CZECH UNIVERSITY OF LIFE SCIENCES PRAGUE

FACULTY OF ENVIRONMENTAL SCIENCES

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Sciences

DISSERTATION THESIS

Sustainable Development In The Context Of Planned Mega-Events, A Forward-Looking Analysis Of The Olympic Games.

Author : Corey Harrison Cowger

Supervisor : Doc. Peter Kumble, PhD

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Czech University of Life Sciences Prague
Faculty of Environmental Sciences

DIPLOMA THESIS TOPIC

Author of thesis:	Corey Cowger
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Thesis supervisor:	doc. Peter Kumble, Ph.D.
Supervising department:	Department of Land Use and Improvement
Language of a thesis:	English

Thesis title: **Sustainble development in the context of planned mega-events, an analysis of the olympic games.**

Objectives of thesis: The hypothesis of this thesis project is to delve into the key elements of what makes for better sustainable practice and planning based on previous Olympic Festivals. The Olympic Games - a Mega Event - have in recent years worked to achieve many of the principle elements of sustainable planning and development, from housing, to transportation infrastructure, to minimizing impacts on built and natural systems in each of the locations - Winter and Summer games. However, do they actually achieve these lofty goals or are they simply nice ideas that do little to affect real change? This thesis will explore these issues using an extensive literature review as the primary form of research.

Methodology: To conduct a thematic network analysis based Literature Review assessment of sustainable development in the context of the Olympic Games.

The proposed extent of the thesis: 80 pages

Keywords: Landscape urbanism, Sustainable development, Olmypic games, Mega-events, urban planning

Recommended information sources:

1. Costanza, Robert with R. d'Arge, R. deGrroot, S. Farber, M. Crasso, K. Limburg, S. Naeem. R. O'Neill, J. Paruelo, R. Raskin and M. van den Belt. 1997. The Value of the World's Ecosystem Services and Natural Capital. Nature, 387, 253-260.
2. Spirn, Anne W. The Granite Garden. in: Center 14: On Landscape Urbanism, Dean Almy, Ed. 2007. University of Texas Austin, School of Architecture
3. Thayer, Robert L. Jr. 1994. Gray World, Green Heart: Technology, Nature, and the Sustainable Landscape. Wiley and Sons, New York: NY.
4. World Commission on Environment and Development. 2004. "Towards Sustainable Development", pp. 53-57. In The Sustainable Urban Development Reader, Wheeler, S.W., and Beatley, T, Editors. Routledge, New York.

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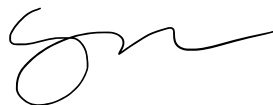
Authors Declaration

I hereby declare that this thesis was written solely by the author under the direction and with advice from the thesis supervisor — Peter Kumble, PhD. All sources and literature the author acquired information from, has been cited in good faith and is beholden to the academic guidelines of the Czech University of Life Sciences in Prague.

—**Corey Harrison Cowger**

Acknowledgements

Abstract

Based on the research compiled by the United Nations in multiple publications, the world's urban populations are projected to massively increase in size over the next few decades. Changes to urban form, structure, and usage are incredibly important areas of study to best deal with the expected issues facing urban landscapes as result of these population shifts. Mega-events, specifically the Olympic Games, have long been promoted for their ability to catalyze and shape urban infrastructure projects. With the expected shift towards socio-ecological cities through sustainable development, the Olympics offer an interesting case study as to the *best* role mega-events should play in the transition towards socio-ecological cities and in effect in meeting the changing needs of urban spaces. This thesis will explore this function, and further investigate how the Olympic Games fit within the goals of Agenda 2030, the United Nations latest publication on Sustainable Development.

Urban Development, Landscape Urbanism, Sustainable Development, Socio-ecological Cities, The Olympic Games, Mega-events, Catalyst, Agenda 2030

Podle výzkumu shromážděného Organizací spojených národů v několika publikacích se předpokládá, že se světové městské populace v budoucích desetiletích výrazně zvýší. Změny v městských formách, strukturách a využití jsou velmi důležité oblasti pro studium s cílem co nejlépe řešit očekávané problémy spojené se změnami v rozložení populace. Mega události, konkrétně Olympijské hry, se již dlouho propagují pro jejich schopnost dát do pohybu a tvarovat městské infrastrukturové projekty. S předpokládaným posunem směrem k socioekologickým městům díky udržitelnému rozvoji se Olympijské hry nabízí jako zajímavý příklad k studiu nejlepší role, kterou by mega události měly zaujmout při cestě k socioekologickým městům a současně vyřešit měnící se potřeby městských prostorů.Tato práce se zaměří na výše zmíněnou funkci a bude také dále zkoumat, jak se Olympijské hry zakomponují do cílů Agendy 2030, která je poslední publikací Organizace spojených národů ohledně udržitelného rozvoje.

Rozvoj Měst, Landscpae Urbanism, Sustainable Development, Socioekologickým Městům, Olympijské Hry, Mega Události, Agendy 2030

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Contents

1. Introduction

In the summer of 2016, the thirty-first summer Olympiad was held in the city of Rio de Janeiro, Brazil. Amongst the artistry, athleticism, and media spectacular which washed over the city in weekly waves of celebration and competition. Another very different narrative was also maturing. To summarize, the media response was not entirely kind nor celebratory, many outlets and pundits have begun to question the Games size, scale, impacts, and claim of sustainability. These concerns are not new nor have they been ignored in the history of the Olympic Movement. However, these criticisms have apparently not been addressed adequately enough by the International Olympic Committee (IOC). For as soon as the sea of Olympism retreated from Rio. Waves began to stir around Pyeongchang, and in a similar fashion to other Olympic host cities; Rio has not come through the Olympic experience unchanged and instead faces future challenges. Namely of what to do with the infrastructural flotsam and jetsam now that the Games have concluded.

This vexing challenge has plagued the legacies of many an Olympic event, a requirement of selected host cities is that they agree to provision the infrastructure to hold the Festival. This requirement has, in recent history, been used by host cities for large-scale urban regeneration and infrastructural renewal projects (Smith, 2017). In essence, repurposing and reconstructing less desirable portions of the city into more desirable urban zones by way of the Olympics. As will be demonstrated in the following pages, this usage of mega-events to re-create and re-imagine urban spaces is not new. However, to the extent in which these events are used and their role in the global effort towards sustainable development is quite novel. Since the publication of the United Nation's (UN) Agenda 2030, cities are more than ever motivated, and in many ways expected, towards transitioning to being less industrial, more sanitary, and more intelligently designed while ecologically less impactful spaces. The lofty goals of sustainable development are resulting in some cities positioning mega-events to act as a catalyst for achieving these complicated transitions. Therefore it must be asked, what role can and should mega-events, such as the Olympics, play in this transition towards socio-ecological landscapes? The following pages will explore

the history of sustainable development theory, urban planning practices in regards to sustainability, and the role mega-events have historically had in urban planning. The focus will then pivot towards the Olympic games themselves; the history of the Games, policies, technical demands, and legacies of sustainability starting from the IOC's adoption of the term to the latest *sustainable games* —London 2012. This thesis shall conclude by addressing two concerns in regards to the previously mentioned central question posed by the author. Namely, in what context should the Olympics or any mega-events be used in regional or urban planning? And secondly, if it is accepted that the Olympics can have a place in urban planning, then, how and in what manner do the narrow technical demands of the Festival prove to be a limiting factor if it were to serve as a model for or to achieve the core elements of sustainable development?

2. Research Objectives

This masters thesis intends to examine the role of mega-events within the framework provided by the goals of sustainable development. Supplementary, this thesis also sets out to explore the relationship between mega-events and urban development. Specifically, how the Olympic games are used for urban regeneration projects. The following pages will also seek to establish the current and future sustainability of the Olympic Games based off of the legacies from past Games.

As a result of this research, it is expected that a broader understanding of the historical and current role of mega-events in urban planning will be established. This work is also expected to critically analyze the claims that the Olympic Games are useful as a model for sustainable development. This work has broader implications in shaping future research into sustainable urban planning processes and practices. Arguments for implications in the fields of nature conservation, economics, anthropology, ecology, event-planning, and global governance could also be made. Overall, the Olympic Games like many mega-events are emerging worldwide

cultural traditions which have extremely broad impacts in many fields of study. By better understanding the background and scope of the effects these events make in our society, we are better able to design future events.

3. Research Methodology

3.1. Methodology Introduction

In this chapter, the author intends to detail the entirety of the thesis research methodology. Specifically, the author will describe the aims, research methods, and research approach. As well as, the literature collection, selection, and analysis process. Lastly, the writer will explain any ethical considerations and research limitations discovered or faced as a result of undertaking this project.

3.2. Research Strategy

The objectives of this thesis are two-fold. Firstly, this thesis aims, with the use of existing literature, to investigate and establish the entwined history between Sustainable Development policy and theory with that of the Olympic Games. Secondly, this thesis aims to assess the viability of the continuance of The Festival in accordance with the parameters and goals for Sustainable Development detailed in the UN's latest publication, Agenda 2030.

3.3. Research Method

As a result of the type of data being used, the availability of novel data, and the expected lack of measurable and quantifiable outcomes. A qualitative approach was decided upon as being the best method to ultimately undertake. Due to the large amounts of literature gathered it was decided to utilize an analytical tool based on thematic measures, similarly to the methodological approach outlined in detail by Attride-Stirling in 2001. The approach is based on argumentation theory, in which

argumentation is the formulaic progression from data to warrant culminating in a claim (Toulmin, 1958). The methodological approach of thematic networks also has some basis and parallel similarity to grounded theory (Attride-Stirling, 2001).

Thematic network analysis is an inductive reasoning system designed to break large amounts of textual data into significant thematic levels. These thematic levels are then mapped in relation to one another. {Figure 1} The mapping is done in such a way that the underlying story can be thoroughly investigated along the fluid interconnectivity between the levels of uncovered themes. The thematic map then serves as an organized illustrative tool for the interpretation of the text (Attride-Stirling, 2001).

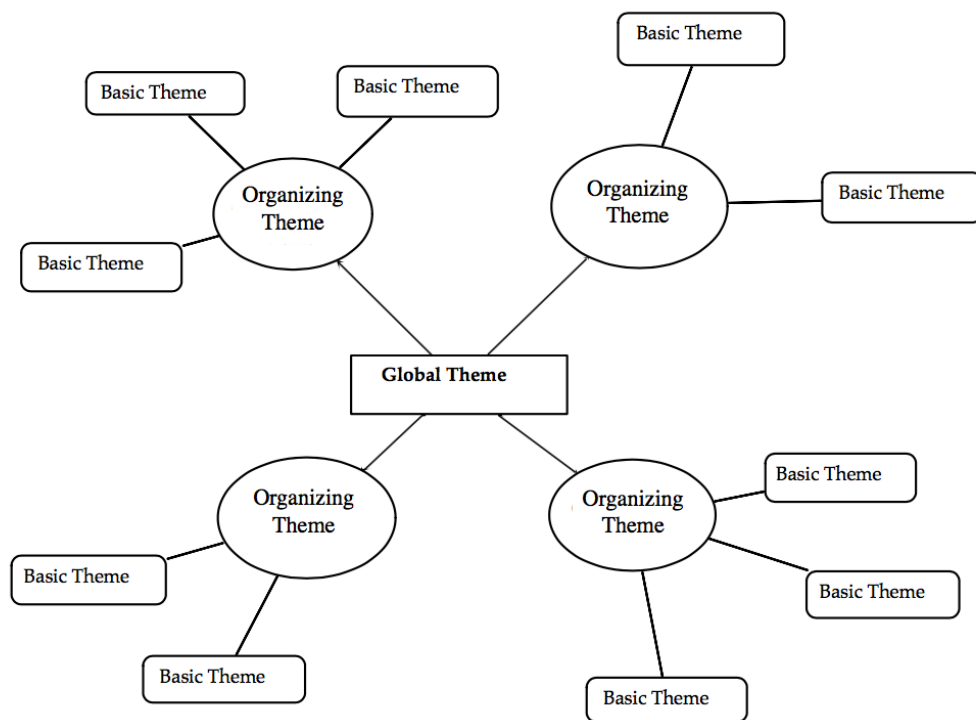Figure {1} Basic thematic network map, *Source: Attride-Stirling 2001*

3.4. Literature Collection Methodology

For this thesis, literature was the primary source for data. The literature material was sourced from a plethora of online databases, as well as from recommendations by the thesis supervisor. Literature was directly collected from many vetted online sources; specifically JSTOR, Web of Science, SCOTUS, and

Google.Scholar. Boolean searches were conducted using a variety of keywords and phrases of (Including various variations and not necessarily limited to) the following terms— Sustainable/Sustainability, Sustainable Development, United Nations, Brundtland, Mega-events, Olympic Games, Urban Development, Ecological Cities, City Forms, Urban Expansion, and Landscape Urbanism. Literature related to the reports and policies of intergovernmental and international organizations was directly accessed from their respected online databanks.

3.5. Literature Selection

Literature was downloaded from accredited and recognizable academic journals as well as published textbooks. The exception being of some historical documents and official reports which were sourced online from reputable sources. Literature was then sorted and summarized into a literature analysis report, where it was color-coded in its applicability to the original observation. The colour-coding was done in marking the article with a green, orange, or red tag next to the title making it easy to search and identify useful articles during the writing process. During the research process, literature was thoroughly investigated, and wildly unrelated materials (red tags) were mostly discarded. The author attempted to, when possible, use original source material over summarized or analyzed reproductions of such material. Thus literature search and selection was a constant and ongoing process during the preparation of this thesis.

3.6. Research Process

The author began research with a general observation in the late summer of 2016, during the height of the Rio de Janeiro Olympic Games. This observation was the result of media concerns regarding the size and sustainability of mega-events such as the Olympic Games. An initial literature search and analysis was performed to narrow down the scope of the project, eventually settling on the effect and role the Olympics have on sustainable urban development.

From that initial research, much more literature was accessed and cataloged and eventually coded and organized in the form of a thematic network map. (Appendices {A}{B} and {C}) This thematic map was then used as the basis for the final literature review. Finally, the literature review provided two lingering analytical questions that were further analyzed using existing literature sources. This analysis is the foundation of the results, future applications, and discussion sections of this thesis.

3.7. Literature Analysis

The literature analysis completed for this thesis was done in the form of a comprehensive literature review. The literature review was written based on the thematic organization obtained from the thematic network map in appendix {C}. Two analytical questions were formed at the end of the literature review process which supports the global theme described in appendix {B}. These questions serve as the basis for the results and discussion section of the thesis.

3.8. Ethical Considerations

There are no ethical considerations or concerns in regards to the rights and dignity of experimental subjects; human or otherwise. All measures were taken to maintain the intellectual rights and property of the literature and images sourced and cited for the purpose of this thesis. The author maintains that this thesis was written in good faith and with respect to all university regulations and academic expectations.

3.9. Research Limitations

As with any secondarily sourced academic work, there are certain unavoidable limitations. Firstly, the lack of originally sourced and gathered data by the author them-self. Secondly, the author was in some regards limited in academic

sources due to the lack of open-source materials. Third, while coding and thematic networks are fully accepted, vetted, and invaluable as an academic methodology. It is limited in its scope and in the way all inductive reasoning can be restricted. Due to the relatively small amount of data, inductive reasoning can produce generalized theories and conclusions (Denzin and Lincoln, 2005). Lastly, it must be noted that there are certain limitations when using sources directly from the IOC (with the exception of legal rules, organizational documents, and contractual demands), mainly the implicit bias the IOC has in ensuring a positive legacy for the Olympic Games. This limitation is discussed and addressed further in the Literature Review in the Sustainable Legacies Section. See page 49.

4. Literature Review

4.1. Introduction To The Literature

The Olympic Games have long brought fascination to sports fans, politicians, urban planners, and indeed the world since they were reintroduced in 1896. The Olympics have an inescapable draw that has lasted almost more than twelve decades now. There are many reasons for this, economic gains surely, however, one resolute draw is the idealism the games present. The Olympics are indeed the backdrop for dream making and ideals which bridge all languages and cultures (Shontz, 2002). For researchers, the idealism of the games is, at times, at odds with the realities the Games produce instead. These varied realities of the scale, impacts, and legacy of the Olympic Games has spawned a new wave of literature on the subject (Gold and Gold, 2017). This literature spans multiple academic disciplines from event management to sustainable development, and importantly requires a great breadth of interdisciplinary work to deal with the scale of global issues we now face. This literature review will extract meaning from a wide range of sources and disciplines to explore the larger narrative that encompasses the role mega-events have (and/or should have) in regards to sustainable development.

4.2. History And Early Criticisms Of The Term Sustainable Development

Sustainable Development, although not named or defined, has its roots in the 1972 meeting of the United Nations *Conference on the Human Environment*. This conference resulted in one of the most important documents for the future of the environment in the care of humankind prior to Brundtland. The UN Report from 1972, established first and foremost that our species Homo sapiens has reached a point in history in which the amount of our impact on the planet indicates our level of responsibility. The first proclamation being;

> *"Man is both creature and moulder of his environment, which gives him physical sustenance and affords him the opportunity for intellectual, moral, social and spiritual growth. In the long and tortuous evolution of the human race on this planet a stage has been reached when, through the rapid acceleration of science and technology, man has acquired the power to transform his environment in countless ways and on an unprecedented scale. Both aspects of man's environment, the natural and the man made, are essential to his wellbeing and to the enjoyment of basic human rights-even the right to life itself"* (United Nations: Stockholm, 1972).

In 1972, it became necessary not only to outline the fundamental and indeed interwoven relationship between humanity and the environment; but to state that without such a relationship the human rights and in fact the right to life becomes itself jeopardized. The Stockholm conference further outlined a set of twenty-six specific principles that should be implemented worldwide to better meet the needs of man and the environment as such issues then existed. These principles touch, amongst other things, the need for the states to create planning institutions for environmental resources, to direct science and technology towards solving the environmental issues that might affect humanity, and the need for increased environmental education. Including, as well, social concerns such as the de-escalation of nuclear arms and working towards eliminating apartheid and segregation. Importantly Stockholm also mandated the need for states to cooperate in a shared dynamic role in the protection and improvement of the environment. Saying in detail that, "Planning must be applied to human settlements and urbanization with a view to avoiding adverse effects on the environment and obtaining maximum social

economic and environmental benefits for all. In this respect projects which are designed for colonialist and racist domination must be abandoned" (United Nations: Stockholm, 1972). This principal tenet is in many regards quite important as Stockholm, and other UN Reports and meetings on the environment have been seen by some as reminiscent of western colonialism. As we move forward in addressing global concerns many see too much of the western worlds influence and some fear that environmentalism is indeed a subversive form of western colonization. This collusion is described powerfully and in brevity by Kathleen McAfee in 1999. She wrote that "contrary to the premise of the global economic paradigm there can be no universal metric for comparing and exchanging the real values of nature among different groups from different cultures, and with vastly different degrees of political and economic power" (McAfee, 1999).

Sustainable Development was developed conceptually, and then rapidly came to the forefront of international policy discussions as a result of the United Nations *World Commission on Environment and Development* in 1987. Otherwise known as the Brundtland Commission's *"Our Common Future"* or simply the *"Brundtland Report."* Where the Commission established the first attempt of a forward-looking set of development goals defined by a central tenant; "development that meets the needs of the present without compromising the ability of future generations to meet their needs" (WCED, 1987). This tenet is based on the Malthusian concept of diminishing resources in relation to the unchecked growth of populations. Despite its 18th century philosophical origin, the defined term did not reach peak popularity in its current state until 1987. It was not, surprisingly, the first usage of the phrase. The first usage originated in the subtitle at the international launch of the *World Conservation Strategy* in 1980 (Mebratu, 1998). It was with close work between the International Union for the Conservation of Nature (IUCN) and the World Wildlife Fund for Nature (WWF) (Tryzna, 1995), in which it was deemed prudent to "help advance the achievement of sustainable development through the conservation of living resources" (World Conservation Strategy, 1980). At this time it would appear that the IUCN and WWF indicate a clear preference of conservation-led development. This preference is an inherent oxymoron, as further discussed by

Redclift in 2005, and is noticeably absent in the *Brundtland Report*. Where Brundtland indicates a clear preference towards development regarding poverty reduction within the scope of limited resources. A domino effect in a way, in which it is seen that ecological and environmental concerns are based on problems of global inequality, not the other way around.

If Sustainable Development as a term reached its most poignant peak in 1987, such poignancy quickly disappeared by the time of the Rio Declaration of 1992. According to David Victor in 2006, the issue lies with the subversion of the term by special interests groups and corporations, instead of adhering to the central three tenets set by Brundtland of social justice, economy, and nature (Victor, 2006). In effect, a return to the argument presented by the WWF and IUCN document. Victor goes on to write that sustainable development policies set a standard for diplomatic processes "devoted to lengthening the international communities wish-list and not to the practical measures that are the hallmark of real policy making" (Victor, 2006). As shown by Victor, the term has gone from that of a forward-looking determinant goal in 1987 to apparent uselessness by 2006. A result of the division from the appropriation and usage of the term, as well as the lack of coherency regarding practical measures and standards for development. This trend can also be seen in the writings of Redclift and Mebratu in the 1990s as they tracked the, by then, many meanings and goals of the term based on whichever group was using it. Redclift in 1992, writes that the term is clearly anthropocentric in that sustainable development is about meeting the "needs" of both current and future human generations (Redclift, 1992). He goes on to break down how the term can be interpreted based on the emphasis of the sustained object. Green groups might argue that the term refers to nature, biota, natural resources. While economists and politicians can argue that it is economic goals that are in need of sustaining. In attempting to reach the various possible definitions of the what is sustainable development. Redclift lays out the later groundwork for his argument in 2005 that the term is an inherent oxymoron (Redclift, 2005).

Similarly, Mebratu writes that there are many "versions" of the term, sustainable development, in use at any one given time. Such versions include the Institutional (of the UN, IUCN, Businesses, etc.), Idealogical (about Eco-theology, Eco-Feminism, Eco-socialism, etc.), and Academic (Economists, Ecologists, Anthropologists, Sociologists, etc.) (Mebratu, 1998). These "versions" arise from what she describes as "various cross-cutting flaws" that encompass the understanding of the term —sustainable development. These cross-cutting flaws as described by Mebratu is more or less the oxymoron as described by Redclift and subversion described by Victor. All three conclude that the problem with the term even into the mid-2000's was a result of "trying to win the environmental debate, the emphasis of conceptual development has shifted from logical coherence to that of semantics. This shift, in turn, has led to fundamental conceptual flaws in most of the definitions" (Mebratu, 1998). All three also end their analysis of the state of sustainable development with the idea that all groups with an interest in sustainable development; must come together to adhere to a strong "logical coherency within the concept" (Mebratu, 1998).

4.3. UN Sustainable Development Agenda For 2030

In 2015 the UN met and passed a resolution on *"Transforming our world: the 2030 Agenda for Sustainable Development"* (UN General Assembly, 2015) effective as of January 1, 2016. This most recent resolution directly stems from the work in 2000 known as the *Millennium Development Goals* (MDGs) (UN General Assembly, 2015), *Agenda 2030* is the most recent worldwide agreement on sustainable development and consists of a series of 17 goals and 169 targets. It recognizes extreme poverty, less than 1.25 dollars a day, as the "greatest challenge and an indispensable requirement for sustainable development" (UN General Assembly, 2015). It is within a timeframe of fifteen years that the UN seeks to have all countries compliant and held accountable to the targets and goals of this resolution. Recognizing that the meeting in 2000 did not result in the expected outcomes the UN states; "They seek to build on the Millennium Development Goals and complete what they did not achieve" (UN General Assembly, 2015). These MDGs consisted of

eight general provisions; "including the eradication of extreme poverty, the provision of universal primary education, and the assurance of the equality of women" (Victor, 2006). These same goals reappear in the 2015 document, an apparent reattempt at refocusing the MDGs which is in the literature described as a "sprawling and incoherent plan" (Victor, 2006).

Furthermore, Victor writes that the only way to fix sustainable development is to follow "four courses of action: making a priority of alleviating poverty, dropping the environmental bias that has hijacked the entire movement, favoring local decisions over global ambitions, and tapping into new technologies to spur sustainable growth" (Victor, 2006). Such *"hijacking"* as has been similarly described in the works of Mebratu as cross-cutting epistemological flaws and as an oxymoron by Redclift. Victor goes further to describe that "progress on sustainable development requires success with economic development, in particular, poverty alleviation; the other two prongs of sustainability, environmental protection, and social justice, will lack force until basic living standards are improved" (Victor, 2006). Once again heralding back to the what Mebratu describes as founding a "logical coherency within the concept" (Mebratu, 1998).

The issue goes further as in *"Our Common Future"* sustainable development is not limited to simply the popular phrase that "Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs." The commission also stipulated the following two concepts, "the concept of 'needs', in particular the essential needs of the world's poor, to which overriding priority should be given; and the idea of limitations imposed by the state of technology and social organization on the environment's ability to meet present and future needs" (WECD, 1987). These two concepts are key to understanding whose needs must be fulfilled and to the context of how to meet those needs. It is apparent that such a limited scope of sustainable development has played a role in the mischaracterization of the term since 1987. Inherently, this mischaracterization has resulted in the loss of emphasis for meeting the needs of the world's poor (Barkemeyer et. all, 2014; Victor, 2006; Doyle, 1998).

Whether it is *hijacking* or mischaracterization, the derailment from addressing the needs of the most vulnerable and marginalized citizens has distinctly harmed the sustainable development movement.

It is this reasoning as to where the strength of *Transforming our world: the 2030 Agenda for Sustainable Development* is derived. Such strength comes from taking a strong stance on the eradication of poverty by 2030. Stating that, "All people must enjoy a basic standard of living, including through social protection systems," and that the first goal of this resolution is to "End poverty in all its forms everywhere" (UN General Assembly, 2015). In accordance with this goal, the UN acknowledges the pressing issue that has hampered sustainable development since 1987. The persistence of poverty and inability for all of humanity to meet its current most basic needs. The newest UN resolution is perhaps the strongest worldwide accord since Stockholm in 1972. By placing poverty first, in many ways back-benching environmentalism and by acknowledging "national ownership is key to achieving sustainable development" (UN General Assembly, 2015). The 70th session of the UN general assembly has stridently re-framed and focused the future of sustainable development policy.

Environmental concerns are, of course, an essential, indivisible part of sustainable development. However, sustainable development is not interchangeable with conservation nor the preservation of natural resources. The hijacking of sustainable development by multinational environmental groups, academics, and policymakers highlights the fears by developing countries that the developed world's concern would overshadow their interest in development (Victor, 2006). It is why the decision to highlight environmental concerns and degradation by the UN in 2015, as dependent on the eradication of poverty and inequality is particularly emboldening. Because, "Natural resource depletion and adverse impacts of environmental degradation, including desertification, drought, land degradation, freshwater scarcity and loss of biodiversity, add to and exacerbate the list of challenges which humanity faces" (UN General Assembly, 2015). One can argue, that almost all current environmental problems have arisen as a result of inequitable and unsustainable

human actions. Thus by addressing the conditions of inequality and the impoverished, the conditions of the environment can tremendously improve.

However, it is important to note the friction between development solutions to that of the needs of the impoverished as well as environmental causes. The solutions to these two separate but connected issues might be incongruent to one another. For example, Victor (2006) describes the elimination of carbon polluting energy production in industrialized society as a goal towards halting climate change. However, for the billions of people who lack electricity, real progress can be seen in the implementation of such existing polluting technologies (Victor, 2006). This back and forth is seen in the past and current concerns over sustainable development as a practice. This bifurcated battle between interests is described as north versus south, as industrialized versus non-industrialized, as wealthy versus poor, and even colonizer versus indigenous (Redclift and Sage, 1998; Doyle, 1998; Victor, 2006). However, there is an issue of scale when looking at the interests of whomever the two groups are. For certainly addressing global climate change and the provisioning of electricity to a village are not equitable in scale as end-goals. They are, however, both achievable. Thus, to move forward in tackling the real concerns of both the poor and environmentalists requires tandem, creative and cohesively strategic work.

Environmentalism is of course not lost within the pages of the UN's 2030 agenda. Goal 12 is to "ensure sustainable consumption and production patterns", Goal 13 is to "take urgent action to combat climate change and its impacts", Goal 14 to "conserve and sustainably use the oceans, seas and marine resources for sustainable development", and Goal 15 "protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss" (UN General Assembly, 2015). The UN recognizes that sustainable development is rooted in the conditions and restrictions of our shared environment. As such, the targets involving environmental concerns involve mostly halting or greatly decreasing the worst environmentally damaging processes, as well as, reaching neutrality between

development and environmental damage and promoting beneficial ecosystem services, as seen in the following targets 15.1-15.5.

15.1 By 2020, ensure the conservation, restoration and sustainable use of terrestrial and inland freshwater ecosystems and their services, in particular forests, wetlands, mountains and drylands, in line with obligations under international agreements

15.2 By 2020, promote the implementation of sustainable management of all types of forests, halt deforestation, restore degraded forests and substantially increase afforestation and reforestation globally

15.3 By 2030, combat desertification, restore degraded land and soil, including land affected by desertification, drought and floods, and strive to achieve a land degradation-neutral world.

15.4 By 2030, ensure the conservation of mountain ecosystems, including their biodiversity, in order to enhance their capacity to provide benefits that are essential for sustainable development

15.5 Take urgent and significant action to reduce the degradation of natural habitats, halt the loss of biodiversity and, by 2020, protect and prevent the extinction of threatened species (UN General Assembly, 2016).

Thus, environmental concerns are reestablished as being part and parcel of sustainable development goal making. While integral, sustainable development seeks to be in the balance with the needs of the present and future. Not solely solving environmental issues or ecosystem preservation. The agenda for 2030 looks heavily back at Brundtland and redefines the need to address the most vulnerable citizens needs while doing so within the constraints of the environment.

The term sustainable development is not a magical fix for the issues that we currently face. It has critical issues in definition, scope, scale, subversion, and application. However, within the newest UN context, the term does offer clear indivisible targets and goals. That if appropriately approached could garner extremely satisfying results for this generation, future generations, and our shared environment.

"We are determined to protect the planet from degradation, including through sustainable consumption and production, sustainably managing its natural resources and taking urgent action on climate change, so that it can support the needs of the present and future generations" (UN General Assembly, 2015).

4.4. Sustainable Urban Development

"We recognize that sustainable urban development and management are crucial to the quality of life of our people. We will work with local authorities and communities to renew and plan our cities and human settlements so as to foster community cohesion and personal security and to stimulate innovation and employment" (UN General Assembly, 2015).

Sustainable urban development is crucial to the provision of fair housing and opportunities within a burgeoning global population. It is goal eleven of the seventeen listed in the 2030 sustainable development agenda.

Goal 11. Make cities and human settlements inclusive, safe, resilient and sustainable

11.1 By 2030, ensure access for all to adequate, safe and affordable housing and basic services and upgrade slums

11.2 By 2030, provide access to safe, affordable, accessible and sustainable transport systems for all, improving road safety, notably by expanding public transport, with special attention to the needs of those in vulnerable situations, women, children, persons with disabilities and older persons

11.3 By 2030, enhance inclusive and sustainable urbanization and capacity for participatory, integrated and sustainable human settlement planning and management in all countries

11.4 Strengthen efforts to protect and safeguard the world's cultural and natural heritage

11.5 By 2030, significantly reduce the number of deaths and the number of people affected and substantially decrease the direct economic losses relative to global gross domestic product caused by disasters, including water-related disasters, with a focus on protecting the poor and people in vulnerable situations

11.6 By 2030, reduce the adverse per capita environmental impact of cities, including by paying special attention to air quality and municipal and other waste management

11.7 By 2030, provide universal access to safe, inclusive and accessible, green and public spaces, in particular for women and children, older persons and persons with disabilities

11.a Support positive economic, social and environmental links between urban, peri-urban and rural areas by strengthening national and regional development planning

11.b By 2020, substantially increase the number of cities and human settlements adopting and implementing integrated policies and plans towards inclusion, resource efficiency, mitigation and adaptation to climate change, resilience to disasters, and

develop and implement, in line with the Sendai Framework for Disaster Risk Reduction
2015–2030, holistic disaster risk management at all levels
11.c Support least developed countries, including through financial and technical
assistance, in building sustainable and resilient buildings utilizing local materials (UN
General Assembly, 2015).

The importance of Sustainable urban development in the 21st century stems
from the many issues facing cities in general. "Cities worldwide are facing many
challenges, including exploding population, inadequate or failing infrastructure, as
well as economic and environmental disruptions" (Childers et al, 2014). Worldwide
cities already face issues in moving forward from their origins to meeting the needs
of their citizenry. Critically, these problems are exasperated by a burgeoning
worldwide population. The UN population report from 2007 investigates the move
towards urbanization. Stating "Urban populations will grow to 4.9 billion by 2030. In
comparison, the world's rural population is expected to decrease by some 28 million
between 2005 and 2030. At the global level, all future population growth will thus be
in towns and cities" (UN State of World Population, 2007). The report also states that
the urban populations of Africa and Asia will double in that fifteen years. This
expected influx of people will result in one of the greatest urban challenges of the
twenty-first century. It is anticipated that without action the current issues already
facing cities will continue to worsen and result in further socio-economic divides and
deteriorating conditions for the world's currently marginalized citizens; an increase
of poverty (United Nations: Stockholm, 1972).

Historically, typical urban development in the northern hemisphere was a
shift from settlements to industrialized urban areas. Urban development followed
industrialization, as workers moved into cities to work in factory style marketplaces
(Pickett et al, 2013). The modern shift has been from an industrialized city to the
"sanitary city" (Pickett et al, 2013). "Provision of clean water, sanitation, public
education, recreational facilities, and green space along with the establishment of
public and non-governmental institutions to integrate new migrants into the social
fabric are aspects of the sanitary city" (Pickett et al, 2013). While in the global south
city form also can include many informal settlements and housing slums, favelas,

shantytowns, etc. These changes known as city modes are the result of the city being accountable for its purpose. An industrial city has to meet the needs of industrialization, while a sanitary city must change to meet the needs of an established, perhaps wealthier, citizenry, in this case, a higher quality of living. Sustainable cities and urban areas are expected to meet a need beyond sanitary cities. These standards include access to equitable living standards for all within the community, protect and restore ecological systems in urban areas, and support positive environmental, economic, and social cohesion and growth (Pickett et al, 2013; UN General Assembly, 2015).

With the combination of issues cities already face and the projected crises arising from a ballooning global population. Sustainable urban development is considered by many the key towards ensuring a healthy and equitable future for all urban populations. Even as urban growth continues, creative, strategic planning can offset the expected challenges urbanity will face.

4.5. Social-Ecological Cities

One of the needed steps in mode transition from sanitary to sustainable cities is to consider the city as a *"social-ecological"* (Pickett et al, 2013) entity. "Strictly speaking, no city is sustainable in the sense of being an autotrophic or even self-supporting ecosystem" (Pickett et al, 2013). Cities will probably not exist solely within strict urban borders; they will always require resources beyond such a border. As a result, we must consider cities as integral ecological zones within the larger biome as well as social zones within, the larger transnationalist sphere. The definition of a social-ecological city is one that "the structural component includes both built and designed elements and natural features and where the functional component includes the interactions of human decisions and ecological processes" (Childers et al 2013). Therefore, by considering cities as what they are, built and natural, and taking advantage of this fact. Cities can potentially rapidly move forward in reaching some of the 2030 agenda goals of sustainable development.

To do so would require an interdisciplinary approach to designing urban areas, requiring the likes of sociologists, ecologists, landscape planners, etc. In doing so, different criterions for decision making can properly be invested in. For instance, the idea of ecosystem services has seen a huge uptick in popularity. However, ecologists have pointed out that it is an anthropocentric criterion that will favor some ecosystem services over others leading to potential consequences to the overall environment (Steiner, 2014). That does not mean ecosystem services should be discounted, as in many cases they perform remarkably important roles. One example is the New York watershed project in which the environment and local citizens benefitted from a healthy protected watershed ecosystem (Steiner, 2014). The renewal of ecological systems is a crucial portion of sustainable design. Another example is with urban heat islands; cities tend to be warmer than what is natural in the region. There is significant research that shows increasing tree coverage in urban zones can mitigate heat extremes and reduce energy costs. There is also evidence that "In many cities, residents of poorer or otherwise disadvantaged neighborhoods enjoy less urban tree canopy, are exposed to greater extremes of heat, and are consequently at greater risk of morbidity and mortality" (Huang, Zhou, & Cadenasso, 2011). Mitigation of urban heat extremes is, therefore, an aspect of providing and addressing public health and safety in urban areas. There is much evidence currently that by readdressing the ecological situations of cities. It is possible to address some of the grave environmental and social concerns as well.

The field of *Landscape Urbanism* also has many appealing prospects to add to sustainable urban development. Landscape urbanism is a relatively recent field in which "theorists advocate the integration of ecology in city design and planning. Networks and complexity are emphasized in order to establish frameworks for urban change" (Steiner, 2014). Landscape urbanism is a more holistic approach to city design which replaces the solitary city-scape with the term landscape. In this approach, both city and environment are one and the same, the ecological merging of hardscape and softscape. Some have written that "Landscape urbanism is meant first and foremost to decipher what happened in city landscapes of the last decades and to consequently act upon them" (Girot, 2006). In that sense, landscape urbanism

can be seen as a reactive philosophy to where standard urban planning has led. Thus, landscape urbanism can be considered a conscious change in the approach to landscape and urban design, of which landscape is the medium of choice. As such, landscape urbanism is a design form in which large scale urban infrastructure projects and urban necessities can fit within the landscapes ecology. One example of this is the Emerald Necklace in Boston, a nineteenth century approach to integrate a series of urban parks to rehabilitate the highly polluted wetlands. Landscape urbanism also has its basis in renovating urban space as well. One prominent example is Barcelona's ring-roads which are renowned for their use of layered space within the city (Shannon, 2006; Mossop, 2006).

Freshkills Park in New York is one example of landscape urbanism in practice. Landscape Architect James Corner and his team worked to redevelop what was once the largest landfill in the world into a park three times the size of central park (Steiner, 2014). It is an example of how once termed brownfield sites, or sites perhaps contaminated or polluted by commercial and industrious uses, can be brought back into ecologically sound shape. To be left for environmental reasons or repurposed for the enjoyment and use by residents. Another example is McConnell Springs in Lexington Kentucky, a series of springs originating from the limestone bedrock of the state (Friends of McConnell Springs, 2017). Once a public dumping ground, The Springs is now a public park with a, newly researched, rich history dating from the first settlement of the State by non-indigenous groups. The Springs are also a unique eco-zone for the region and one of the only places where such a water system exists in the state. The significant restoration of the space is a testament to the work done by the Friends of McConnell Springs since October of 1993.

The Highline project in New York City, again principally orchestrated by landscape architect James Corner, is in many ways hailed as a beautiful example of landscape urbanism. The project transformed an abandoned railway viaduct into a vibrant redeveloped community asset (Steiner, 2014). The project has been heavily criticized as being a "gentrification project" or as a project that is "at odds with the goal of humane and equitable distribution of material and symbolic

Figure {2} A section of The Highline, *Source: thehighline.org 2017*

resources” (Rothenberg and Lang, 2015). In essence Rothenberg and Lang, show that projects, such as the Highline, which attempt to create a premium out of the aesthetic experience ultimately recreate and exasperate class inequality and social exclusion. Rothenberg and Lang are not, however, critical of the urban form itself, recognizing the place that projects such as the Highline have within society. Stating that:

> *“While retaining our critical perspective, however, we also recognize that spectacular urban spaces like the HLP serve as a sensual reminder about the real aesthetic possibilities of urban life and the social interaction that occurs in and through urban form. We wonder what kinds of aesthetic experience might be harnessed to repurpose defunct industrial spaces like the High Line if the goal of urban development were to solve rather than mask the problems of distribution that plague neoliberal society”* (Rothenberg and Lang, 2015).

Their critique of the Highline project points to a greater issue within the discourse of landscape urbanism. They highlight the work of Emily Talen (2015), referencing that:

> *“She points out that part of this movement's popular success lies in its ability to meld vague and shallow references to several fashionable discourses, including environmentalism, Marxism and Post-modernism into its founding documents and*

public relations statements thus appealing to a diverse set of urban stakeholders. At the same time, LU's design projects are visually impressive, innovative and technically complex and sufficiently lacking in social (and ecological) accountability to make them appealing to developers, investors and wealthy donors alike" (Emily Talen through Rothenberg and Lang, 2015).

If landscape urbanism is promoted continually as an interdisciplinary form of urban development, landscape urbanists and designers alike must be held accountable to all people and stakeholders including the environment and the impoverished. Landscape urbanism has the opportunity, if not responsibility within sustainable development, to not create further socio-economic divisions but to integrate access and a place for all within repurposed and improved urban landscapes.

Sustainable development is a larger ongoing process and not an endpoint; it is a model or "vision, tuned to the realities of each place and culture, that attempts to overcome the shortcomings of other city modes" (Pickett et all, 2013). With the shift towards sanitary cities in the north, there have been significant improvements within social demographics. Although progress has occurred, there is still issues of equitablity, and many face difficulties in access to the benefits of sanitary cities (Pickett et al, 2013). Such inequalities can be seen worldwide especially in the southern hemisphere and China. Places where urban expansion has occurred with and without a significant increase in the quality of life for its citizens (Pickett et al, 2013; Childers et al, 2013). This disconnect between development and inequality is a glaring issue at the heart of the sustainable development movement; the very movement that seeks to upheave traditional development systems and provide equal access to a healthy living environment. Sustainable urban development is a way forward to create the best living environment for all in the urban world while planning for the least disruptive expansion in the future.

4.6. Mega-events And Theory Of Linkages

Mega-events are intrusive large-scale events of often short durations which have a wide array of impacts throughout the lifecycle of the event (Roche, 1994).

These impacts occur in various areas including tourism, urban development, civic pride, etc. Such events can include but are not limited to in scope to the football world cup, world fairs, music festivals, etc. Often mega-events are perceived as economic initiatives. For which the event is many times judged by its potential economic benefits or its effects expressed in economic terms (Hiller, 2013). Critics of mega-events rightly state that there are often long-term, lasting debts to hosting events and such event sites require long-term use planning (Roche, 1994). Whereas proponents of mega-events tend to state the economic benefits, of job creation, infrastructure improvements, media access and media sales, etc. For which, many of these are not entirely calculable or merely are estimates until the conclusion of the event (Crompton, 1994).

Mega-Events are more than just their economic impacts, and the concept of linkages can thoroughly explore these impacts. In which the event is one piece of a larger chain of events connected through a link. In thinking of linkages as expressed by Hiller (2015), "forward linkage is based on the presupposition that the event is itself the cause of effects." "Backward linkage refers to the context in which the idea for the mega-event occurs and the background objectives that stand behind the event." "Parallel linkages are side-effects of the mega-event which were not necessarily anticipated" (Hiller, 2013). The concept of linkages allows for a complete understanding of all the impacts hosting a mega-event can have on a community. Utilizing this system provides the opportunity to effectively trace back impacts to a known source or interruption within the community's system, in this case, the large-scale event. As a result, events can be better planned against negative impacts and designed to highlight positive outcomes for future host communities.

Examples of such linkage orientated analysis can be seen in Cape Towns 2004 Olympic bid, in which urban development was the basis of the submission. Tantalizingly the Olympic village would become housing for the disadvantaged, a classic backward linkage (Hiller, 2013). However, the need for housing was already a crisis previous to the event in Cape Town, and as a result, should the Olympic village become a housing project for the existing disadvantaged it would become a forward

linkage. To explain what would happen to the surrounding areas of the event site. Would be to find parallel linkages between a Cape Town Olympics and the community. Thus by looking at linkages, events can be thoroughly investigated in countless ways beyond simple economic arguments. As explained by Hiller, a linkage led investigative approach could be used to hold event organizers accountable for their social responsibility to the host community.

4.7. Mega-events As Catalysts For Change

Mega-events throughout history have been critical catalysts for change in society. Often these events are on such a massive size that their impacts reach beyond the communities that agree to host them. These events have taken many different forms and functions throughout history from religious and ceremonial events of early human civilizations to the large mass media sporting events of today (Solis, 2006; Wheeler, 1935; Gold and Gold, 2017). What has been consistent in regards to mega-events, has been their impacts on urban form throughout this history.

The first World's Fair event was in 1851 in London, United Kingdom. Was intended to be the first international exhibition of manufactured goods. It also served to cement the UK in its place as the leader of world industry (Auerbach, 1999). For which the Victorian age was particularly well known. For this grand event, a massive glass structure was commissioned and built in Hyde Park, the Crystal Palace. Although relocated from Hyde Park to Penge peak after the end of the Great Exhibition, it remained a fixture of London until a fire destroyed it in 1936. Although manufactured goods and industrialization was the theme of the Great Exhibition, great significance was placed on architecture and dwelling design. It was at the Exhibition that Prince Albert's model cottage was first displayed. A pet project of the Prince, designed to provide affordable housing for the working poor (Auerbach, 1999).

Architecture and design continued to have a profound impact on future World's Fairs. The Chicago world's fair of 1893, The World Columbian Exposition,

was to coincide with the 400th anniversary of Christopher Columbus making landfall in the Americas. Once Chicago had won the bidding process from United States Congress to hold the exposition, Daniel H. Burnham was selected to head the design and construction of the fairgrounds (Rydell, 1984). His decisions led to the creation of the White City, or a palatial set of ornate white washed buildings, each corresponding to a separate exhibit. Aside from the buildings, the fairgrounds itself was the brainchild of Frederick Law Olmsted, who envisioned a large sprawling public park rivaling another of his creations, Central Park in New York City (Rydell, 1984). The Park remains today, although most of the elements from the exposition have been removed or lost in subsequent fires. However, the legacy of the Colombian Exposition permeated future urban design. One direct example is the *City Beautiful Movement*, which changed how cities were planned and constructed during the 20th century. The movement is characterized by clean straight sidewalks, open parks, hidden infrastructure, and civic art. The city beautiful movement was so successful, that "many aspects of the City Beautiful persist in zoning codes, subdivision regulations, and local ordinances and, more profoundly, in the culture of suburbia" (Peterson, 1976). So while the White City of Chicago has long since vanished, it can be argued that its legacy fundamentally changed the American city and in fact, urban life as Americans have come to know it.

Another Example of the lasting urban impacts of mega-events were the Worlds Expositions to take place in San Diego, California. The city hosted two world's fairs in 1915 and 1935. Known in history as the Panama-California Expo and the California Pacific International Expo respectively. Both expositions also were held in Balboa Park a 490-hectare urban cultural zone. Home today to many of San Diego's museums, municipal gardens, and the San Diego Zoo. (*www.balboapark.org*, 2017) Previous to the Panama-California Exposition, Balboa Park was mostly open landscape (Engstrand, 2015). For the first exposition, the Park was designed with both permanent and temporary buildings in what is now known as Spanish colonial revival style. Heavily influenced by Churrigueresque sculptural ornamentation and Moorish style (Amero, 1990). The buildings were of such high standard that President Roosevelt said in reference to the architecture.

Figure {3} Presidents Taft and Roosevelt in San Diego, California for the Panama Exposition. Photo from *www.insidesandiego.org* 2017

"It is so beautiful that I wish to make an earnest plea ... I hope that not only will you keep these buildings running for another year but you will keep these buildings of rare, phenomenal taste and beauty permanently" (Theodore Roosevelt, 1915).

His request was ultimately honored, and the temporary buildings were mostly retained and reused 20 years later in the Exposition of 1935. After hosting two World's Fairs the once open and naturally landscaped park was transfigured into the permanent home of San Diego's cultural tradition, forever changing the cultural significance and usage of public space within the city. Today Balboa Park is still a heavily used public space, for example there is a weekly concert for the public at the Spreckels Organ Pavilion, and the park is host to (as well as other events) the annual two-day San Diego Pride Festival, a major festival for the local LGBTQ community. (sdpride.org) The history of World's Fairs, especially in the United States, establishes a legacy of urban development changes. These events are not limited to legacies of planning and architectural changes, such as the Colombian Exposition. They also include the way in which changes to urban space can drastically influence its purpose and function within a community. As is the case of Balboa Park, its transformation from a natural zone to an area of cultural exchange is quite remarkable and continues to meet a critical need for the citizens of the city today.

Mega-events have this ability to affect drastic change in urban design and planning. While the events are usually ephemeral, their impacts can leave both long-standing legacies and immense challenges; if linkage theory is accepted with the understanding that mega-events are connected to a multitude of impacts from the planning stage to its conclusion. Impacts can be understood to even emanate beyond the confines of the event itself and could present themselves decades later. Thus, mega-events can in many ways be greatly powerful as catalysts for change. Such change can be social, economic, theoretical, academic, or directly affect practices in urban design.

Contemporary Mega-events, including world's fairs, still contribute to this legacy of urban change. There are many examples in sporting events of the late 20th and early 21st centuries. The FIFA World Cup, Commonwealth Games, and the Olympic Games of both the winter and summer seasons, all can have profound impacts on their host communities. Not only do they have profound effects, events today can at times be the ignition for change or provide the inertia to allow for the initiation or completion of urban development projects. The summer Olympic Games, in particular, have drawn an extreme amount of attention and desire from host cities for this purpose since the 1960s (Gold and Gold, 2017). The games have been tabled as a catalyst thoroughly in literature (Gold and Gold, 2017; Essex and Chalkley, 1999; Smith, 2017; Sanchez and Broudehoux, 2013). Critics argue and warn, that "mega-events are being instrumentalized by local political and economic elites, especially a coalition of ambitious civic leaders, private entrepreneurs, and local real estate interests, who exploit the event-related sense of urgency, mobilization, and consensus in order to remake the city in their own image" (Sanchez and Broudehoux, 2013). The nature of mega-events as needing immense amounts of development or investment quickly, to be ready for the event. Is often used to jumpstart intensive development or infrastructure projects that otherwise would not happen, rapidly or at all.

Moreover, this sense of catalysis through urgency is evident in many of the Olympic games. "In Munich, the pre-existing (1963) plan to regenerate the Olympic Park site was scheduled for 15–20 years, but the 1972 Games meant it was delivered in five years" (Essex and Chalkley, 1999). The Olympics also can be causally linked to the decontamination of brownfield sites in the Sydney (2000) and London (2012) used to host the games (Smith, 2017). Without a doubt the scale of development and the stringent time frame to achieve the necessary changes in urban structure gives mega-events, like the Olympics, a significant influence in affecting how, when, and what projects ultimately continue. The Barcelona Summer Olympics Games of 1992, are an excellent and often highly touted success story of such a phenomenon. 83 percent of the expenditure for the games was for urban development alone (Gold and Gold, 2017). A significant departure from how the previous games spent their budget. The waterfront development of Vila Olimpica for the games is hailed as an example of good sustainable practices (Smith, 2017). However, the Cinturon ring-road was perhaps the most successful infrastructural and development outcome for the games. It has been consistently heralded for its design and was integral for the cities reconnection. Its completion was also directly linked to the 1992 Olympics, as the highway connects Barcelona's housing, cultural institutions, and parks. It has also been written that the Cinturon's development can prove insights into how highways can enhance the commuters experience in today's cities (Preuss, 2017; Shannon, 2006; Tatom 2006). It is because of this that mega-events are, due to their nature, exploitable as catalysts for dramatic urban change.

However, it is also important not to overstate what can be accomplished by mega-events. As Smith notes, "Any claims made for accelerated development need to be treated with caution – this rhetoric is part of the way Olympic projects are justified. Although the Olympic Games can speed up the initial phases of urban regeneration (such as land assembly and remediation), wider projects often remain incomplete long after the event" (Smith, 2017). Essentially while the state of urgency caused by mega-events can initiate urban development, the fact that they are often short-lived or temporary means that the event might not be able to do little more than initiate. Highlighting the need for an outlook and urban plan that looks beyond the

event itself and recognizes the event as a catalyst and a need for long-term development solutions.

4.8. Introduction To The Olympic Festival

The Olympic games are the preeminent worldwide sporting event of our time. Originating as an ancient Greek sporting event, the Olympics (in their current form) were reincarnated by Baron Pierre de Coubertine in 1896. The first host city was rightly Athens to be followed by Paris in 1900 (Gold and Gold, 2017). The 1896 Olympics although financed by a combination of public and private funding were of particularly low expenditure with restricted stadia construction to a few events (the velodrome and shooting gallery) and seating for the swimming area. Although small in comparison to today's games, the 1896 Olympics indicated "that that the modern games had considerable potential as a coherent framework for a new international festival" (Gold and Gold, 2017). The following games successes and missteps, categorically known as legacies, directly shapes and impacts the future of the Olympic movement; therefore shaping one of the most drastic catalysts of urban change and development in the modern era.

The first few incarnations of the Olympic Games largely lacked major urban transformations and were often side-shows or additions to the larger and more popular International Expositions (Gold and Gold, 2017). It was not until the rushed effort of the International Olympic Committee to salvage the Olympic Festival in 1906, following Rome's inability to carry the games after the devastating eruption of Mount Vesuvius; that the Olympic Festival become truly independently designed and specialized as a sporting event. London was selected to host the Games in 1908 and while they once again coincided with an international exposition. The London Games, due to the rushed circumstances, became distinct from the concurrent Expo. This change manifested in two ways. Firstly, the event was under the direct control of the British Olympic Association (BOA) and not subject to all the influences of the Exposition. Secondly, while the organizers attempted to use as many existing venues as possible, the BOA successfully negotiated the construction of an independent

Olympic stadium, the White City Stadium (Gold and Gold, 2017). The largest stadium of its day it was the epicenter of the 1908 games. The stadium hosted multiple events as well as the ceremonial aspects of the 1908 Olympics. With a stand capacity of 93,000 people and direct connections to the rail system of central London, it was truly a magnificent architectural statement. These achievements set aside, this stadium represented and physically created the first truly "compact and independent Olympic Festival" (Gold and Gold, 2017). The Olympics for the first time also represented more than sport and culture. The 1908 Olympics cemented the Olympic brand with that of urban development. It was independence through construction, and it is this model that, although very much expanded in scale, persists today.

In Continuance, this independence found in 1908 has everything to do with the scale of the Olympic movement today. The Olympics have grown in popularity, size, and economic impact. As a result, major changes to the Olympic system have arisen. No longer can cities accommodate the athletes and spectators descending on host cities *en masse* with existing tourism infrastructure. In 1924, Paris "witnessed the first significant dissatisfactions about the growing size of the Games, given that the scatter of the Olympic venues around the Paris region necessitated long bus journeys for most competitors" (Gold and Gold, 2017). This major criticism of the 1924 Paris games, prompted the next festival in Amsterdam to be much more compact with the athletes housed within ships in the harbor (Gold and Gold, 2017; Sainsbury, 2017). It was not until the first Los Angeles games in 1932 however, that the modern idea of an Olympic village came into the picture.

However, in the case of Los Angeles, the idea to constrict the Olympics was co-opted within the bigger need for the games to be financially successful. As a result of the Wall Street crash in 1928, the Los Angeles games were largely financed by bonds and the private sector (Gold and Gold, 2017). Therefore, there was a great need to draw in as many competitors as possible and as well as spectators. A compact village for the athletes and participants largely left space in the cities tourism infrastructure to draw in those spectators. To help matters, Los Angeles concurrently

hosted 62 conventions and tourism companies directly integrated the games into existing sight-seeing packages (Gold and Gold, 2017). By the conclusion of the 1932 festival, Los Angeles had come out ahead economically. A feat that previous games, especially Antwerp in 1920, known more for its financial failures than athletic legacy, had failed to achieve (Renson, 1996).

4.9. The Olympic Village

The Olympic village has been and is one of the most challenging aspects of the Olympic Festival. "In Rio, the village consists of 31 brand-new buildings of up to 17 floors each, with a total of 3,604 apartments, stretching 1.5km (about 1 mile) long. As well as more than 10,000 athletes, the Olympic Village will play host to officials from national delegations, including coaches, doctors, and psychologists. At peak time in the middle of the Olympic Games, about 18,000 people will call the village home. Furthermore, about 13,000 staff and volunteers will be working in this massive complex" (Largest athletes' village in history ready to give guests a very Rio welcome. 2016). For security, safety, and logistical reasons the Olympic village has become the standard housing solution to the thousands of participants of the Olympic experience. The 2016 Rio games offered the largest to date Olympic village able to accommodate approximately 18,000 people. Not all villages have been on such a scale and the scope. The first Olympic village in 1932 was built to accommodate only 2000 participants (Gold and Gold, 2017; Sainsbury, 2017).

The Olympic games have seen steady growth in scale historically, with each games attracting more participants, more coverage, and more challenges. The games of 1940 in Helsinki had to designate two villages to accommodate the realism of such a growth in scale and meet the needs of the burgeoning cold war (Hornbuckle, 1996). For the Soviet Team demanded separate accommodations from the rest of the participants. Other unexpected challenges included the Munich games of 1972, which presented an unprecedented security and safety challenge with the tragic *"Munich Massacre"* (Coaffee, 2017). An event in which members of the Israeli Olympic team were very publicly held hostage and then murdered by a Palestinian

terrorist organization. Due to these ever changing and unique needs of the Olympic games, the Village has a massive impact on the urban landscape of the host city. It is not just constructing the temporary and permanent athletic venues, training facilities, security and personnel infrastructure, and athlete housing. The village must also connect to all of the other athletic venues scattered throughout the city, and then to the city itself. This connection means massive changes to the transportation infrastructure of entire regions (Sainsbury, 2017). As important as it is to house 17,000 plus people safely, it just as important to efficiently transport them in the area during the games. As well as to orchestrate the symphony that is meeting the needs of the thousands of people participating in the Olympic experience. Be they athlete, official, fan, or volunteer. Despite these continued challenges, the Olympic village has continued as a part of the Olympic legacy. Many times, due to the drastic urban change it catalyzes, it is one of the most lasting physical legacies of the Games.

4.10. Urban Development For The Olympic Games

Construction and urban development is an inescapable portion of the modern Olympic experience. The Olympic festival has eclipsed the "minor impact of the early Games to a more substantial, entrepreneurial and business-led approach to urban planning through Olympic-led development" (Essex, 2017). The early Olympic games proved to have some impact on urban development. The winter games of 1928 and 1932 used a mixture of refurbished and newly constructed event infrastructure. However, neither had an Olympic village, as local accommodations were able to be adapted to handle the expected influx of regional visitors. For in this early stage of Olympic history, the games were not the tool of regional development they have become today. In the case of the Winter Olympic festival, it was the 1960's when regional development became a key point of the games. This shift coincided with larger cities (100,000 plus citizens) hosting the festival, meaning that the games were much more expansive in scale. It is also due to the events of the Winter Olympiad that the festival is much more regional than constrained to a single host city. This period also coincided with a massive increase in television revenue as well

as other sources of income directly attributed to hosting the Olympic Games. As a result, "Both private development companies and local authorities recognized the potential of the Winter Olympics for justifying major infrastructural investment as part of broader modernisation programmes" (Essex, 2017). This transformation in how the Olympics are used for regional and urban transformation is heavily discussed in text. Excellent examples of the Olympics utilized for urban transformation can be seen in Seoul (1988), Barcelona (1992), Sydney (2000), and London (2012).

One argument for the use of the Olympics as regional transformers is that the games are considered a *"Flagship"* event. An event that will continue to bring in more financial investments and encourage further development. As has previously been discussed, mega-events can be exploited as catalysts for urban change. More so, mega-events, especially the Olympic games, provide a tool for regional planners and local governments to achieve transformation and regeneration goals (Smyth 1994; Bianchini et al., 1992; Smith, 2017). The Olympics also provide some perceived "safety" to undergo these transformations. As "the Olympic Games are seen as a particularly valuable flagship project because investors know that governments have to deliver so, unlike other regeneration projects, there is less chance that development will drift, stall or collapse" (Smith, 2017). The Olympic games are considered simply *"too big to fail"* by investors and local governments alike. This thinking, however, has its many detractors. One claim is that this negation of risk provides an unfair and questionable subsidy to private investors using public funds (Scherer, 2011). Another important point about "flagship-led regeneration is that further investment does not automatically follow, or that it takes longer than expected to materialize" (Smith, 2017). Olympic led regeneration, and urban transformations do have a risk and can like all urban projects ultimately fail to bring the desired outcomes; as was seen in the aftermath of the Sydney Games. From which the Olympic village zone is struggling to compete in attracting further investment and development with other Sydney suburbs (Yamawaki and Duarte, 2014; Smith 2017).

The Barcelona games of 1992, is perhaps best known for its legacy of helping to transform the city. Barcelona had been massively investing in urban regeneration since the introduction of the democratic process in the 1970s (Busquets, 2006). The Olympic bid was designed from the start to continue that process of urban transformation. Firstly the athletic facilities were planned in four areas surrounding the city, allowing for the *Ronda de Dalt* ring road to be pushed through. The road and a subsequent metro extension were critical projects to the development of the city before the Olympics and were made crucial to transporting the athletes between venues (Gold and Gold, 2017; Brunet, 2009; Shannon 2006). Challenging transportation projects were purposely planned into the fabric of the games, as the planners of the 1992 Olympics saw the opportunity hosting the games had in catalyzing the completion of the cities transport plan. The 1992 games also provided the impetus to revitalize the city's waterfront with the *Vila Olimpica* project. The *Vila Olimpica* was the main Olympic village for the games and consisted of 1200 dwellings as well as a marina and two flagship buildings (Busquets, 2006). Before the Games, the flats were put onto the market and sold with special tax benefits due to their Olympic connection. The waterfront revitalization also reconnected the seaside to the city and returned the waterfront to a space for public use after the Olympics (Busquets, 2006; Smith, 2017; Rowe, 2006) While the Barcelona festival was plagued with massive cost overruns (Gold and Gold, 2017), the games overall managed to break even and have been hailed as a benchmark for what can be considered a successful Olympic legacy (Gold and Gold, 2007; Smith, 2017). Candidature cities are required to provide athletic venues, housing, and specific transport provisions (Smith, 2017). As a result of Barcelona, it has become the status quo that cities will take this opportunity of building requirements to restore, reinvigorate, or completely transform communities or even entire regions.

Furthermore, Barcelona was the start of the games being purposely (and successfully) designed to meet and further the infrastructural desires of host cities. A markedly different trend than previous games such as Munich, Rome, Oslo, and Grenoble, where the infrastructural demands of the Olympics themselves, changed the fabric of the host city (Gold and Gold, 2017; Essex, 2017). Following the trend

set forth by the 1992 games, the Sydney (2000) games London (2012) Games also attempted to use the Olympics as catalysts for urban regeneration and development. Both games set about in seeking to remediate postindustrial land and reinvigorate sections of the host city (Mulley and Moutou, 2014; Freestone, 2017; Evans 2017). With the positive legacy of Barcelona, the games of 2000 and 2012 were very legacy focused. Sydney was the *"green games"* and sought to leave a legacy of ecologically friendly design and construction (Mulley and Moutou, 2014). Whereas the London games were fully focused on leaving a legacy like Barcelona of positive regeneration in the city. The so-called *"regeneration games"* were chosen to be on a brownfield site in East London (Evans, 2017). Both games saw success in regeneration, but also faced criticisms to the legacies they left. The difference in success between the three events can be seen in their planning process and how each event approached urban renewal. The 1992 games were used to "advance long-held regeneration ambitions" (Smith, 2017), whereas the Sydney and London games had regeneration as justification for hosting the games. "This highlights that the relationship between the Olympic Games and urban regeneration should not be merely understood as what the Games can do for regeneration, it is also about what regeneration can do for the Games" (Smith, 2017). Smith's comments highlight a distinctly important facet of using in combination an event like the Olympic games and urban development/ regeneration. Both must work in tandem together, yes, but also within the scope of existing planning and needs. The history of the Olympic games shows that urban development projects can be accomplished and that such development can be driven to completion as a result of the Festival. However, the long-term success of the projects hinges on how they will survive after the closing ceremonies.

4.11. Sustainable Development In The Context Of The Games

Sustainability was first introduced in the Olympic context in the 1990's. It was in 1994 that the International Olympic Committee decreed that candidature cities be also assessed by the environmental consequences of their plans (Gold and Gold,

2017). In 1996, the IOC moved to alter the official Olympic Charter. Adding a brief paragraph on environmental protection;

> "The IOC's role with respect to the environment is: to encourage and support a responsible concern for environmental issues, to promote sustainable development in sport and to require that the Olympic Games are held accordingly." Chapter 1, Rule 2, Paragraph 13 of the 2011 (Olympic Charter, 2015)

While the IOC's concern with environmentalism and sustainability coincided with the UN's move in holding conventions on the matter, specifically the UN Conference on Environment and Development, Earth Summit, in 1992. The actual turning point was the Albertville Games of 1992, an absolute "ecological disaster" (Cantelon and Letters, 2000). A winter Olympic Festival, in which environmental concerns were blatantly ignored in the face of protests, leading to widespread ecological harm to French Alps (Cantelon and Letters, 2000). Without any environmental policies in place, the IOC moved quickly in bringing environmentalism to the Olympic Games. The 1994 decree was a direct about face to address the recent failings of Albertville in 1992. It was then in 1995 that the sport and environment commission was founded to advise the executive board on policy matters related to sustainable development (IOC Factsheet, 2014). The IOC then, in 1996, added an addition to the two original pillars of the Festival, sport, and culture. The third pillar of the Olympics core philosophy became —environment (Gold and Gold, 2017; IOC Factsheet, 2014). The IOC's next major move was to emulate the Rio Declaration in creating their own "Agenda 21". In doing so, the IOC cemented sustainable development as an agenda
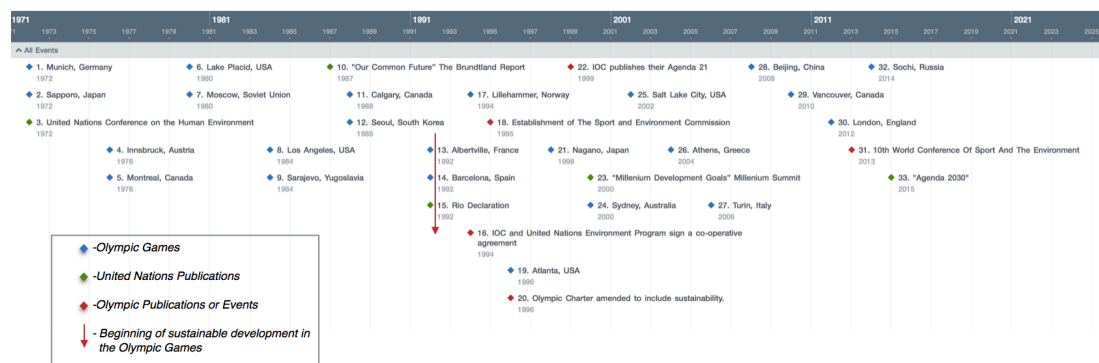

Figure{4}A timeline of Sustainability and the Olympic Games *Source: IOC Fact Sheet, 2014*

which "is totally in conformity with the goal of Olympism" (IOC, 2001). Further stating that the goal of Olympism "is to place everywhere sport at the service of the harmonious development of man" (IOC, 2001). This harmonious view that sport and sustainable development fit together is echoed in the UN's latest conference on the subject, Agenda 2030. In which sport is specifically mentioned as follows;

> *"Sport is also an important enabler of sustainable development. We recognize the growing contribution of sport to the realization of development and peace in its promotion of tolerance and respect and the contributions it makes to the empowerment of women and of young people, individuals and communities as well as to health, education and social inclusion objectives"* (UN General Assembly, 2015).

Sport, now accepted as playing an integral part in putting in place long-term sustainable practices. As the preeminent sporting event in the world, the Olympics have a pivotal role and place in seeing that such practices go into effect. The IOC's Agenda 21, clearly links together "long-term preservation of our environment" and simultaneous "economic, social and political development particularly geared to the benefit of the poorest members of society" as the two key components of sustainable development. This view is much supported by the originalist views written about the Brundtland Reports inceptive definition of sustainable development (Barkemeyer et. al, 2011; Doyle, 1998; Mebratu, 1998; Redclift, 1992; Redclift, 2005; Victor, 2006). That being said, there are still critics of the role events, such as the Olympics, have in relation to sustainable development.

It can be argued, that the IOC's *Agenda 21* is an idealistic conveyance of environmentalism (Gold and Gold, 2017). That the IOC's adoption of such an agenda "gave the IOC the chance to respond to accusations of 'gigantism,' in which the governing body was blamed for requiring host cities to expend vast amounts of resources in constructing and staging one-off events" (Gold and Gold, 2017). This claim of "gigantism" has consistently trailed the Olympics, often along with examples of *"white elephants"*—stadia and Olympic specific construction that fails to find a long-term use post-event (Gold and Gold, 2017; Sainsbury, 2017). The failings of the Albertville Games also give credence to this perception. The Olympic

games have an obvious image problem when it comes to the lasting legacies of the infrastructure required to hold the Festival. Hosting the Olympic Games can be an incredible burden on a city (Furrer, 2002). It can also be disastrous, such as the mentioned case of Albertville. (Cantelon and Letters, 2000). In respect to the historical interpretations, the IOC's Agenda 21 can be seen as a way to assuage responsibility to host cities. It can also be interpreted as the IOC's way "to minimize or eliminate the potential damage that can be the result of hosting the Games" through sustainable development (Furrer, 2002). This view takes into account the immense difficulty and challenges that the Olympic organisers face with developing a mobile and ever changing mega-event. As such, sustainable development is and can be a guide to navigating such difficulties.

4.12. Olympic Sustainability Policies And Programs

The IOC's *Agenda 21* was proposed by the IOC "to encourage members of the Olympic Movement to play an active part in the sustainable development of our planet" (IOC, 2001). The document is intended as a "theoretical and practical guide" (IOC, 2001) for all people and groups associated with the Olympic Games. In the context of a guide, the IOC, in section three, outlined the *Olympic Movement's action program for sustainable development.* The action program goes on to detail three objectives.

1. *Improving socio-economic conditions*
2. *Conservation and management of resources for sustainable development*
3. *Strengthening the role of major groups*

These three objectives are further expanded upon in the rest of the Agenda. In summary, provisioning "concrete recommendations", in the form of an official guide, (Furrer, 2002) for more ecologically sensitive events. The measures include amongst others the usage of environmental impact assessments, reducing usage of non-renewable resources, and allowing for the economical usage of natural resources. As well as "increase involvement of the local population, improve the socio- economic and health benefits they derive from it, strengthen international cooperation projects

for sustainable development, help combat social exclusion, encourage new consumer habits, promote a sports infrastructure which is even better adapted to social needs, and further improve the integration of development and environment concepts into sports policies" (Furrer, 2002; IOC, 2001). This format of recommendations and suggested 'paths' to follow towards sustainable development is similar to the other major declarations on the current state of the society and the environment, such as the Rio Declaration of 1992. This system also, very importantly, places the onus of responsibility on the members of the Olympic Movement to play in active part in sustainable development goals. In essence, the IOC makes recommendations and the associated groups and individuals follow through on making the goals in the action plan, happen.

In accordance with the third objective in the Olympic Movements Action Plan, the IOC began running the *Transfer of Olympic Knowledge* (TOK) program. Its purpose is to enhance and direct the collection and dissemination of information on past Olympic Games to the organizers of future games (Furrer, 2002). The IOC also created the *Olympic Games Knowledge Services* (OGKS). It is a company owned by the IOC in cooperation with Monash University in Australia (Furrer, 2002). The OGKS is the working body which collects and distributes working knowledge on the Olympics. "As such, OGKS uses the TOK information for the delivery of services and tailors it to the specific needs of the end client. Training sessions, briefings, workshops and research/consulting assignments are only a few examples of the service range that OGKS offers" (Furrer, 2002). These two IOC initiatives directly assist in meeting the Action Plans third objective in strengthening the role of major groups associated with the Olympic Movement.

The IOC also enacted the *Olympic Games Study Commission* and the *Olympic Games Global Impact study*. These announcements came in the wake of fears by the president of the IOC at the time that the "future of the Games was being jeopardised by the apparently unchecked growth in size, cost and complexity of the event" (Furrer, 2002). This criticism of 'gigantism' has been a mammoth concern of the IOC, for if the games are unable to find suitable host cities, the entire Olympic

movement is threatened. This move also was in response to surveys which made clear that not all cities are suitable to host a modern Olympic Festival; due to the Olympic standards, increasing size, and increasing infrastructural demands (Essex and Chalkley, 1999). The commission is charged with guaranteeing a "smaller, cheaper and less complex organization of the Games" to open up hosting opportunities (Furrer, 2002). As a response to the feedback from both the study and the commission's suggestions. The IOC in kind has already set about caps on events and the number of athletes to allow for more manageability of the games (Furrer, 2002) Reducing the size of the Olympics is a major step forward in eliminating the taxing pressure of hosting the games and moving towards a more sustainable future for the Festival.

The latest detailed IOC publication on the subject of sustainability was the *2012 Sustainability Through Sports* document, in which the IOC reaffirmed its commitment to pursuing a more sustainable future for the games as well establishing the role that the Olympics have in developing a more sustainable world. (IOC, 2012) Furthermore, the IOC in their conclusion attempt to further intertwine sport and sustainable development theory. By stating;

> *"There are those who believe that this is an impossible dream – as many doubted that the sub-1 minute mile or sub-10 second 100 metres would ever be achieved. however, the IOC understands that if it is to fulfil its aim to Create a way of life based on the joy of effort, the educational value of good example, social responsibility and respect for universal fundamental ethical principles there is no other option"* (IOC, 2012).

The adoption of sustainability, as the IOC correctly recognizes, is therefore as much for the good and continuation of the Olympic movement as it is for the socio-ecological future of the planet.

4.13. Sustainable Legacies

The concept of 'legacy' was first introduced into the Olympic Charter in 2002, in which the IOC agreed to take measures to "promote a positive legacy from

the Olympic Games to the host city and the host country "—New Rule 2.13 of the Olympic Charter (Furrer, 2002). The term in itself "exerts a powerful sway over the way in which the outcomes of the Games are imagined, conceptualized, negotiated and realized" (Gold and Gold, 2014; Gold and Gold, 2017). Legacies if viewed analytically, are a narrative or structured series of events that connect actions with specific outcomes (Gold and Gold, 2017). Therefore, legacies can be seen as the lasting interpretations of the narrative of the event itself. The use of legacies in the context of sustainability is highly relevant to the IOC. For which legacy serves are the evidence for sustainable practice and tool in which to direct recommendations for future Games (Gold and Gold, 2017; Furrer, 2002). Critics have shown, that the IOC's definition of legacy often imparts a biased stance towards *positivity*. Positive and negative outcomes from Olympics festivals are grouped by the IOC into "*Legacies*"(Positive) and *"Impacts"*(negative) (Gold and Gold, 2017; Tomlinson, 2014). This practice by the IOC brings into question the usefulness of 'legacy' as an academic term (Gold and Gold 2017). However, the construction of an accurate narrative of all available data on the linkages of the Olympic Games as an event can be a powerful tool in shaping future Games. Therefore, the academic use of legacies lies not in the connotation but denotation of study results.

4.13.1 Albertville 1992 and Lillehammer 1994

The Winter Games of 1992 in Albertville marked a distinct historical change. 1992 was the last year that both the winter and summer programmes were held together. The Games in the French Alps also are considered to be an absolute disaster and left a lasting legacy of long-term ecological damage (Cantelon, 2000). The construction of winter ski resorts, athletic facilities, and free riding snow sports is quite damaging to Alpine environments (Cantelon, 2000; Rixen et al, 2016; Patthey, 2008; Spector et al, 2012). Reports after the Albertville games indicate that construction for the games caused an "irrevocable transformation of the natural environment and the subsequent destruction of the existing ecosystem" (Cantelon, 2000). This destruction, as mentioned, was a direct result of the IOC not having any environmental policies in place and public dissatisfaction led to a complete u-turn on

the subject. Come the Winter Games in Lillehammer two years later the script was flipped. Due to the Norwegians concern with environmental impact and the presence of then Prime Minister Gro Harlem Brundtland, the Lillehammer games were extremely sensitive to environmental concerns (Cantelon, 2000). The Lillehammer Games were the first Winter Games to "initiate and implement a comprehensive, co-operative environmental programme" (Furrer, 2002).

4.13.2 Sydney 2000 and Athens 2004

The *"Green Games"* in Sydney, were by then the most ecologically responsible in history" (Furrer, 2002). A significant boost to Sydney being awarded the 2000 games came down to the Sydney 2000 Games Bid Committee releasing the *Environmental Guidelines for the Summer Olympic Games* (Furrer, 2002). The games went on to achieve great success in the introduction of sophisticated environmental management systems as well as the development of regional parklands. The *Green Games* also came through on promises to remediate the polluted Olympic site, Homebush Bay. Significant work was done to contain and remove pollutants, recreate wetlands and restore waterways at the site. Green building guidelines were also implemented, and there was a significant consideration to energy conservation, renewable energy, and passive solar buildings (Cashman, 2011; Freestone, 2017). Great strides were made in investment into forward-thinking ecologically conscious construction and site utilization. However, in areas that Sydney Olympiad was successful other areas fell short. The transport plan has been criticized for not looking beyond the immediate need of the event itself and while it was considered successful for its purpose during the Games. That "success has not been translated into everyday public transport" (Mulley, 2014). As a result, the Olympic Park has faced issues in being seamlessly integrated into the metropolitan region (Freestone, 2017). The Olympic Park also faces tough competitiveness with other Sydney neighborhoods on the open market (Freestone, 2017; Yamawaki and Duarte, 2014; Smith, 2017). Criticisms such as these indicate that although Sydney was a success in 'Green urban design' the Olympic Park lacked a strong future plan for the site Post-Olympic Games.

In 2004, the summer games returned to their ancestral home in Athens, Greece. The Master Plan of the winning bid "sought to concentrate the Games in a small number of locations while making use of existing sports infrastructure. Indeed, the bid claimed that 75 percent of the competition venues and 92 percent of the training venues were already in place" (Gold, 2017). Transportation infrastructure at the time largely lacked in the Greek capital city, and the master plan highlighted many infrastructural projects. In the bid, "The Olympic Ring project remained as before to link the conurbation sporting venues. Investment in roads and in metro, tramlines and suburban railways would improve movement throughout the metropolis and provide access to the other venues" (Gold, 2017). Many have noted that it is the Athenian transport plan which is the lasting legacy of the 2004 Games (IOC, 2012; Furrer, 2002). Critics show that the planning committee did not utilize *Strategic Environmental Assessment* (SEA) planning (Zagorianakos, 2004; Gold, 2017). The lack of coherent planning resulted in "apparent contradictions" including the use of greenfield sites instead of readily available brownfield sites (Gold, 2017). Despite such planning issues, the transport plan has left an overall positive legacy. New metro, tram, and roadways have created greater access within the city. Automotive pollution was addressed in the lead-up to the Games, as the entire bus fleet was replaced with cleaner-greener vehicles (Gold, 2017; Furrer, 2002). Overall, the Athens games suffered, like others, from the lack of a long-lasting vision for the infrastructural components associated with the Olympic Games. Moreover, the absence of a coherent and SEA based planning approach overwhelmingly stunted the potential for a legacy of success in sustainable development, especially in the footsteps of the Sydney Games. However, it should be noted that "the city gained a tangible legacy of infrastructure that can provide the basis for the hoped-for cultural, convention and business tourism trade" (Gold, 2017).

4.13.3 Turin 2006

The 2006 Festival in Turin, Italy from the beginning set to guarantee the sustainability of the Olympic System before, during and after the conclusion of the event (TOROC, 2002; Furrer, 2002; Essex, 2017). The Turin Games also coincided

with the passage of law in Italy requiring strenuous SEA planning, marking the first time in both Olympic and Italian History in which the comprehensive process was used (Furrer, 2002). SEA is an integral tool for sustainable development, ensuring the from the outset decisions are focused on sustainability objectives. The Organising Committee for the Turin Games also initiated other ecologically minded instruments and policies, including a sophisticated environmental management system, and *HECTOR* (HEritage Climate TORino). *HECTOR* is an analytic tool created for the Torino games to analyze every aspect of the Festival "including transport infrastructure, hospitality facilities, and waste and sustainable event management" (IOC, 2012; Essex, 2017), for the "volume of direct and indirect greenhouse gas emissions." The Organising Committee then partnered with "Italian and international compensation projects to offset these emissions" (IOC, 2012; Essex, 2017). Aside from these brilliant planning operations for ecological sustainability, the Turin games also marked the first move towards addressing issues of sustainability deriving from social inequality (Furrer, 2002; Essex, 2017). This is a major step as sustainable development cannot proceed effectively without tangible work on both ecological and social initiatives. Unfortunately, despite the immense planning some facilities have failed to find further use after the games, namely the ski jump and bobsled track (Stimilli, 2016). Some of the villages targeted for urban renewal projects in the regional plan have faced economic difficulties following the games. The anticipated increase in tourism has not actualized for these communities, making the costs and management of facilities related to the Olympics costly and burdensome (Stimilli, 2016). However, the ecological initiatives and planning processes can be accounted as great successes for the Turin Games. Moreover, the urban plan for the city itself is considered highly successful (Essex, 2017). As, "in addition to a general renovation and improvement of open spaces and building facades, the ex-Olympic arenas have been the stage for different kind of sports, musical and other cultural events; the Turin back-bone has provided new public areas and (re)connected different parts of the city; the first line of the city subway was finally completed; and the rest of the Olympic facilities were re-adapted and sold as residences in the real estate market, or given to the municipality as student dormitories and social housing" (Stimilli, 2016).

The model provided by Turin, like Barcelona, indicates that with proper planning for the demands of the Olympic festival and following through with a strong post-games strategy. The Olympics can potentially be integrated into urban planning as a sustainable tool.

4.13.4 Beijing 2008

"Beijing was fantastic, the venues were superb, the planning was superb, the athletes were well looked after, and they performed well because they were well looked after" (Lord Sebastian Coe, Chair, and CEO of the London 2012 Games, 2008).

The Beijing Games were intended to impress and not only impress but to contextualize "the rise of the New China, a China that is proud of its past and increasingly proud of its present" (Cook, 2017). Prior to the Games in Beijing, there were significant concerns regarding human rights, pollution, and social costs. However, the Beijing Organising Committee committed to a five-year modernisation plan to address many of those concerns (Cook, 2017; Gold and Gold, 2017; Broudehoux, 2004). The cost of the 2008 games is estimated at being over 30 billion dollars with an estimated 1.5 million people displaced during the urban transformation process (Gold and Gold, 2017; Cook, 2017). The organizers made many promises and initiatives to uphold sustainable practices. The IOC notes that as a result of the Games, Beijing increased its green space by 43%, and enacted measures to reduce water, air and soil pollution. The city improved and built new sewage treatment facilities and all of the cities river systems underwent ecological regeneration (IOC, 2012). Moreover, Satellite data indicates that immediately before the Games opening ceremonies, Beijing reduced its NO2 levels between 43 and 59%. (Mijling et al, 2009; Witte et al, 2009). However, the air quality and airborne particulate situation in the city has not seen lasting improvements. During the Games, a study estimated that the air pollution in Beijing was many times the levels of previous host cities (Cook, 2017), incredibly, by "2013 air pollution in the city had once again reached crisis proportions, especially in the downtown area" (Cook, 2013). Environmentally the legacy of Beijing can be seen as having some success, but in many ways, such success was unable to be sustained beyond the Festival.

The most troubling concerns of the lasting legacy of the 2008 Games, is the use of stadia and Olympic infrastructure. In addition to who the urban renewal plan most benefitted. "The concern here is that the Olympics have transformed the city of Beijing but have done so at considerable cost by adopting a model that is all about developing leisure enclaves for the rich that have simply served to impoverish the public life of the city" (Cook, 2017). It is important to note that in this scenario, the people who bear the heaviest costs also reap the smallest reward. Thus the actual legacy of the success of Beijing would be seen in improvements to the social capital as much as the environmental capital. As Beijing has been selected to host the 2022 Winter Games, it will be interesting to see how lessons from the 2008 games can be applied. This will also be the first time that a modern host city has been given the Games in such quick succession. Therefore the 2022 Winter Games are an incredible opportunity for Beijing to redouble its efforts for lasting positive urban change.

4.13.5 Vancouver 2010

2010, saw the return of the Olympic Games to Canada after the *misfortunes* of Montreal in 1976 (Gold and Gold, 2017). "Although intended as a 'modest Games,' Montreal 1976 produced a final shortfall of $1.2 billion, primarily caused by cost overruns on over-ambitious buildings" (Gold and Gold, 2017). The Montreal Games were plagued by ambitious but incredibly flawed architectural installations. One example was the Olympic Stadium roof, designed to be retractable. The roof was not finished until over a decade later and even then could not function properly. As a result of the failings of the Montreal Games, the Vancouver attempt in 2010 was focused on "Increased awareness about sustainable solutions" (IOC, 2012). As with all modern Olympic Festivals, massive infrastructure and urban renewal projects were a key competent to the Vancouver bid." New and upgraded facilities were constructed, together with a rapid transit link between the airport and central Vancouver and an upgrade of the 'Sea-to-Sky' highway between Vancouver and Whistler" (Essex, 2017). To ensure that all of British Columbia would benefit from the region hosting the Games, the non-profit group Legacies now was established. Legacies Now moved quickly to begin various programs in schools, sports, the arts,

and literacy. Working to improve on "softer Olympic legacies" in relation to people, skills, and employment (2010 Legacies Now, 2009; IOC, 2012).

The Vancouver Games were not without controversy, issues of gentrification and homelessness escalated in the city leading up to the Festival. Low-income housing was demolished during the pre-Olympic development boom combined with reversals of promises of affordable housing harmed the sustainable image the Games organisers envisioned (Esparza and Price, 2015; Essex, 2017). Furthermore, many of the First Nations Aboriginal communities objected to the Games usage of the Inuksuk as a symbol of the games. Arguing that the symbol "reduced, objectified and dehumanized over 630 First Nation Aboriginal communities into a singular 'culture,' which reflected the dominant colonial view of Canadian nationhood" (Perry and Kang, 2012; Essex, 2017). The IOC in the document Sustainability Through Sport, write, however, that the Vancouver Games should be considered a success about Aboriginal peoples, as it was the first Olympic games to work in connection with Aboriginal peoples (IOC, 2012). The IOC also point out that the Vancouver Olympic Committee maximized "opportunities for aboriginal people to fill Games-related jobs; for Aboriginal businesses to win contracts and to develop crucial partnerships showcasing aboriginal talent" (IOC, 2012).

Ecologically the Vancouver games continued to show momentum towards ecologically sustainable decision making. The Speed skating rink was created using salvaged wood from trees killed by mountain pine beetles, a destructive pest to the timber industry (IOC, 2012; IOC factsheet, 2014). The organizing committee also worked to make the games carbon-neutral, they did so with "innovative approaches to energy management were also adopted including the harvesting and reuse of waste heat energy from ice refrigeration plants, the use of clean hydro-power and biodiesel generators" (IOC, 2012). Vancouver also worked to implement a zero-solid waste management program with limited success (IOC, 2012). Lastly, the "IOC's Olympic Games Impact (OGI) study, the University of British Columbia established the UBC Centre for Sport and Sustainability to act as a community resource to capture and transfer knowledge on how sport can create sustainable benefits locally, regionally and internationally" (IOC, 2012; IOC factsheet, 2014). These programs work to

continue to spread sustainable development through sport in Canada. Overall, the Vancouver games massively improved from the legacy set forth by the Montreal Games. Furthermore, Vancouver can be used to show that sustainable development through sport has potential. However, such potential must be met with consistency and adherence to the more than the ecological sustainability objectives. Sustainability through sport must adhere to sustainable objectives of equitability and lasting improvements for the impoverished.

4.13.6 London 2012

London 2012's Olympic Committee embraced the concept of sustainability early on in the bidding process. The Committee structured the bid around five sustainability themes: climate change, waste, biodiversity, inclusion and healthy living (IOC fact sheet, 2014; IOC, 2012). From the outset the cost London games were "woefully underestimated" (Evans, 2017). The publicly funded budget was over 9.3 billion British pounds, more than twice the bid estimate. This 9.3 Billion pounds also did not include "the future costs of staging the event, land acquisition and wider regeneration and transport investment, including the legacy conversion of Olympic facilities themselves" (Evans, 2017). Partly as a result of the exorbitant underestimation in cost, the London Games were prone to "compromises in community benefits (social, local economy and procurement), design quality and after-use" (Evans, 2017). This financial blundering and the concurrent global recession cast quite a pale on the event and its sustainable legacy.

Nevertheless the economic turmoil, the Organisers of the London Games pushed on with the event. Sustainable development was still a key component of the Games. The Olympic village was selected to be on a brownfield site with existing transportation infrastructure. The brownfield site "located in the Lower Lee Valley, had been the site for industry, waterways, marsh and farm land for several centuries, this ignored the reality that much of the land developed for the Olympics was open and green space, albeit with neglected canals and a legacy of polluted land and water" (Evans, 2017). Meaning that after the site was redeveloped and reinvigorated, fixing and addressing the issues of post-industrial pollution and decay, much of the

green space was lost to hardscape. While there was a loss in green space, there was significant work done in pollution remediation (IOC, 2012). The 2012 Games also claim to have created the "largest new city park in Europe." With "at least 45 ha of new wildlife habitats also being created, with the potential to be designated Sites of Importance for Nature Conservation" (IOC, 2012). The organizers also utilized the latest and most green building procedures and materials available (Epstein et al, 2011). These procedures are similar to what was undertaken for the Sydney 2000 games, the Beijing Games of 2008 and the Vancouver Games of 2010. Ecologically and in regards to environmental sustainability by 2012, the Olympic games have developed a pattern to meet acceptable standards to claim sustainability.

Environmental objectives are only a portion of the objectives pushed by sustainable development theorists and adherents. This is what makes the sustainability themes of the London Games concerning. For three out of five of the sustainability themes are environmental concerns and only two concern social issues. Neither of which is poverty alleviation. This is an essential faucet to understanding the London Games as the choice to rejuvenate the Eastern portion of London was its disadvantaged profile in regards to other London areas (Evans, 2017; Davis, 2010). The site of improvement for the Olympic neighbourhoods were economically some of the worst in London at the time. Leading the London Organisers to form a series of visions for the area. "One of the visions of the Olympic host boroughs has therefore been to tackle deprivation through preventing the cycle of gentrification whereby residents who prosper and move out of the area are replaced by higher income newcomers, but this is hampered by the housing market and lack of social housing within the legacy themselves" (Evans, 2010). This strategy has largely failed, one, because of the reality of the financial situation of the games. Secondly, the vision has struggled as there has not been further opportunities to offer affordable housing has not appeared. Either promised housing is not affordable for the residents in question, or it was never built (Evans, 2017; Davis and Thornley, 2010). All together, the Olympic village has resulted in more gentrification and an increase in middle-upper class residents furthering already existent social divisions (Evans, 2017). The resulting legacy of the London Olympic games can be therefore described

as successfully meeting the environmental goals of rendition and reuse of dilapidated and lacking urban space. While the planned beneficial social impacts failed to materialise.

4.14. Summary Of Literature And Further Concerns

Based on the holistic approach towards sourcing materials and the subsequent narrative, it appears that while sustainability has been adopted by the IOC there remains some disconnect in practice. It is clear from this literature review that there still remains some questions worth investigating regarding the Olympics and Sustainable Development. These concerns are namely in respect of urban planning and sustainability of The Festivals many technical demands. With the thorough legacy analysis evidence of the most recent Olympic Games explored in this literature review. It is possible to further analyse these two remaining matters.

5. Applications For Future Mega-Events

What then, is the best sustainable future form for mega-events to take? This section will apply the information gathered in the literature review chapter to describe, in general, a series of measures that could be undertaken to maximize a sustainable future. If mega-events continue to be used as urban landscape modifiers, future events must be congruent with the bottom-line of sustainability outlined in this thesis. Thus, from the planning stage onwards, events should be designed to meet the targets for the UN's Agenda 2030—specifically Goal 11, outlined in Table {5}. Moreover, these events must be held accountable for meeting the actual and expected future needs of the host city itself regardless of the constraints this presents.

The first measures to be undertaken in this regard are in governance and planning accountability. Both governance and planning accountability are critical aspects to ensuring a sustainable future for mega-events. The IOC has, as history shows, been hesitant to take direct responsibility for sustainability of the Olympic Games. Oftentimes, the burden has been on the host city to ensure that sustainable outcomes are presented in the bidding process and seen to throughout the cycle of the

event. However, the IOC has the power to design the Olympic Games and authority over the branding of the event. If the Olympics are to move forwards in sustainable development, the IOC will need to reassume that responsibility. This could be done in a multitude of ways, including requiring more stringent controls over the festival or by ensuring future-use rights over sporting arenas. Adding a new cycle of world class events to take place after the Olympics would allow for the costs of development to be better offset. There is already two examples of this, firstly the Paraolympics and secondly the Junior Olympics (IOC, 2017). These two events are run by the IOC in connection to the Olympic brand, and it would not be impossible for other events to be added to this rotating roster.

Overall, much more importance should be made of the role that the event organizers and city officials have in maintaining accountability to the sustainable outcomes of the event. These measures, preferably, should include and start with a more equitable bidding or selection process for prospective hosts. And likewise, much more accountability must be made in planning sustainable futures during the bidding process. It must be taken into consideration, that in the bidding process for the 2012 Olympic Games. London won based on an ambitious sustainability focused platform. However, the end result was nowhere near what had been presented to the IOC (Evans, 2017). One lingering legacy from the 2012 Olympics, was the much needed and promised social benefits never materialized after the Games. The legacy of the London Games indicates that stronger governance in planning and constructing sustainable futures must be included in future events to ensure their success in meeting their outlined ambitions.

Furthermore, there then needs to be a measured analysis of what can be achieved by mega-events before they are selected as an agent of change. This process should ideally involve strenuous planning as to what needs must be met and then how best to meet those needs using the structure of the event. As opposed to the current method of justifying the event on supposed benefits, real planning towards actual outcomes are necessary. In some small ways, this is already accepted practice by the IOC and by past host cities. The Olympics are used most in urban planning to

meet the four general areas exemplified in the results section. (Table 1) Using the example of transportation, again, the Barcelona games of 1992 are a perfect model for this process. The ring roads, an already existing need for the city, were adapted to meet both the cities' as well as the IOC's requirements. Another excellent recent example is in the use of the Olympics to clean up and regenerate the brown-field sites selected for the Sydney 2000 and London 2012 Games. However, as these three Olympics have shown, using mega-events can be economically taxing, and those costs must be weighed regarding the real benefits to the identified stakeholders. Stakeholder accountability in itself is another legacy issue plaguing current mega-events. As shown in this thesis from the Beijing 2008 Olympic Games, it is the stakeholders who have gained the least but lost the most who are often already disadvantaged peoples before the event. Therefore it will be extremely important for future Games, to identify key stakeholders early on and keep them included throughout the planning process. And in keeping with the bottom line of sustainability, these stakeholders must include the often forgotten poorer or disadvantaged citizens.

Moreover, another top-down measure to be undertaken would be to encourage more creative planning for the event to meet the constraints of the cities existing urban form and not force a rigid event structure onto the host city. In other words, a more plastic design approach. Plasticity, in this case, would make the Olympics, or other events, more desirable for cities which could benefit from using them as a landscape modifier. As a result, cities would be allowed to utilize these events as agents of change in the way they best see fit. This plasticity will also help to make sure that the proposed benefits for the host city are brought to fruition. In general, a Sustainable Olympic Festival would be designed more for the future of the site and its future inhabitants over the immediate needs of the event, an acute departure from the currently established approach. A plastic event could help address the issues of lacking, or less than ideal, future use plans. As has been shown, because mega-events are so fleeting they are often criticized for the infrastructure projects which find little use post-event. These criticisms indicate that the immediate requirements of the event should not come before the needs identified for regional

sustainable development. If the goal is to be sustainable, then the event requirements could instead be met with temporary venues, or in other creative ways, rather than massive expenditures in permanent structures with no clear future-use plans. Necessary permanent structures could then be prioritized for their future applicability to enhancing the urban space. This enhancement could be then fully focused on the development needs discovered in the planning phases of the event.

All things considered, this thesis shows that if mega-events are to continue to be used in transforming urban spaces. Such transformations should be intentionally designed to address the existing and future needs of the prospective host city. Future events, in this case, would not take on an expected and rigid design form. Instead, these events will be more diverse in the approach to their design. For example, a standard approach to the design of the Olympic Games has been a centralized village for housing and event stadia. However, a future Olympic Games could instead be a series of small Olympic hubs connected by an integrated transportation system. These hubs could include housing, stadia, and other infrastructure (temporary or permanent) which is adapted post-event to be seamlessly incorporated into the urban landscape. Depending on the exact needs of the host city, this approach could be used in many ways to address the goals of Agenda 2030. For If the goal is to create urban spaces that are more "inclusive, safe, resilient, and sustainable" (UN General Assembly, 2015). Measures could be taken so that the Olympic hubs are outfitted with new healthcare infrastructure, secure and affordable housing zones, as well as opportunities for recreational infrastructure and additional green space for future inhabitants. Such measures are not a big leap to take, as much of these measures are already currently required in the incredibly detailed, although rigid, instructions for outfitting an Olympic Village. The described scenario is of course just one of the many outcomes that would be possible if mega-events slightly shift towards being more plastic in their design requirements and shifted focus from the immediate to the future usage of the eventing space. By approaching mega-events and urban planning in regards to the bottom line of sustainable development, future events are much more likely to be better at transitioning current urban landscapes sustainably.

Ultimately, the sustainable future for mega-events lies in meeting the described measures, starting with changes to the structure of governance and accountability to the planning during the bidding process. The planning process itself also needs to undergo changes in addressing the needs of key stakeholders, as well as remain accountable to meeting those needs. Lastly, a key to ensuring a sustainable future will be in allowing the design of the event to be much more plastic. Plasticity will allow for flexibility in who can host the games as well as allow the games to be better at integrating the urban infrastructure projects for the event into the overall master plan of the host city. These general measures are easily achievable and, as this thesis details, is the key towards planning more sustainable events.

6. Results

The Olympic Festival faces two significant hurdles when positioned against the idea of sustainable development. Firstly, in what context should the Olympics or any mega-events be used in regional or urban planning? And secondly, if it is accepted that the Olympics can have a place in urban planning, then, how and in what manner do the narrow technical demands of the Festival prove to be a limiting factor if it were to serve as a model for or to achieve the key elements of sustainable development?

To address the first question, it must be made clear that urban-planning and Mega-events have a largely entwined history. The modern Olympic Games have been used to push urban infrastructure projects since the 1960s with the games in Rome (Gold and Gold, 2017). Mega-events have also long been used to promote technological and ideological prowess and prestige, including in city-planning and architecture. A superb example is the Columbus Exhibition in Chicago, which in 1893 led to the *City Beautiful Movement* in Europe and the Americas (Peterson, 1976). In fact, throughout human history, it can be argued that cities have, in part, grown out of events and ritual. America's first city, Caral, located in the Peruvian Supe Valley (Solis, 2006), is considered to have developed out of the ritualistic and

religious importance of the site to the Caral peoples. It is from the remaining archaeological evidence from this period of human civilization that Solis writes; Caral *"…was the center of the greatest economic, social, political and religious dynamism…"* in the Americas. Continued visitation and deference to the religious importance of the site could have led to it being developed. Many of the archaeological remains left at Caral are ritualistic or religious architecture pieces. Moreover, investigating the Egyptian civilization shows a similar evidence and pattern. The Pyramids from the Egyptian eras are purpose built structures correlating with singular events, the accession of the god-like kings and queens to the afterlife (Wheeler, 1935). There is little evidence to show that the archaeological remains from ancient Egypt and Caral are the result of singular mega-events. However, It does not change that cities are, and always have in part been the sites of cultural and ritualistic events from which the stages and infrastructure necessary to hold the event have affected the overall urban form and continuity. Needs have however, changed over the last few thousand years. Cities are now tasked with providing the infrastructure necessary to provision and meet the needs of an overwhelmingly rising number of urban citizens. This question of the role of mega-events, therefore, must be orientated to whether or not mega-events are beneficial or detrimental to the goals of modern urbanity.

Thus, what benefit do mega-events offer to master planners and in the field land use and planning? In the case of the Olympic games, it appears that the festival provides a motivating agenda in which to hitch along further plans and projects (Smith, 2017). A *flagship* opportunity for which all stakeholders have a profound interest in the success of the festival and associated projects (Smith, 2017). Furthermore, the conditions and structure of the Olympic Games provide the opportunity to improve many aspects of urban infrastructure along four general themes: energy, venue housing, transportation infrastructure, and accessibility See Table {1} Lastly, the Olympics offers a catalyzing effect in which projects can commence or be proposed as a result of the new demand and economic market arising from the momentum of the Olympic Movement (Gold & Gold 2017; Essex 1999; Smith 2017; Sanchez 2013).

General Overview of Host City Infrastructural Commitments

Infrastructure Type	Energy	Venues/Housing	Transportation	Accessabiltiy
General Conditions	A secure, reliable and resilient energy supply is required to protect against any disruptions that would negatively impact the athletes and competitions and/or the operations of major stakeholders (broadcast, press, technology), as well as the spectators, the viewing audiences and the global image of the Games and the Host City.	The Key Olympic Venues include all competition venues, the Olympic and Paralympic Village(s), International Broadcast Centre (IBC), Main Press Centre (MPC), Mountain Media Centre (MMC) when relevant, Ceremony stadiums and Medal Plaza(s), Olympic Family Hotel(s) (OFH); accommodation villages, Olympic Parks and major common domains.	All Olympic and Paralympic stakeholders count on safe, efficient, reliable and on-time transport services during the Games. The Transport area should consider all stakeholder needs, including those of the Host City residents, to align Games transport planning with existing Host City operations. A well- executed transport programme meets the needs of all Games stakeholders and contributes to a positive Games legacy by improving transport systems and encouraging the use of public transport in the Host City.	Increasing the accessibility of the host-city through the Paralympic Games for people with disabilities. This includes the Olympic Village and associated buildings, as well as within the Olympic Transportation network.

Table {1} *Source: IOC Host City Contract, 2016*

These four areas of infrastructural development highlighted in Table {1} are increasingly important to cities and regions intent of moving towards a post-industrial city mode, specifically sustainable or socio-ecological modes. These four areas, amongst others, are also heavily explored in the United Nations *Agenda 2030*, the most recent document on sustainable development (UN General Assembly, 2015). It is in this movement towards post-industrial cities and places in which the Olympic games can be co-opted to provide some form of urban renewal or restructuring. These projects take many forms and often result in utilizing the requirements of the Olympic festival to establish or renew ailing infrastructure within the host city, before sustainable development being a core principle of the *Olympic Charter* in 1996. There are two prime examples of this approach to adapt the Olympic requirements to meet long-standing urban infrastructure needs, Seoul 1988 and Barcelona in 1992 Table {2} and Table {3}.

Seoul Olympic Park 1988

Infrastructure Project	Importance/Use
Olympic Expressway	Connected the Olympic Park with the Airport and Seoul's Downtown.
Expansion of Airport, Highways, and Metro System	The city used the Olympic's to address the cities main transportation system. Including the Metro System, Airports, and adding two new motorways.
Athletes Village	5,540 apartment units sold to private owners post-olympics.
Preservation of the Historic Baekje Kingdom Fotress	Discovered during the construction process. The fortress's preservation was incorporated into the master plan.
Rejuvenation of Seoul's Energy and Water Management Infrastructure	An overall city services rejuvenation was undertaken prior to the Games Opening Ceremonies.
Han River Development Project	A complex river restoration project that was completed prior to the Games.

Table {2} *Source: Gold and Gold, 2017*
Image Source: Columbia Libraries Online Image Cach

Barcelona Olympic Park 1992

Infrastructure Project	Importance/Use
Vila Olimpica Residences	The Athlete Villages were sold as 2,500 individual residences post-games.
Vila Olimpica Waterfront	The Waterfront portion of Vila Olimpica underwent a complete restoration and was subsequently rejuvenated.
Telecommunications	The cities telecommunications infrastructure was completely modernised.
Transportation	The Metro, Railway, and Airport were redesigned and extended.
Ronda de Dalt ring road	The ring road was a hugely impactful project, which completely changed automotive transportation in the city.

Table {3} *Source: Smith, 2017*
Image Source: http://bcn87-92.tempusfugitvisual.com/

Of the two legacies, the 1992 Games is the general go-to for this model of urban regeneration. This conferred status is due to the way the Olympic facilities and requirements for transportation were adapted into the Barcelona's master plan. Of the highly touted projects, the waterfront Olympic Village (*Vila Olimpica*) was constructed and sold to the public, and *Vila Olimpica* has been given a high sustainability score (Rowe, 2006) because of its usage of open spaces and the "democratic" restoration of the waterfront to the citizens. However, the social costs and sustainability are often questioned as the project was not overly beneficial to poorer residents in the area (Smith, 2017). Other projects including changes to the transportation plan and creation of unique ring roads for the city also have been characterized positively since the games end. Overall, it is the consensus that the 1992 games established a good "legacy" in the field of urban regeneration (Busquets, 2006; Smith, 2017; Rowe, 2006; Gold and Gold 2017).

Since Barcelona, every Olympic Games has attempted to recreate the success seen in tying urban regeneration to the Olympic Festival, with varying degrees of success as well as failure. Most notably are the Games of Sydney, Athens, and London because of their openness in addressing sustainability as a key issue and in their ambition to drastically use the Olympics for urban landscape transformation. It is the legacies resulting from these Olympic Games which offers surprising concessions Table {4}.

Examples of Olympic Legacies Focused On Urban Regeneration

Olympics	Contributions Towards A Positive Legacy	Contributions Towards A Negative Legacy
Sydney 2000	The "Green Games" in Sydney, were by then the most ecologically responsible in history."(Furrer 2002) The games went on to achieve great success in the introduction of sophisticated environmental management systems as well as the development of regional parklands. The 'Green Games' also came through on promises to remediate the polluted Olympic site, Homebush Bay. Green building guidelines were also implemented, and there was a significant consideration to energy conservation, renewable energy, and passive solar buildings. (Cashman, 2011)(Freestone 2017)	The transport plan has been criticized for not looking beyond the immediate need of the event itself and while it was considered successful for its purpose during the Games. That "success has not been translated into everyday public transport." (Mulley 2014) As a result, the Olympic Park has faced issues in being seamlessly integrated into the metropolitan region.(Freestone 2017) The Olympic Park also faces tough competitiveness with other Sydney neighborhoods on the open market.(Freestone 2017)(Yamawaki and Duarte, 2014)(Smith 2017) Criticisms such as these indicate that although Sydney was a success in 'Green urban design' the Olympic Park lacked a strong future plan for the site Post-Olympic Games.
Athens 2004	The Master Plan of the winning bid "sought to concentrate the Games in a small number of locations while making use of existing sports infrastructure. Indeed, the bid claimed that 75 percent of the competition venues and 92 percent of the training venues were already in place."(Gold 2017) Transportation infrastructure at the time lacked in the Greek capital city, and the master plan highlighted many infrastructural projects. In the bid, "The Olympic Ring project remained as before to link the conurbation sporting venues. Investment in roads and in metro, tramlines and suburban railways would improve movement throughout the metropolis and provide access to the other venues."(Gold 2017) Furthermore, Automotive pollution was addressed in the lead-up to the Games, as the entire bus fleet was replaced with cleaner-greener vehicles.(Gold 2017)(Furrer 2002) Many have noted that it is the Athenian transport plan which is the lasting legacy of the 2004 Games.(IOC 2012)	Critics show that the planning committee did not utilize Strategic Environmental Assessment(SEA) planning.(Zagorianakos 2004) (Gold 2017) The lack of coherent planning resulted in "apparent contradictions" including the use of greenfield sites instead of readily available brownfield sites.(Gold 2017) Overall, the Athens games suffered, like others, from the lack of a long-lasting vision for the infrastructural components associated with the Olympic Games. Moreover, the absence of a coherent and SEA based planning approach overwhelmingly stunted the potential for a legacy of success in sustainable development.
London 2012	For the "Sustainable Games", the Olympic village was selected on a brownfield site with existing transportation infrastructure. The site was redeveloped and reinvigorated, fixing and addressing the issues of post-industrial pollution and decay, The 2012 Games also claim to have created the "largest new city park in Europe." With "at least 45 ha of new wildlife habitats also being created, with the potential to be designated Sites of Importance for Nature Conservation."(IOC 2012) The organizers also utilized the latest and most green building procedures and materials available.(EPSTEIN 2011) These procedures are similar to what was undertaken for the Sydney 2000 games, the Beijing Games of 2008 and the Vancouver Games of 2010.	While the London Games were hailed successful ecologically, that is not the complete picture.The brownfield site "located in the Lower Lee Valley, had been the site for industry, waterways, marsh and farm land for several centuries, this ignored the reality that much of the land developed for the Olympics was open and green space, albeit with neglected canals and a legacy of polluted land and water."(Evans 2017) Meaning that after the site was redeveloped and reinvigorated, fixing and addressing the issues of post-industrial pollution and decay, much of the green space was lost to hardscape. Furthermore, as a result of the exorbitant underestimation in cost, the London Games were prone to "compromises in community benefits (social, local economy and procurement), design quality and after-use."(Evans 2017) Once of the main themes to the London games was to provide affordable housing. Due to the financial collapse during the preparations for the games. the vision struggled. There has not been further opportunities to offer affordable housing has not appeared. Either promised housing is not affordable for the residents in question, or it was never built.(Evans 2017)(Davis 2010) All together, the Olympic village has resulted in more gentrification and an increase in middle-upper class residents furthering already existent social divisions. (Evans 2017)

Table {4} *Sources indicated within table.*
Image Source: IOC.org (IOC, 2017)

As can be seen many projects were completed, and arguably only achievable, due to the Olympic Movement enveloping the host cities. Table {4} highlights a persistent issue concerning the follow-through and implementation of promised future plans for the infrastructure. As well as, either underestimated or under-addressing the social costs resulting from these massive projects. For while the Olympics are certainly a desirable and debatably effective mode in which to address issues of ailing infrastructure and post-industrialization, this figure provides insight into why the Olympics are not a cure-all nor certainty for a complete shift in city mode towards post-industrialization and/or socio-ecological cities. Such a shift requires more than an event to get the ball rolling; it requires good purposeful planning, governance, and a commitment to an applicable future-use plan. In other words, the Olympics can provide the impetus for urban renewal projects to get off

the ground through a huge influx of monitary investment, albeit with potential financial and social detriments for the host city or nation. Using the Olympics as an example, it is clear, that mega-events often introduce a new planning dynamic, facilitating and initiating projects that in non-event contexts are unlikely to see fruition. As is detailed in the Literature Review, Mega-events are great facilitators and disruptors for urban landscape changes. Mega-events cannot however, guarantee the success and benefits of these ambitious development projects. Therefore understanding mega-events, in this context, positions them as useful, and at select times potentially necessary, tools for urban planning.

The second question hinges more on the principles and modern understanding of sustainable development as well as the technical demands of the Olympic Festival; sustainable development is only a recent worldwide agenda goal and initiative its short history is rife with dissenting opinions and understandings as discussed in the Literature Review chapter. In short, sustainable development has been hampered in the past by what Desta Mebratu (1998) describes as "conceptual flaws" from various groups using a select definition of the term. Others have described it as the hijacking or co-opting of the term to be used for the self-interests of various groups (Redclift, 1992; Redclift, 2005; Victor 2006). Nevertheless, the term is in some ways inherently, and unfortunately, flexible. Therefore for the purpose of this masters thesis, the term is to be understood in the way that it is described in the UN's 2030 Agenda for Sustainable Development. A document which addresses the criticisms of the term and returns to the original tenets set in 1987; that "Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs" (Our common future, 1987). With the understanding that "needs" specifically references the needs of worlds impoverished peoples.

Agenda 2030 specifies a series of goals in regards to urban development, of which Goal 11 is to "Make cities and human settlements inclusive, safe, resilient and sustainable"(UN General Assembly, 2016). Table {5}. These targets and indicators provide a basis in which to determine if development projects fit within the scope of

what the UN considers sustainable. It also provides master planners with targets and general thematic concerns to address within their planning since the Olympic Games are now at a scale that they can transform entire urban zones or regions. Goal 11 should be viewed as an appropriate data source to determine whether the technical demands of the Olympics meets the targets of sustainability it proposes.

SUSTAINABLE DEVELOPMENT GOAL 11
Make cities and human settlements inclusive, safe, resilient and sustainable

TARGETS	INDICATORS	TARGETS	INDICATORS
11.1	**11.1.1**	**11.6**	**11.6.1**
By 2030, ensure access for all to adequate, safe and affordable housing and basic services and upgrade slums	Proportion of urban population living in slums, informal settlements or inadequate housing	By 2030, reduce the adverse per capita environmental impact of cities, including by paying special attention to air quality and municipal and other waste management	Proportion of urban solid waste regularly collected and with adequate final discharge out of total urban solid waste generated, by cities
11.2	**11.2.1**		**11.6.2**
By 2030, provide access to safe, affordable, accessible and sustainable transport systems for all, improving road safety, notably by expanding public transport, with special attention to the needs of those in vulnerable situations, women, children, persons with disabilities and older persons	Proportion of population that has convenient access to public transport, by sex, age and persons with disabilities		Annual mean levels of fine particulate matter (e.g. PM2.5 and PM10) in cities (population weighted)
		11.7	**11.7.1**
		By 2030, provide universal access to safe, inclusive and accessible, green and public spaces, in particular for women and children, older persons and persons with disabilities	Average share of the built-up area of cities that is open space for public use for all, by sex, age and persons with disabilities
11.3	**11.3.1**		**11.7.2**
By 2030, enhance inclusive and sustainable urbanization and capacity for participatory, integrated and sustainable human settlement planning and management in all countries	Ratio of land consumption rate to population growth rate		Proportion of persons victim of physical or sexual harassment, by sex, age, disability status and place of occurrence, in the previous 12 months
	11.3.2	**11.A**	**11.A.1**
	Proportion of cities with a direct participation structure of civil society in urban planning and management that operate regularly and democratically	Support positive economic, social and environmental links between urban, per-urban and rural areas by strengthening national and regional development planning	Proportion of population living in cities that implement urban and regional development plans integrating population projections and resource needs, by size of city
11.4	**11.4.1**		
Strengthen efforts to protect and safeguard the world's cultural and natural heritage	Total expenditure (public and private) per capita spent on the preservation, protection and conservation of all cultural and natural heritage, by type of heritage (cultural, natural, mixed and World Heritage Centre designation), level of government (national, regional and local/municipal), type of expenditure (operating expenditure/investment) and type of private funding (donations in kind, private non-profit sector and sponsorship)	**11.B**	**11.B.1**
		By 2020, substantially increase the number of cities and human settlements adopting and implementing integrated policies and plans towards inclusion, resource efficiency, mitigation and adaptation to climate change, resilience to disasters, and develop and implement, in line with the Sendai Framework for Disaster Risk Reduction 2015-2030, holistic disaster risk management at all levels	Proportion of local governments that adopt and implement local disaster risk reduction strategies in line with the Sendai Framework for Disaster Risk Reduction 2015-2030
11.5	**11.5.1**		**11.B.2**
By 2030, significantly reduce the number of deaths and the number of people affected and substantially decrease the direct economic losses relative to global gross domestic product caused by disasters, including water-related disasters, with a focus on protecting the poor and people in vulnerable situations	Number of deaths, missing persons and persons affected by disaster per 100,000 people.		Number of countries with national and local disaster risk reduction strategies
	11.5.2	**11.C**	**11.C.1**
	Direct disaster economic loss in relation to global GDP, including disaster damage to critical infrastructure and disruption of basic services	Support least developed countries, including through financial and technical assistance, in building sustainable and resilient buildings utilizing local materials	Proportion of financial support to the least developed countries that is allocated to the construction and retrofitting of sustainable, resilient and resource-efficient buildings utilizing local materials

Table {5} *Source: UN General Assembly, 2015*

The technical demands the host city must provide are again generally outlined in Table {1}. Essentially the host city is responsible for the creation of athletic and media venues, housing for the athletes and support staff, and a transportation plan that will allow consistent and uninhibited transit of Olympic participants and related personnel throughout the Olympic and Paralympic Games. The amount of venues are dependent on which events are to be held during the particular Games; the IOC allows for temporary venues when suitable, however, the host city must provide adequate training facilities as well as competition venues for each event. The infrastructure required by so many differing events is incredibly taxing on host cities (Gold and Gold, 2017). As many of the event spaces are limited to use for that event and cities might not have existing facilities suitable for use at the Olympic level.

Another concern is the future use of these spaces after the Olympics, there might be little use for a specialised eventing space. It is therefore incredibly important, that these spaces be created so they can best be reused for the needs of the local citizenry. Temporary facilities are also increasingly important to consider in better meeting sustainable eventing goals. As for the Olympic Village, the IOC has capped the number of athletes and support staff to a total of 16,000 individuals and provisions a max of two individuals per bedroom. Technically the infrastructure requirements are quite numerous and complex. However, overall the requirements do not mandate that all services and infrastructure be newly produced solely for the games. Such massive development has been at the discretion of the bidding cities.

From a comparison of Goal 11 from the UN's *Agenda 2030* document, it is obvious that the technical requirements of the Olympic games can be stretched to meet some of the targets outlined. Venues and transportation networks can and have in previous games (See Seoul Table {2} and Barcelona Table {3}) been used to in ways that echo a similarity to the language of targets 11.2-11.4 as well as 11.6-11.7,11.A and B. More recent Legacies including Sydney and London (Table {4}) have shown that the use of brownfield sites, latest greenest technology, and creation of novel or regenerated green space is an achievable target for a modern Olympic Festival.

However, there are issues in relation to the provisioning of affordable housing and upgrading of informal settlements around the globe. Realistically the Olympic Movement is still viable only to cities and regions developed extensively enough to tackle an event of this scale. Meaning that in many cases, there is little chance of the Olympics as being used as a tool in the upgrading of the worlds slums into adequate, accessible, and affordable housing. However, affordable housing is not solely an issue of the "third world" it is a world wide issue. Moreover, it is an issue that has consistently plagued the Olympic Movement. The games of Seoul, Barcelona, Sydney, Vancouver, and London have all been criticised for being short sighted on the creation of affordable housing or on under delivering on the promise of such housing (Smith, 2017; Gold and Gold, 2017).

It is based on this research, that the answer to the second question of whether the Demands of the Olympics limits sustainability. Becomes slightly complicated, as the technical demands although numerous, seemingly can be met in a sustainable way and the IOC has been pushing for such changes. However, the demands of the Olympics still limits *who* can host the event. As well as, *who* is to benefit from hosting the Olympics. As for the first *who*, the technical demands alarmingly limits potential host cities to those that can currently afford to host the event (Furrer, 2002). This severely deprives the potential of other cities, perhaps more needing, of development than others. As for the second *who*, the legacies of the *Regeneration Olympics* and of *Green Olympics* has shown that the poorest of citizens do not reap the benefits of having played host to the Games. Certainly better planning, and a focus on *who* can stand to benefit from the games most as stakeholders, is needed to better realize *Olympic Sustainable Development*.

7. Discussion

As has been previously touched on in this thesis, the world is at a crucial crossroads in regards to the future of human settlements. With the ever increasing human population and expected expansion of urban areas. It will be important that cities continue to grow in such a way that they can provide essential services to their citizens without overburdening natural resource availability. With these constraints, it is ever more important to consider any aspects that can help to achieve a sustainable transition of city mode. The UN has identified sport as an increasingly significant contributor to the goals of sustainable development (UN General Assembly, 2015). In return, the IOC has, in recent years, adopted this role of contributor towards sustainable development as a core principle of the Olympic Movement. Potential host cities have also been quick to proclaim and push the perceived benefits made available to their citizenry as a result of the Olympic Festival. Specifically, host cities have touted the Olympics as a way to develop, and regenerate or re-imagine urban spaces. Therefore, it is important to revisit this assumed role mega-events, such as the Olympics, should have in urban regeneration and sustainable development.

As was detailed in the results section of this thesis, there are two critical questions which needed to be addressed to understand better the role the Olympics should play in the transition towards sustainable/socio-ecological cities. Firstly, this thesis laid out an argument that mega-events have throughout history impacted urban planning projects and shaped urban infrastructure and city form. The Olympics are just a recent, albeit large scale, manifestation. Secondly, it was demonstrated that the Olympics fill the role of a catalyst and act as a desired "flagship" event to facilitate construction and development. These two related functions both stem from arguments made that stress the size and expected economic return of the modern Olympic movement. Using the recorded legacies and data from previous Olympic Games, it was shown that while the festival provided the necessary impetus to start development projects. The ephemeral nature of the Olympics cannot sustain lasting urban changes related to regeneration or development beyond the necessities of the event itself. In other words, better planning results in better cities. And while the Olympics, like other mega-events in history, can, at times, be indispensable tools in kickstarting urban planning projects. The role of the Olympics in urban planning should not be overstated. For as once the closing ceremonies have come and gone. The Olympic movement bubble immediately moves to encapsulate the next host city leaving the infrastructure behind to stand on its own.

It was subsequently discussed in the results whether the technical demands limits the Olympic games as a model for sustainable development as it is laid out in Agenda 2030. As stated, the reality is somewhat complicated as although the technical demands are thorough and numerous. There are currently, and have been, ecologically, economic, and in some ways socially sustainable approaches towards developing Olympic infrastructural projects. Many of which could be seen as in line with the goals of Agenda 2030. (Table {5}) Limitations it would seem, are more restricted towards *who* benefits from these projects once completed. This *who* includes the poorest citizens of Olympic host cities, and as a result of the technical demands. The Olympic Games are still inaccessible for less "developed" nations and

cities as hosts. A trend that overall parallels the north-south division in regards to sustainable development.

Therefore, the results of this thesis indicate that Mega-events are currently likely to be overstated and underperforming in regards to sustainable development. Using the Olympic Games as an example, it was shown that while the Olympics are desirable and impactful in manipulating urban landscapes quickly. There is still much work to be done in making the Olympics a better sustainable development tool. The IOC for their part has knowledge such in their proposed document —agenda 2020 and is using the outlined goals of the document to open the Games to more perspective hosts. It must be noted that the IOC's agenda has not yet been implemented in an Olympic Festival to date. Furthermore, the IOC's approach towards creating a model for sustainability is based on the legacies of previous Olympic Games. There are potentially a few issues with this method. First, a majority of Olympics have been hosted in well developed post-industrial cities. A group of cities that has mostly been based in Europe and North America. Firstly, one implication is that the needs presented and met in these cities might not be representative of most cities in the world, especially the Global South and Asia. Thus skewing the narrative of needs presented by these other cities towards solutions that might be unnecessary or burdensome. Secondly, this approach could constrain sustainable development in general and stall creative solutions for the issues facing future host cities. It would be prudent and interesting to investigate these concerns using the most recent Olympic Games in Rio de Janeiro, the first Festival to be held in South America.

In regards to the above summarized results, while the research was done painstakingly and thoroughly. Some limitations are worth mentioning and exploring further. Firstly, as a result of the available time and resources, it was not possible to examine every Olympic Games in the detail that the Author would have liked. It was instead decided to utilize general thematic and detailed outcome-based, *legacy*, evidence from existing text. This limited the scope of research and potentially oversimplified the concluding results. Preferably further research on this topic would

take the form of examining the technical demands and development, from past and future Olympic Games, in more detail and comparing them to a series of sustainability measures. If possible, it would also be the prudent to take those results and compare them with similar urban development projects. Future work could also branch off of this research and investigate other mega-events as well as the impacts perspective Olympic host cities face during the bidding process.

Moreover, the field of sustainability has begun to look more carefully at the role of governance. With this in mind, more research and investigation should be made into the IOC's governance role for provisioning and ensuring future use planning for Olympic infrastructure. Such commitments could be in the form of contracts and predesignation of housing for poorer residents. As well as, ensuring that some of the infrastructure is reimagined to best benefit the host city. The IOC could also retain usage rights and control over some venues for secondary events to follow in quick succession of the Olympic Games. For example the Youth Olympic Games, or investing in a series of other events capitalizing on the Olympic brand. Thus providing sustained tourism and event related economic benefits, as well as job creation. For the current system all too often produces a vacuum of uncertainty immediately following the closing ceremonies of the Olympics and Paralympics.

While the Olympic movement has now accepted sustainable development as a core principle, it is not yet apparent that the Olympics are truly purveyors of sustainability to the cities which gamble on hosting the event. Based on work done for this thesis, it is evident that mega-events will continue to shape our urban spaces as they will continue to be seen as beneficial aids towards development. It is not yet clear whether sustainability will be the defining practice, however.

8. Conclusion

Looking forward, now that the Olympic Games have moved past Rio and onward towards Pyeongchang for 2018 and Tokyo 2020, it will be the task of researchers and the IOC to craft the legacy of the thirty-first Olympiad in Rio.

Importantly, Rio is another chance to analyze just how sustainably designed the Olympics were. It will also offer a trove of experiences in which future Olympiads can base their designs and policies. However, It is likely that the legacy of Rio will follow the same legacy model as previous games. As has been shown in this thesis, it is probable that Rio over-promised and under-delivered in developing the city in a sustainable way. This, of course, is speculation and the facts will not be known until the work has been done concerning Rio. However, since the IOC has not steered from its consistent policy towards initiating development and based on the thematic trends taken from this thesis. There is every possibility of the Rio Olympics underperforming in regards to creating long-lasting sustainable urban changes for the city of Rio de Janeiro.

The research gained from examining a vast array of interdisciplinary material has provided a good basis in which to move forward with future research on this topic. Not only that, it has contributed towards a broader understanding of mega-events and their impacts in our communities. By continuing to expand our knowledge and working understanding of the subject. We are able to be better policy makers, designers, and global citizens.

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9. Works Cited

2010 Legacies Now, (2009). *http://www.2010andbeyond.ca*

Amero, R. W. (1990). The Making of the Panama-California Exposition, 1909-1915. *Journal of San Diego History*, *36*(1), 1-47.

Attride-Stirling, J. (2001). Thematic networks: an analytic tool for qualitative research. *Qualitative research*, *1*(3), 385-405.

Auerbach, J. A. (1999). *The Great Exhibition of 1851: a nation on display*. Yale University Press.

Balboa Park. (2017). Retrieved December 3, 2016, from www.balboapark.org

Barcelona Image, (2017). Retrieved 2017, from *http://bcn87-92.tempusfugitvisual.com/*

Barkemeyer, R., Holt, D., Preuss, L., & Tsang, S. (2014). What happened to the 'development'in sustainable development? Business guidelines two decades after Brundtland. *Sustainable Development*, *22*(1), 15-32.

Bianchini, F., Dawson, J. and Evans, R. (1992) Flagship projects in urban regeneration, in Healey, P., Davoudi, S., Tavsanoglu, S., O'Toole, M. and Usher, D. (eds.)

Bianchini, F. and Parkinson, M. (eds.) (1993) Cultural Policy and Urban Regeneration: The West European Experience . Manchester: Manchester University Press.

Broudehoux, A. M. (2004). *The making and selling of post-Mao Beijing*. Routledge.

Brunet, F. (2009) The economy of the Barcelona Olympic Games, in Poynter, G. and MacRury, I. (eds.) Olympic Cities: 2012 and the Remaking of London , Farnham: Ashgate, pp. 97–119.

Busquets, J. (2006). Barcelona Revisited: transforming the city within the city. *City Edge*, 34.

Cantelon, H., & Letters, M. (2000). The making of the IOC environmental policy as the third dimension of the Olympic movement. *International review for the sociology of sport*, *35*(3), 294-308.

Cashman, R. (2011). Sydney Olympic Park 2000 to 2010: History and Legacy. Walla Walla Press.

Childers, D. L., Pickett, S. T., Grove, J. M., Ogden, L., & Whitmer, A. (2014). Advancing urban sustainability theory and action: Challenges and opportunities. *Landscape and Urban Planning, 125*, 320-328.

Coaffee, J (Eds.). (2017). In: *Olympic Cities: City Agendas, Planning, and the World's Games, 1896–2020*. Routledge.

Cook, I. (Eds.). (2017). In: *Olympic Cities: City Agendas, Planning, and the World's Games, 1896–2020*. Routledge.

Columbia Online Image Cach, (2017). *Abitare, April 1989 http://www.columbia.edu/cu/gsapp/BT/DOMES/SEOUL/images.htm accessed 2017*

Crompton, J.and McKay, S.L. (1994) Measuring the economic impact of festivals and events. *Festival Management and Event Tourism: An International Journal* 2, 33–43.

Davis, J., & Thornley, A. (2010). Urban regeneration for the London 2012 Olympics: Issues of land acquisition and legacy. *City, Culture and Society*, *1*(2), 89-98.

Denzin, N. K., & Lincoln, Y. S. (2005). 2005. *Handbook of qualitative research*, *3*.

Doyle, T. (1998). Sustainable development and Agenda 21: the secular bible of global free markets and pluralist democracy. *Third World Quarterly*, *19*(4), 771-786.

Engstrand, I. (2015) The Origins of Balboa Park: A Prelude to the 1915 Exposition.

Epstein, D., Jackson, R., & Braithwaite, P. (2011, May). Delivering London 2012: sustainability strategy. In *Proceedings of the Institution of Civil Engineers-Civil Engineering* (Vol. 164, No. 5, pp. 27-33). Thomas Telford Ltd.

Esparza, L. E., & Price, R. (2015). Convergence repertoires: anti-capitalist protest at the 2010 Vancouver Winter Olympics. *Contemporary Justice Review*, *18*(1), 22-41.

Essex, S.& Chalkley, J.S. (1999). Urban development through hosting international events: a history of the Olympic Games. *Planning perspectives*, *14*(4), 369-394.

Essex, S (Eds.). (2017). In: Olympic Cities: City Agendas, Planning, and the World's Games, 1896–2020. Routledge.

Evans, G. (2010) London 2012, in Gold, J.R. and Gold, M.M. (eds.) Olympic Cities: City Agendas, Planning and the World's Games 1896–2016 , 2nd ed. London: Routledge, pp. 359–389.

Evans, G (Eds.). (2017). In: *Olympic Cities: City Agendas, Planning, and the World's Games, 1896–2020*. Routledge.

Freestone, R (Eds.). (2017). In: *Olympic Cities: City Agendas, Planning, and the World's Games, 1896–2020*. Routledge.

Friends of McConnel Springs. (2017). Retrieved January 2, 2017, from *http://www.mcconnellsprings.org*

Friends of The Highline. (2017). Retrieved January 9, 2017, from *http://www.thehighline.org*

Furrer, P. (2002). Sustainable Olympic Games. *Bollettino della Società Geografica Italiana*, (4).

Girot, C. (Ed.). (2006). *The landscape urbanism reader*. Princeton Architecture Press.

Gold, M. M. (Eds.). (2017). In: *Olympic Cities: City Agendas, Planning, and the World's Games, 1896–2020*. Routledge.

Gold, J. R., & Gold, M. M. (2014). Legacy, sustainability and Olympism: crafting urban outcomes at London 2012. *Staps*, (3), 23-35.

Gold, J. R., & Gold, M. M. (Eds.). (2017). *Olympic Cities: City Agendas, Planning, and the World's Games, 1896–2020*. Routledge.

Hiller, H. (2013). *Host cities and the Olympics: An interactionist approach* (Vol. 15). Routledge.

Hornbuckle, A.R. (1996) Helsinki 1952: the Games of the 15th Olympiad, in Findling, J.E. and Pelle, K.D. (eds.) Historical Dictionary of the Modern Olympic Movement . Westport, CN: Greenwood Press, pp. 109–118.

Huang, G., Zhou, W., & Cadenasso, M. L. (2011). Is everyone hot in the city? Spatial pattern of land surface temperatures, land cover and neighborhood socioeconomic characteristics in Baltimore, MD. *Journal of environmental management*, *92*(7), 1753-1759.

Inside San Diego, (February 17, 2017). PRESIDENTIAL VISITS TO SAN DIEGO, *http://insidesandiego.org/2017/02/17/*

International Olympic Committee, (2001), Agenda 21 and IOC requirements. *IOC: Lausanne. www.IOC.org*

International Olympic Committee, (2012). Sustainability Through Sports, 2012. *www.IOC.org*

International Olympic Committee, (2014). Factsheet: IOC Environment Summary July 2014. *Olympic. www.IOC.org*

International Olympic Committee, (2015). Olympic Charter. August 2, 2015. *www.IOC.org*

International Olympic Committee, (2016). Host City Contract: Operational Requirements December, 2016. *www.IOC.org*

International Olympic Committee, (2017). *www.IOC.org*

International Union for Conservation of Nature, Natural Resources, & World Wildlife Fund. (1980). *World conservation strategy: living resource conservation for sustainable development*. Gland, Switzerland: IUCN.

Largest athletes' village in history ready to give guests a very Rio welcome. Rio (2016). https://www.olympic.org/news/olympic-village-opens-as-first-athletes-arrive-for-rio-2016

Lord Coe, S. (2012), Chair, and CEO of the London 2012 Games.

McAfee, K. (1999). Selling nature to save it? Biodiversity and green developmentalism. *Environment and planning D: society and space*, *17*(2), 133-154.

Mebratu, D. (1998). Sustainability and sustainable development: historical and conceptual review. *Environmental impact assessment review*, *18*(6), 493-520.

Mijling, B., van der A, R. J., Boersma, K. F., Van Roozendael, M., De Smedt, I., & Kelder, H. M. (2009). Reductions of NO2 detected from space during the 2008 Beijing Olympic Games. *Geophysical Research Letters*, *36*(13).

Mossop, E (Ed.). (2006). *The landscape urbanism reader*. Princeton Architecture Press.

Mulley, C., & Moutou, C. J. (2015). Not too late to learn from the Sydney Olympics experience: Opportunities offered by multimodality in current transport policy. *Cities*, *45*, 117-122

Patthey, P., Wirthner, S., Signorell, N., & Arlettaz, R. (2008). Impact of outdoor winter sports on the abundance of a key indicator species of alpine ecosystems. *Journal of applied ecology*, *45*(6), 1704-1711.

Perry, K. M. E., & Kang, H. H. (2012). When symbols clash: Legitimacy, legality and the 2010 Winter Olympics. *Mass Communication and Society*, *15*(4), 578-597.

Peterson, J. A. (1976). The city beautiful movement: Forgotten origins and lost meanings. *Journal of Urban History*, *2*(4), 415-434.

Pickett, S. T., Cadenasso, M. L., & McGrath, B. (Eds.). (2013). *Resilience in ecology and urban design: linking theory and practice for sustainable cities* (Vol. 3). Springer Science & Business Media.

Preuss, H (Eds.). (2017). In: *Olympic Cities: City Agendas, Planning, and the World's Games, 1896–2020*. Routledge.

Redclift, M. (1992). The meaning of sustainable development. *Geoforum*, *23*(3), 395-403.

Redclift, M., & Sage, C. (1998). Global environmental change and global inequality: North/South perspectives. *International Sociology*, *13*(4), 499-516.

Redclift, M. (2005). Sustainable development (1987–2005): an oxymoron comes of age. *Sustainable development*, *13*(4), 212-227.

Renson, R. (1996). *The Games Reborn: The VIIth Olympiad*. Pandora.

Rixen, C., Rolando, A., Arlettaz, R., Braunisch, V., Buffet, N., Caprio, E., ... & Freppaz, M. (2013). *The impacts of skiing and related winter recreational activities on mountain environments*.

Roche, M. (1994). Mega-events and urban policy. *Annals of Tourism research*, *21*(1), 1-19.

Roosevelt, T. (1915)

Rothenberg, J., & Lang, S. (2015). Repurposing the High Line: Aesthetic experience and contradiction in West Chelsea. *City, Culture and Society*.

Rowe, P.G. (2006) Building Barcelona: A Second Renaixenca . Barcelona: Actar.

Rydell, Robert W. All the World's a Fair: Visions of Empire at America's International Expositions, 1876–1916. 1984

Sainsbury, T (Eds.). (2017). In: *Olympic Cities: City Agendas, Planning, and the World's Games, 1896–2020*. Routledge.

San Diego Pride, (2017). Retrieved December 16, 2016, from *https://sdpride.org*

Sánchez, F., & Broudehoux, A. M. (2013). Mega-events and urban regeneration in Rio de Janeiro: planning in a state of emergency. *International Journal of Urban Sustainable Development*, *5*(2), 132-153.

Scherer, J. (2011) Olympic villages and large-scale urban development: crises of capitalism, deficits of democracy? Sociology , 45 , pp. 782–797.

Shannon, K (Ed.). (2006). *The landscape urbanism reader*. Princeton Architecture Press.

Shontz, L. (2002). Olympic Games blend political realities with idealism, philosophy and sports. post-gazette.com

Smith, A (Eds.). (2017). In: *Olympic Cities: City Agendas, Planning, and the World's Games, 1896–2020*. Routledge.

Smyth, H. (1994) Marketing the City: The Role of Flagship Development in Urban Regeneration . London: E. and F.N.Spon.

Solis, R. S. (2006). America's first city? The case of Late Archaic Caral. In *Andean Archaeology III* (pp. 28-66). Springer US.

Spector, S., Chard, C., Mallen, C., & Hyatt, C. (2012). Socially constructed environmental issues and sport: A content analysis of ski resort environmental communications. *Sport Management Review*, *15*(4), 416-433.

Steiner, F. (2014). Frontiers in urban ecological design and planning research. *Landscape and urban planning*, *125*, 304-311.

Stimilli, F., ŠĆITAROCI, M. O., & Sargolini, M. (2016). Turin, Sochi and Krakow in the context of winter Olympics. *Prostor*, *24*(1).

Tatom, J. (2006). Urban highways and the reluctant public realm. *The Landscape Urbanism Reader*, 179-195.

Tomlinson, A. (2014). Olympic legacies: recurrent rhetoric and harsh realities. *Contemporary Social Science*, *9*(2), 137-158.

Toulmin, S. (1958). The Uses of ArgumentCambridge University Press. *Cambridge, UK*.

Tryzna, T. C. (1995). A sustainable world. *Sacramento: IUCN*.

United Nations State of World Population, (2007). *State of world population 2007: unleashing the potential of urban growth*. UNFPA.

United Nations General Assembly, (2015). Transforming our world: The 2030 agenda for sustainable development. *New York: United Nations, Department of Economic and Social Affairs*.

United Nations: Stockholm, (1972) United Nations Conference on the Human Environment: Stockholm, 5–16 June 1972

Victor, D. G. (2006). Recovering sustainable development. *Foreign Affairs*, 91-103.

WCED, U. (1987). Our common future. *World Commission on Environment and DevelopmentOxford University Press*.

Wheeler, N. F. (1935). Pyramids and their Purpose II. The Pyramid of Khufu (The Great Pyramid). *Antiquity*, *9*(34), 161-189.

Witte, J. C., Schoeberl, M. R., Douglass, A. R., Gleason, J. F., Krotkov, N. A., Gille, J. C., ... & Livesey, N. (2009). Satellite observations of changes in air quality during the 2008 Beijing Olympics and Paralympics. *Geophysical Research Letters*, *36*(17).

Yamawaki, Y., & Duarte, F. (2014). Olympics and urban legacy in Sydney: urban transformations and real estate a decade after the Games. *Journal of Urban Design*, *19*(4), 511-540.

Zagorianakos, E. (2004). Athens 2004 Olympic games' transportation plan: A missed opportunity for strategic environmental assessment (SEA) integration?. *Journal of Transport Geography*, *12*(2), 115-125.

10. Appendices

Thematic Network Analysis

	Codes	Issues Discussed
Sustainable Development	- Sustainable - Sustainable Development - Brundtland - United Nations - Man and Environment - Nature - Economy - Social Justice - Poverty - Ecology - Conservation	• Limited Resources • Meeting the needs of the present • Provisioning for the future • Stockholm 1972 • "Our Common Future" 1987 • Rio Declaration 1992 • Agenda 2030 • Poverty alleviation • Green Groups • Conflicting interests for what constitutes "sustainable" and the need for "development" • Defining "Sustainable Development" • Term usage from 1987-2015
Urban Development and Land Use Changes	- Sustainable development - Urban Development - Urban Expansion - Urban Design - Cities - Human Settlements - Infrastructure - Industrialization - Sanitary Cities - Socio-Ecological - Ecological zones - Social Zones	• Population growth and future services cities must perform • Cluster Development, movement of people into cities • Landscape Urbanism • Socio-Ecological Cities and City modes • City scape transitions, city mode to city mode transitions. • Sustainable urban development, usage, practice, future
Mega-Events	- Mega-events - Linkages - Catalyst - Urban Change - Urban Development - World Fair - Olympic - Olympic Games	• Mega-events and their effects on regional hosts • Event-led urban development • Mega-events as catalysts for urban development projects
Olympic Games and Sustainable Development	- Olympic Games - Sustainability - Green - Olympic Village - Environment - Urban Development - Catalyse - Urban Regeneration - IOC Agenda 21 - Impact - Host City Legacy - Sustainable Legacy - Olympic Impacts	• History and Changes to the size and impacts of the Olympic Games • The olympic village and technical demands of the Olympic Games • Urban development for the Olympic Games • Usage of the Olympic Games as urban and regional regenerators • The Olympic Games as Flagship events • The linkage of "Long-term preservation of the environment" with "the economic, social and political development geared to aid the poorest of society." IOC Agenda 21 • Role of Sustainable Development in the Olympic Charter • Lessons learned and "legacies" of sustainability from the Olympic Festival

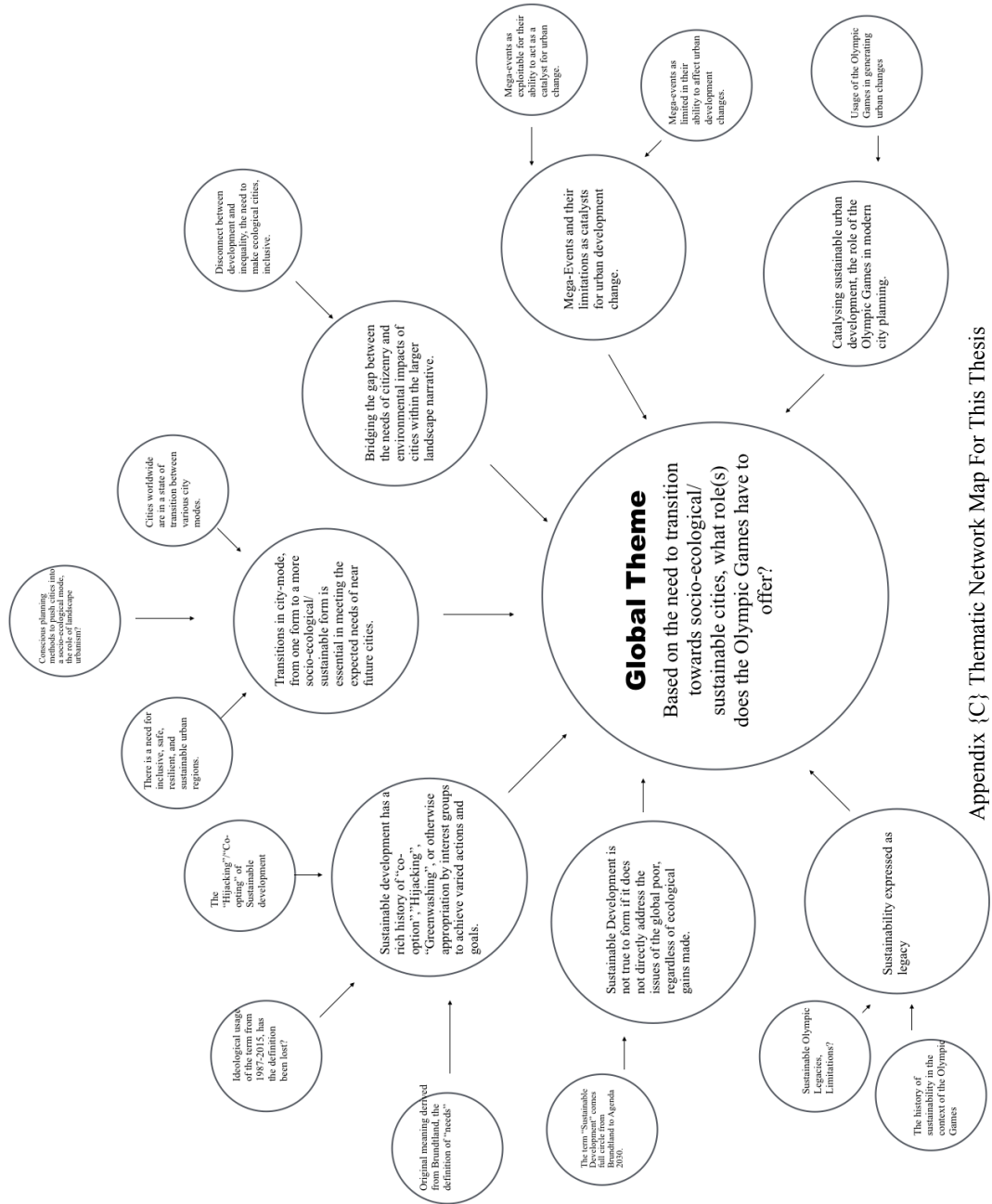Appendix{A} Thematic Network Analysis For This Thesis

Thematic Network Analysis

Themes Identified	Organising Themes	Global Themes
1. Original meaning derived from Brundtland, the definition of "needs" 2. Ideological usage of the term from 1987-2015, has the definition been lost? 3. The "Hijacking"/"Co-opting" of Sustainable development 4. The term "Sustainable Development" comes full circle from Brundtland to Agenda 2030.	✳ Sustainable development has a rich history of "co-option","Hijacking", "Greenwashing", or otherwise appropriation by interest groups to achieve varied actions and goals. ✳ Sustainable Development is not true to form if it does not directly address the issues of the global poor, regardless of ecological gains made.	
5. There is a need for inclusive, safe, resilient, and sustainable urban regions. 6. Cities worldwide are in a state of transition between various city modes. 7. Conscious planning methods to push cities into a socio-ecological mode, the role of landscape urbanism? 8. Disconnect between development and inequality, the need to make ecological cities, inclusive.	✳ Transitions in city-mode, from one form to a more socio-ecological/sustainable form is essential in meeting the expected needs of near future cities. ✳ Bridging the gap between the needs of citizenry and environmental impacts of cities within the larger landscape narrative.	Based on the need to transition towards socio-ecological/sustainable cities, what role(s) does the Olympic Games have to offer?
9. Mega-events as exploitable for their ability to act as a catalyst for urban change. 10. Mega-events as limited in their ability to affect urban development changes.	✳ Mega-Events and their limitations as catalysts for urban development change.	
11. Usage of the Olympic Games in generating urban changes 12. The history of sustainability in the context of the Olympic Games 13. Sustainable Olympic Legacies, Limitations?	✳ Catalysing sustainable urban development, the role of the Olympic Games in modern city planning. ✳ Sustainability expressed as legacy	

Two Resulting Questions based on the literature and thematic network analysis
1. **In what context should the Olympics or any mega-events be used in regional or urban planning?**
2. **Are the narrow technical demands of the Festival, a limiting factor for sustainable development?**

Appendix {B} Thematic Network Analysis Continued

Global Theme

Based on the need to transition towards socio-ecological/ sustainable cities, what role(s) does the Olympic Games have to offer?

Mega-events as exploitable for their ability to act as a catalyst for urban change.

Mega-events as limited in their ability to affect urban development changes.

Usage of the Olympic Games in generating urban changes

Mega-Events and their limitations as catalysts for urban development change.

Catalysing sustainable urban development, the role of the Olympic Games in modern city planning.

Disconnect between development and inequality, the need to make ecological cities, inclusive.

Bridging the gap between the needs of citizenry and environmental impacts of cities within the larger landscape narrative.

Cities worldwide are in a state of transition between various city modes.

Conscious planning methods to push cities into a socio-ecological mode, the role of landscape urbanism?

Transitions in city-mode, from one form to a more socio-ecological/ sustainable form is essential in meeting the expected needs of near future cities.

There is a need for inclusive, safe, resilient, and sustainable urban regions.

The "Hijacking"/"Co-opting" of Sustainable development

Sustainable development has a rich history of "co-option", "Hijacking", "Greenwashing", or otherwise appropriation by interest groups to achieve varied actions and goals.

Ideological usage of the term from 1987-2015, has the definition been lost?

Sustainable Development is not true to form if it does not directly address the issues of the global poor, regardless of ecological gains made.

Sustainability expressed as legacy

Original meaning derived from Brundtland, the definition of "needs"

The term "Sustainable Development" comes full circle from Brundtland to Agenda 2030.

Sustainable Olympic Legacies, Limitations?

The history of sustainability in the context of the Olympic Games

Appendix {C} Thematic Network Map For This Thesis