned by one of the participants, which is used more often. As researched by Dan et al. (2016), passive house design aims to limit energy consumption within homes through techniques such as smart orientation design and insulation. Secondly, zoning has seen changes to limit emissions in Vancouver over the last decade. As one participant stated:

“...the zoning has changed quite a bit as well, [to] zoning that allows for densification of housing.”

Densification is seen as one of the prominent strategies to ensure ecological modernization when it comes to urban development (Næes, et al., 2020). Thus, by changing the zoning to push for more densification, the city is greening the housing practice.

4.5 Institutional effects of the 2010 Vancouver Winter Games

As mentioned before, zoning and energy usage are the two aspects of the housing practice that have seen the most change over the last decade. This section will incorporate these two aspects into the narrative of the 2010 Olympic Games, along with other institutional effects. This research focusses on both policy effects and human capital effects, as forms of institutional effects. This section will firstly go into the policy effects, followed by the human capital effects.

4.5.1 Policy effects

All participants mentioned policy changes that occurred due to the Olympic Games. An important role the 2010 Games plays in changing policy is through event leveraging. As one participant put it:

“...changes have occurred at the policy level in part, because they were able to leverage the 2010 games.”

The event could be leveraged by policy makers or other stakeholders to push for more ambitious environmental policies because of the strides that were made during the event around environmental innovations. One participant mentioned how the Games showed it was possible to include environmental ambitions with urban development and have the two work together. Whereas before the idea was that the two were mutually exclusive. It thus brought in a new train of thought in which environmental policies could complement urban development and vice versa. By using the 2010 Games as an example, it could be used to leverage these changes and thus change policies reflect this new thought.

Furthermore, the 2010 Games were seen as catalytic by several participants in that it pushed environmental policy to be more ambitious and keep the ball rolling. Vancouver was already a city that incorporated environmentalism in its ambitions and policies before the Games, but the 2010 Olympics put a global spotlight on Vancouver. This made the city want to push its environmental ambitions further as one participant mentions:

“The Olympic spotlight, it highlighted, it delivered on it, and it helped provide momentum into the future.”

This comment reflects how the focus on environmental sustainability had a catalytic role in the narrative of environmental sustainability in Vancouver. It did not introduce environmentalism to the city, but it forced it to aim higher and improve environmental policies. However, during the planning of the event, policies were instated that did not look to the future but focused more on solving a problem in a quick manner according to one participant. Due to unwise choices, and the economic crisis of 2008, certain aspects did not work out as planned. In order to fix this, policies

were created to deal with these problems. The event thus also created policies that were quick problem-fixes instead of future forward to ensure environmental sustainability in the future.

As mentioned before, the energy and zoning sides of the housing practice have seen the most change over the last decade in Vancouver. Both have also been mentioned in relation to the 2010 Olympic Games by participants. When it comes to energy, the Olympics utilized new technologies in their venues and the Olympic village, including capturing thermal energy from the sewage (City of Vancouver, 2021b). Many of these technologies are now standard in the building process of housing in Vancouver as they have shown to be effective ways to reach ambitious energy standards. According to one participant, it showed politicians you can be ambitious and can experiment with innovative energy approaches, such as district energy systems. This is furthermore reflected in the Greenest City policy document, which was inaugurated for the Olympic Games, and has continued to be influential in drawing up ambitious policies noted one participant. This document consists of ten goal areas that all fit in the general aim of zero carbon, zero waste, and healthy ecosystems (City of Vancouver, 2021c). Among these goal areas is Green Buildings, which aims to limit electricity and natural gas usage by improving the environmental performance of buildings. Zoning is likewise incorporated in the area of Green Transportation (City of Vancouver, 2012) by creating compact and dense neighbourhoods that encourage walking, cycling, and transit usage. The 2010 Winter Olympics was used to leverage the implementation of this document which can be seen as a policy effect of the event.

4.5.2 Human Capital effects

An event can also have institutional effects in the form of human capital. One of the main forms of human capital mentioned by the interviewees was confidence. Although confidence is usually not included in definitions of human capital, it is, as stated by Becker (1993), an important aspect of increasing human capital and thus will be discussed here. In entrepreneurship science, confidence is seen as an essential aspect of a successful venture emergence (Dimov, 2010). Confidence means that someone believes an opportunity is feasible and that it can be utilised, also when it comes to the believe in their own abilities. When relating this to the housing sector, the confidence from the 2010 Games creates the belief that similar ambitions can be achieved. By seeing that a mega-event could incorporate ambitious environmental goals and technologies, it fostered a confidence that this could be continued and thus to strive for ambitious environmental standards. As one participant stated:

“...it gave Vancouverites the collective self-confidence that Vancouver could play on the world stage without having to boast.”

Another human capital effect the 2010 Olympics have had on the housing practice in Vancouver, is that it created connections that ensure more effective communications in the future. Connections or networks are often considered to be social capital (Ostrom, 2009), however, it is connected to human capital in the sense that it requires personal network skills (Kaplanidou, et al., 2019). The 2010 Olympics forced not only departments and organisations to work together, but also with cities surrounding Vancouver. Seeing as several events were held elsewhere, such as Whistler, coordination was key in creating a successful event. The event forced people to work together in a short time period to achieve a common goal, which fostered furthering of network skills and created connections. However, when it comes to skills surrounding innovative

techniques in the housing sector, one participant was skeptical about the degree of skill learned from the event. They stated:

“So, they used a German system of capillary heating and cooling. Pipes that would emit essentially very thin cool mist. But that meant that we didn't have the capacity to manufacture that in Canada or the United States. So, we had to ship it over from Germany.”

Because many of the technologies were created overseas, the skill was also fostered overseas and not in Vancouver. It is thus essential to manufacture these new technologies locally for the host city to gain the extra human capital in skills after an event. However, another participant stated that the Olympics did add expertise and created the opportunity to build a network of experts that could work together more efficiently and build on each other's knowledge.

“We would have never established our relationship and built a staff expertise and a community of engineers and architects and financiers and insurers that are understanding this language, without the Olympics.”

It thus might not have led to added human capital when it comes to the manufacturing of certain technologies, however, it did add to staff expertise that learned what tools worked, which did not (e.g., LEAD certification did not help with decarbonisation), and who to involve in future projects because of their understanding of certain topics. The 2010 Olympics can be seen as a learning school for future projects, and for furthering working relations to use the available expertise efficiently in the future.

5. Conclusions

Mega-events require significant capital investments and thus have to be well-thought-out and planned. It is often argued that they have a catalytic function for the host city, which would justify these investments. Over the years, environmental sustainability has become an important aspect of mega-event planning. This research aimed to analyse the institutional effects such a focus on environmental sustainability in mega-event planning has on environmentally sustainable housing practices. Housing is often argued to be at the forefront of limiting emissions to limit the effects of climate change. This makes it important to understand what role a mega-event can play in furthering this shift towards environmentally sustainable practices. Through a case-study of the 2010 Vancouver Winter Olympics, this research has tried to answer four sub-questions by conducting five semi-structured interviews. When it comes to the first sub-question of how environmental sustainability was applied in the planning of the Games, it was incorporated by setting ambitious goals and the use of innovative technologies to decrease emissions. However, even though a mega-event such as the 2010 Games includes environmental sustainability in a majority of decisions, in its current form it is difficult to say a mega-event can be environmentally sustainable. The second sub-question was about how the inclusion of environmental sustainability in the planning of the Games fits into the narrative of the host city. The fact that environmental sustainability was an important part of the 2010 Games is not surprising seeing as Vancouver included sustainability in many of its decisions before already. It thus fits in the narrative of a city that was already aware of the challenges around climate change and was actively trying to limit the effects. It can thus be argued that the level of inclusion of environmental sustainability in mega-event planning is reflective of the narrative of the host city around the topic.

The third sub-question looked into what aspects of the institutional system pertaining to housing practices, appear to be most sensitive to change because of a focus on environmental sustainability during the mega-event planning process. When looking at the housing practice in particular, energy policy and zoning have seen the most change because of a focus on environmental sustainability during the 2010 Games. This follows from the use of ambitious technologies during the Games, which later became standard in housing developments as the Olympics gave officials the confidence that it could be used. The event can be leveraged to provide a stronger argument of why to aim for higher standards and greener technologies, which is in line with the findings of several researchers mentioned in the theoretical framework (O'Brien & Chaplin, 2008; Ziakas, 2014). It can thus be argued that a mega-event can be used as experimentation ground to provide confidence for more ambitious policies and technologies to be used afterwards.

To answer the fourth sub-question of how the housing practice is influenced by the environmental sustainability rhetoric in the host city, it needs to be acknowledged that environmental sustainability was an important part of the housing practice in Vancouver before the event. It thus depends on the existing ambitions as to what types of advancements a mega-event can enable. In Vancouver environmental sustainability was already incorporated in most decisions, however, the Olympics pushed this to become more ambitious. Mega-events can be used to have a catalytic function to push an environmental agenda further as it brings more attention to the topic and provide momentum. However, when it comes to human capital effects, the 2010 Games did not add to the skill capital surrounding the manufacturing of innovative techniques. A lesson that can be learned from this is that if a city aims to use a mega-event to add skill capital, it needs to ensure the skills can be fostered in the city or surroundings. But

organisationally the Games did add both confidence and connections, which can enable more efficient and ambitious strategies in the future.

This study utilized five semi-structured interviews to answer the main research question. Five participants was deemed satisfactory for this research due to both time-constraints and a relatively small population. The recruitment requirements were kept relatively wide to ensure enough willing participants could be found. This can lead to varying answers and due to the small sample size can cause an overrepresentation of certain views. Thus, future research should be done with a larger sample to provide more evidence for the found conclusions or disprove them. It is thus important to keep in mind that the results of this research represent the views of a small sample and can highlight outcomes that might be less important to the larger population. This research is explorative in nature and can thus serve as a foundation for future research, but the outcomes cannot be taken as general laws due to the small sample. Using semi-structured interviews allowed the participants to lead the direction of the interview, which provided new insights and enabled them to share their own experiences. Future research could focus on different mega-events that had a focus on environmental sustainability to analyse what role the local context plays and how it affected the respective housing practices. Furthermore, future research could focus on the way in which the narrative of the host city before the event influenced the narrative of the event itself, and how the event influenced the narrative of the city after the event. As became evident in the interviews is the environmental sustainability focus during the 2010 Games inseparable from the narrative that Vancouver has carved out for itself. Without a previous ambition to become a green city, Vancouver would not have pushed itself to host an as environmentally sustainable Games as possible, which could have led to different institutional outcomes for the housing practice.

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Appendix

Appendix 1: Interview Guide

Introduction

Welcome! Thank you for partaking in this interview. Before starting with the interview, I need to ask for your consent of taking part in this interview. Your answers will help me in answering my research questions for my bachelor thesis. It is about the impact a focus on environmental sustainability during a mega-event such as the 2010 Vancouver Winter Olympics, can have on environmentally sustainable housing practices within the host-city. You can stop the interview at any point during the interview and withdraw your consent at any point during or after the interview. Your answers will be confidential and will be anonymised.

I also need to ask for your consent regarding recording this interview. The recording will solely be used to help in transcribing the interview, which will help me in answering my research questions later on. As with your previously given consent, you can withdraw your consent about the recording of this interview at any point during or after the interview.

If you have any questions, you can ask them now, or at any point during the interview.

Positionality questions

Before diving into the questions relating more specifically to my research questions, I want to ask you two questions regarding your positionality in relation to the topic. It is up to you to decide how much you are willing to share, and if you are not comfortable with sharing anything, you do not have to share anything.

1. What is your professional relation to the 2010 Vancouver Winter Olympics?
 - a. Guiding questions:
 - i. Were you involved in the planning of the 2010 Vancouver Winter Olympics?
 - ii. Have you researched the 2010 Vancouver Winter Olympics?
 - b. In case of no professional relation to the 2010 Vancouver Winter Olympics:
 - i. No need to share anything, but if the participant wants to share something they deem to be relevant, allow them to speak about it.
2. What is your professional relation to the housing practice in Vancouver?
 - a. Guiding questions:
 - i. Are/Were you involved within the municipality with the planning of new housing developments in Vancouver?
 - ii. Are/Were you involved within the municipality with the planning of new policy regarding housing developments in Vancouver?
 - iii. Have you done research about housing development in Vancouver?
 - b. In case of no professional relation to the housing practice in Vancouver:
 - i. Allow them to share anything regarding the topic that they want to share.
 - ii. If no relevant relation is present with both the housing practice in Vancouver and the 2010 Vancouver Winter Olympics, the interview can be stopped as they do not fit the participant profile. Thank them for their time and explain why the interview can be stopped.

Question related to the 2010 Vancouver Winter Olympics

3. Would you say that the 2010 Vancouver Winter Olympics were environmentally sustainable?
 - a. If yes, in what ways?
 - i. In environmental standards.
 - ii. In energy consumption.
 - iii. In promoting environmental sustainability.
 - iv. In the planning process. (e.g., through having it as an important objective)
 - b. If no, why not?
 - i. Greenwashing.
 - ii. Energy consumption.
 - iii. Not incorporated (enough) in the planning process.
 - iv. No/not enough environmental standards.

Questions relating the 2010 Olympic Games to the housing practice in Vancouver

4. Do you think the 2010 Olympic Games influenced environmental policies regarding the housing practice in Vancouver?
 - a. If yes, how?
 - b. If no, why not?
5. Do you think the 2010 Olympic Games added human capital to the housing practice in Vancouver?
 - a. If yes, what types?
 - b. If no, why not?

Questions related to environmental sustainability

6. In your opinion, did the 2010 Vancouver Winter Olympics add to the debate around environmental sustainability in Vancouver?
 - a. If yes, in what way?
 - i. More attention
 - ii. Accelerated it
 - b. If no, why did it not add anything?
 - i. Because it was more greenwashing
 - ii. Did not offer practical solutions or different ways of thinking

Questions related to the housing practice in Vancouver

7. What role does the housing practice play within the environmental sustainability debate in Vancouver? Is it a front runner, or is it lagging behind?
 - a. Guiding questions:
 - i. Is it promoting environmental sustainability in the city?
 - ii. Is it showing new possibilities that can be used in other sectors?
 - iii. Is it not influencing it? Why not?
8. Which aspects of the housing practice in Vancouver have seen the most change the last decade?
 - b. Follow up with how these aspects have changed.
 - i. Less/More environmental rules.

- ii. Less/More attention to economic issues.
- iii. A shift in focus.
- c. Why have these aspects changed?

Closing

These were the question I had prepared to ask. If you want to share anything else or want to ask any question, feel free to do so now, or you can always contact me later on.

For now, I want to thank you for participating in my research. Your input is very valuable for my thesis!

Appendix 2: Relation interview questions and research questions

Question 1

Would you say that the 2010 Vancouver Winter Olympics were environmentally sustainable?

This question aims to get an insight into how the participants view the 2010 Vancouver Winter Olympics, and through follow up questions the role environmental sustainability had in the Olympics. It is thus connected to the first sub-question in that it aims to clarify the role of environmental sustainability in this specific mega-event. It is also important to understand how the participants view the event, as if they do not view the 2010 Olympics as environmentally sustainable, it is unlikely that the event had an effect on environmentally sustainable housing practices.

Question 2 and 3

Do you think the 2010 Olympic Games influenced environmental policies regarding the housing practice in Vancouver?

Do you think the 2010 Olympic Games added human capital to the housing practice in Vancouver?

These questions pertain to the institutional effects the Olympics could have had on environmentally sustainable housing practices. As mentioned in the theoretical framework (section 2), are policies and human capital two types of institutional effects that can be expected to arise out of a mega-event. Both questions are directly related to the main research question, and to the third sub-question. How both policies and human capital have changed due to the 2010 Olympics gives an indication as to what aspects of the housing sector are most sensitive to change due to a mega-event. Furthermore, they provide an answer to the main research question as both are types of institutional effects that could have occurred due to a mega-event.

Question 4

In your opinion, did the 2010 Vancouver Winter Olympics add to the debate around environmental sustainability in Vancouver?

This question helps to understand the place of a mega-event within the environmental sustainability debate. It is important to understand the place in a specific case, as this influences the outcomes and thus how to generalize the findings of the interview. Furthermore, through follow up questions it leads to more information on the debate in the specific case, and thus can give insight into conditions that shaped the institutional effects found throughout the interview. It helps to understand the narrative around environmental sustainability in Vancouver in relation to the 2010 Games (sub-question 2).

Question 5 and 6

What role does the housing practice play within the environmental sustainability debate in Vancouver?

Which aspects of the housing practice in Vancouver have seen the most change the last decade?

The last two questions pertain to the housing practice in the specific case. These questions aim provide answers for the second, third, and fourth sub-questions, together with question four. By understanding the role the housing practice has played within the host city around environmental sustainability, will help understand how sensitive the housing practice is to change, and how both the housing practice and the environmental sustainability debate are interrelated. These questions follow question four because before being able to understand the relation between the housing practice and the environmental sustainability debate, the debate itself needs to be understood. Seeing as the aim of this research is to understand the effect of a mega-event on this debate, the debate needs to be placed in the context of the event, which is why question four precedes the last two questions.

Appendix 3: Link to previous courses

This method section concludes with discussing the link between the used methods and previous course in the bachelor Spatial Planning and Design at the RUG. The two main courses to which the research methods can be linked are *Introduction to Academic Research (IAR)* and *Methods of Academic Research (MAR)*. IAR dealt with writing a research paper based on a literature review and seeing as this research utilizes this method the skills learned during IAR will be used in this research. The interview skills and analysis skills have been dealt with during the MAR course, thus linking the second method used in this research to this course. Several other courses have also required skill development when it comes to research, such as *Mobility and Infrastructure Planning* and *Water and Planning*. The institutional side of this research has been discussed during the course *Governance Dynamics*.

This will be valuable to answer the research questions as it will allow the discussion of issues that were not discovered through the literature research.