

## How to explain Olympic Games cost overruns in terms of Project Management<sup>1, 2</sup>

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### INTRODUCTION

"On September 13, 2017 Paris was selected to host the 2024 Summer Olympics that is schedule to take place from 26 July to 11 August 2024"<sup>3</sup>. One of the arguments of the Paris's campaign was that "most of the Olympic events will be held in and around Paris in venues that already exist"<sup>4</sup>. In fact, if the candidature of Paris for this international event was obviously a real opportunity for Paris to develop the city and its image around the world. For those opposed to this project, "it was a real danger for the economy as all the previous Olympic Games were underestimated and caused a lot of money to the host cities"<sup>5</sup>. Indeed, the main problem of the Olympic Games is that cost overrun has become a routine from 2% in 2008 for Beijing to 720% in Montreal in 1976.<sup>6</sup> The average cost overruns for Olympic Games to be a whopping 156% from 1966 to 2016. It means that Rio's Games were a budgeting success by only running 51% overbudget.<sup>7</sup>

But before going further, few terms have to be defined for the well-understanding of the following paper: Program, Assets, Project, Portfolio of Projects, Portfolio of Assets and the application to the Olympic Games.

**Keywords:** Olympic Games, cost overrun, cost estimate, megaproject, risk.

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<sup>3</sup> Payne, M. (2017, September 13). It's official: Los Angeles to host the 2028 Olympics, Paris gets 2024 Games. Retrieved from [https://www.washingtonpost.com/news/early-lead/wp/2017/09/13/its-official-los-angeles-to-host-the-2028-olympics-paris-gets-2024-games/?noredirect=on&utm\\_term=.53ddcd5f6862](https://www.washingtonpost.com/news/early-lead/wp/2017/09/13/its-official-los-angeles-to-host-the-2028-olympics-paris-gets-2024-games/?noredirect=on&utm_term=.53ddcd5f6862)

<sup>4</sup> Gee, O. (2016, February 18). Paris 2024 Olympics: See which events will be where. Retrieved from <https://www.thelocal.fr/20160218/paris-olympics-which-events-where>

<sup>5</sup> Poirier, V. (2017, September 27). The 10 main challenges of the 2024 Paris Olympics. Retrieved from <https://www.institutmontaigne.org/en/blog/10-main-challenges-2024-paris-olympics>

<sup>6</sup> Raul. (2016, August 31). The Costs of the Olympic Games. Retrieved from <https://howmuch.net/articles/olympic-costs>

<sup>7</sup> Raul. (2016, August 31). The Costs of the Olympic Games. Retrieved from <https://howmuch.net/articles/olympic-costs>

	Definition	Application for Olympic Games
Program	<p><u>There are 4 types of program</u>: strategic program, operational program, multi-project program and mega project program.</p> <p>The general purpose of an <b>operational program</b> is to deliver assets and benefits that are critical to the sponsoring organizations day to day operations.</p> <p><b>Strategic program</b> delivers assets and benefits that are directly linked to attaining the sponsoring organization's future state.</p> <p><b>Multi-project program</b> achieves synergies from project with common traits such as shared resources, similar clients or product technology.</p> <p><b>Mega-project program</b> delivers a specific asset to the sponsoring organization.</p>	<p>Here we can consider Olympic Games as a program conducting by the International Olympic Committee. Each Olympic game is a project aiming at the same goal (deliver benefits).</p> <ul style="list-style-type: none"> <li>● <u>Operational program</u>: logistic projects (ticketing...).</li> <li>● <u>Strategic program</u>: building the olympic and paralympic village as a model of sustainable development in order to meet the new resolution of IOC.</li> <li>● <u>Multi-project program</u>: sponsorship/brand communication projects.</li> <li>● <u>Mega-project program</u>: building projects (stadium, olympic pools..)</li> </ul>
Asset	<p>A tangible or intangible resource with economic value that an individual, corporation or country owns or controls with the expectation that it will provide future benefit.</p>	<ul style="list-style-type: none"> <li>● <u>Financial assets</u>: money (sponsors, government and IOC contribution).</li> <li>● <u>Human assets</u>: IOC committee, athletes, employees, project team member...</li> <li>● <u>Physical assets</u>: the infrastructures that already exist.</li> <li>● <u>Knowledge assets</u>: all information and feedbacks from previous Olympic Games.</li> <li>● <u>Intangible assets</u>: copyrights of the Olympics, reputation...</li> </ul>
Project	<p>A project is defined to be "an investment that requires a set of logically linked and coordinated activities performed over a finite period of time in order to accomplish a unique result in support of a desired outcome". "A project may be simple or complex. As an investment each project requires a commitment of financial resources, non-financial resources, or both. Coordinated means that the work of the project is done in an organized way to ensure effective and efficient use of committed resources. The finite period of time may be defined in advance as a constraint, determined by planning. Unique means that the characteristics of the</p>	<p>Concerning Olympic Games, we can take the example of the organization of the opening ceremony. The project needs a commitment of financial resources such as sponsors. There is a final period of time which is the date of the ceremony. The results and outcomes of the ceremony are different depending on the sponsor of the event (a sport brand for instance) and clearly defined in general terms at the start of the project.</p>

	<p>result are different in some identifiable way. The disired outcome is expected to benefit the entity or entities that have invested in the project. The activities, the period of time, the result and the outcome are typically described in general terms at the start of the project, then in more detail as the project progresses."<sup>8</sup></p>	
Portfolio of Projects	<p>A "portfolio of projects" is no different that any investment portfolio, the objective being to minimize the risk and maximize the return. Any organization, be it Owner or Contractor has a portfolio of assets (resources) available to dedicate to projects, with the objective being to develop the best "mix" of projects which will generate the most favourable return on those assets.</p>	<p>Here the portfolio includes the event but also the team member and employees recruited, the supplier choosen, infrastructures are selected... That's why, each city choosen to organize the olympic games will have to manage some portfolios of projects.</p>
Portfolio of assets	<p>The definition of portfolio of assets is the same as any investment portfolio as expressed in the definition of portfolio of project. Only, instead of regrouping different projects, the portfolio of assets, as follow: Human assets, Information assets, Financial assets, Intangible assets.</p>	<p>The portfolio of assests is the mix of assets that the project manager uses: the money, the infrastructures, the employees...</p>

Table 1: assets, program, project and portfolio definitions<sup>9</sup>

The budget estimate, formulated fairly early in the project's planning stage, is "most often based on analogous estimating, taking budget lessons learned from a similar project and applying them to the current project."<sup>10</sup> According to this definition, it's difficult to understand cost overruns for such a kind of megaproject that has been occured every 4 years since 1896. However, going deeper on the complexity of Olympic project allows us to understand more where the problem is. Indeed, Olympic budgets are complex: "In addition to the costs of actually putting on the games, there are all those other factors—infrastructure and land prep, other construction costs, security. And the money to pay for all of that can come from a number of different places, which will surely differ depending on the country and its form of government."<sup>11</sup>

<sup>8</sup> Milsom, P. (2018, April 20). So... What is a Project? Retrieved from <http://www.blog.greenprojectmanagement.org/index.php/2018/04/20/what-is-a-project/>

<sup>9</sup> Harris, P., Kriel, J., LeServe, M., Riaz, Y., Giammalvo, D. P. D., Illingworth, S., ... Weaver, P. (n.d.). 01.1.2.1.05 In *Guild of project controls compendium and reference (car)*. Retrieved from <http://www.planningplanet.com/guild/gpccar/introduction-to-managing-project-controls?fbclid=IwAR28qfz7FcD6qA60E1dtZs03w9m7QRPKd5q1b1dTVNm98qRvAE-Otf0HA>

<sup>10</sup> Phillips, J. (n.d.). Project Cost Management. Retrieved from <https://www.projectsmaart.co.uk/project-cost-management.php>

<sup>11</sup> Vaccaro, A. (2015, February 12). How London's Olympics Went Way Over Budget. Retrieved from <https://www.boston.com/news/business/2015/02/12/how-londons-olympics-went-way-over-budget>

The following Fishbone diagram presents the possible causes to the Olympic Game cost overruns:

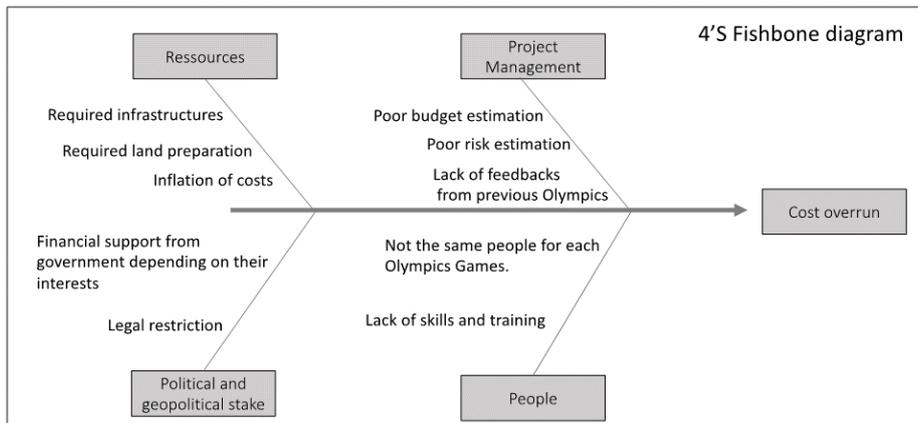


Figure 4's Fishbone diagram<sup>12</sup>

In order to fix the problem of cost overruns, "the International Olympic Committee (IOC) introduced Olympic Agenda 2020 in 2014"<sup>13</sup>. "The 40 recommendations are like pieces of a jigsaw puzzle that, when you put together, form a picture that shows the IOC safeguarding the uniqueness of the Olympic Games and strengthening sport in society" (IOC, 2014)<sup>14</sup>. The reforms follow a year of discussion and consultation with all stakeholders of the Olympic Movement. This document is a strategic roadmap which contains 40 recommendations such as reduce the cost of bidding on the Games and maximize the use of existing facilities so as to enhance the sustainability aspect of the Games while reducing infrastructural expenses.

As a consequence, we understand that cost overruns for Olympics Games are a great challenge for host cities, inevitable and can be explained by many factors. Then a question arises: Why the initial budget cannot be respected, what are the main project management causes of this project failure?

<sup>12</sup> By Author

<sup>13</sup> Duffy, A. (2015, March 23). The Olympic Agenda 2020: A Global Reset for Sport, Sustainability and Legacies. Retrieved from [https://www.huffingtonpost.com/ann-duffy/welcome-to-2015-the-year-b\\_6512992.html](https://www.huffingtonpost.com/ann-duffy/welcome-to-2015-the-year-b_6512992.html)

<sup>14</sup> IOC. (2017, September 7). Olympic Charter & other Official IOC Documents | Downloads. Retrieved from <https://www.olympic.org/documents/olympic-agenda-2020>

## METHODOLOGY

### **Step 1 – Problem identification**

As we mentioned previously, cost overruns in Olympic Games have become a habit every 4 years since 1968. Indeed, the most striking example of this problem is the one of Montreal in 1973 when the cost overruns went over budget by 720%. It may be interesting to see what the link between project management and those cost overruns can be.

- **Delays**

The risks may occur from weather which can delay a competition for instance and lead to cost a lot of money. For example, in February 2018 in South Korea, "strong winds delayed olympic skiing events and the park had to close for few days."<sup>15</sup> But delay can also come from mismanagement such as in 2004, when Athens hosted the Olympic Games. Indeed, the ICO warned twice the government because of the fact that "the Karaiskaki football stadium had been a source of debate for months and only 4 months before the Olympics Open a deal had been agreed but the stadium was still not built."<sup>16</sup>

- **Over promising of benefits**

There is a "mismatch between expected and actual benefit of a mega-event"<sup>17</sup> such as Olympic Games. Each city creates a bid book which will be submitted to the IOC committee with promises about the outcomes of the event. Bid book promotes a vision of urban transformation, with associated costs and benefits. It's a key document for decision-makers to evaluate whether to host an event and invest in it. Cities tend to overvalue the outcomes of hosting the Olympics that can be also a cause of cost overruns.

- **Scope changes**

During a project unexpected things may appear that will require scope changes to occur. "In behavioral terms, scope changes etc. are manifestations of such underestimation on the part of planners, and it is in this sense that bias and underestimation are the root causes of cost overrun. But because scope changes are more visible than the underlying root causes, they are often mistaken for the cause of cost overrun. It is not scope changes, complexity, etc. in themselves

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<sup>15</sup> Hu, E. (2018, February 14). Powerful Winds Delay More Olympic Skiing Events And Force Park's Closure. Retrieved from <https://www.npr.org/sections/thetorch/2018/02/14/585667418/powerful-winds-delay-more-olympic-skiing-events-and-force-park-s-closure>

<sup>16</sup> N/A. (2016, August 25). 'The preparations for Athens 2004 are turning into a theatre of the absurd'. Retrieved from <https://www.theguardian.com/sport/2003/mar/26/olympicgames>

<sup>17</sup> Müller, M. (2015). The mega-event syndrome: why so much goes wrong in mega-event planning and what to do about it. *Journal of the American Planning Association*. Retrieved from: [https://www.academia.edu/15030592/The\\_megaevent\\_syndrome\\_why\\_so\\_much\\_goes\\_wrong\\_in\\_megaevent\\_planning\\_and\\_what\\_to\\_do\\_about\\_it?auto=download](https://www.academia.edu/15030592/The_megaevent_syndrome_why_so_much_goes_wrong_in_megaevent_planning_and_what_to_do_about_it?auto=download)

that are the main problem; it is how human beings misconceive and underestimate these phenomena, through overconfidence bias, the planning fallacy, etc."<sup>18</sup>

- **The "eternal beginner"<sup>19</sup> syndrome**

Biddings move from nation to nation and city to city each time, forcing hosts being into the role of eternal beginners with poor learning across cities. "During 90's the IOC started to see more efficient the knowledge transfer between host cities that might be affected by the "eternal beginner" syndrome."<sup>20</sup> This is a possible reason why cost overruns appear in each Olympics project.

### **Step 2 – Feasible alternative solution to the problem statement**

In order to remedy this situation, we can use the 5 following alternative solutions:

1. The first one would be to focus on existing venues in order to avoid building delays.
2. The second one would be to gather all knowledge and lesson learned from previous edition in a report that each hosting city has access.
3. The third one would be not to give Olympic Games to developing countries an award the rich countries that are better able to absorb more of the cost.
4. The fourth one would be to hire a high skill project team specialised in mega-project in order to avoid delays and to reduce the risk of cost overruns.
5. The fifth one would be to create a strong anti-corruption plan.

### **Step 3 – Development and outcomes for each alternative**

**The first alternative** would be to use existing or temporary venues. During the Olympic Marketing Campaign of Paris in 2016, bid leaders promised that "95 percent of the venues" would be "already existing or temporary to minimize investment."<sup>21</sup> Among recent host cities, the average number of existing venues used is just over 50 per cent, though in most cases these existing venues required modifications to accommodate Olympic events. Temporary facilities are also gaining favour, particularly for outdoor, grass-based sports with lower spectator demand, such as archery, shooting, and equestrian events. "They are attractive primarily

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<sup>18</sup> Flyvbjerg, Bent and Ansar, Atif and Budzier, Alexander and Buhl, Søren and Cantarelli, Chantal and Garbuio, Massimo and Glenting, Carsten and Holm, Mette and Lovallo, Dan and Lunn, Daniel and Molin, E.J.E. and Rønne, Arne and Stewart, Allison and van Wee, Bert, Five Things You Should Know about Cost Overrun (December 13, 2018). Transportation Research Part A: Policy and Practice, vol. 118, December 2018, pp. 174-190. Retrieved from: <https://ssrn.com/abstract=3248999>

<sup>19</sup> Flyvbjerg, B., Stewart, A., & Budzier, A. (2016). *The Oxford Olympics Study 2016: Cost and Cost Overrun at the Games*. Retrieved from <https://eureka.sbs.ox.ac.uk/6195/1/2016-20.pdf>

<sup>20</sup> Pacifico, G. (2016). *Bidding for Megaprojects: A Case Study of the Rome Olympic Games 2024*. Retrieved from [https://tesi.luiss.it/19037/1/665991\\_PACIFICO\\_GIORGIA.pdf](https://tesi.luiss.it/19037/1/665991_PACIFICO_GIORGIA.pdf)

<sup>21</sup> Reuters. (2016, February 17). Paris Highlights Existing Venues in 2024 Olympic Games Bid. Retrieved from <https://www.voanews.com/a/paris-highlights-existing-venues-olympic-games/3195390.html>

because of their cost basis, estimated at approximately one-half to one-third less than building new." <sup>22</sup>

**The second alternative** would be to create a program in order to improve the efficiency in delivering the Games having new host cities and nations learn from the previous ones. In 1990's the committee implemented a program called Olympics Games Knowledge Management Program which "provided an integrated platform of services and documentation, which assisted organisers in their Games preparations, while also aiding the transfer of knowledge from one Organising Committee to another." <sup>23</sup>

**Another alternative** would be for the committee to not reward developing countries with the opportunity to host Olympic Games. Indeed, "the empirical evidence suggests that if rich countries want to promote economic development in poor countries, it would make more sense for high-income nations to explicitly keep these events out of the developing world and instead continue to award the games to rich countries that are better able to absorb more of the associated costs than low-income countries." <sup>24</sup>

**The fourth alternative** would be to hire high-skilled project team specialised in mega-project. The aim is to bring the right combination of skills together is one critical part of successful project management, but also to "manage and integrate that talent properly for the project to go smoothly. Another aspect is to define a clear purpose for why you're hiring, and the exact skills you need, as well as communicating with Independent Professionals clearly in terms of project expectations, and investing in your relationship with them." <sup>25</sup>

**The last alternative** would be to create an anti-corruption plan. For instance the "Three-year anti-corruption plan" <sup>26</sup> adopted in 2016 by the Italian National Olympic Committee (CONI) can be a good example of an anti-corruption process. The process of preventing corruption, as a methodology used to decrease the probability that risk will occur is structured in the following logical steps:

1. Internal and external context analysis;
2. Risk assessment;

<sup>22</sup> Grant Long, J. (2017). Media Objects Articles Rethinking Olympic Infrastructure En Gb. Retrieved from <https://lsecities.net/media/objects/articles/rethinking-olympic-infrastructure/en-gb/>

<sup>23</sup> The International Olympic Committee. (2014, January 22). Olympic Games Knowledge Management programme provides 'essential' resource for Games organisers. Retrieved from <https://www.olympic.org/news/olympic-games-knowledge-management-programme-provides-essential-resource-for-games-organisers>

<sup>24</sup> Matheson, V., & Baumann, R. (2013, August). Infrastructure Investments and Mega-Sports Events: Comparing the Experience of Developing and Industrialized Countries. Retrieved from [http://web.holycross.edu/RePEc/hcx/HC1305-Baumann-Matheson\\_MegaEventsDeveloping.pdf](http://web.holycross.edu/RePEc/hcx/HC1305-Baumann-Matheson_MegaEventsDeveloping.pdf)

<sup>25</sup> A-connect. (2017). How efficient project management could have streamlined the lead-up to the 2016 Rio Olympics. Retrieved from <https://www.a-connect.com/acknowledge/how-efficient-project-management-could-have-streamlined-the-lead-up-to-the-2016-rio-olympics/>

<sup>26</sup> Italian National Olympic Committee. (2016). The three-year anti-corruption plan. Retrieved from [https://www.coni.it/images/PTPC\\_2018-2020\\_eng.pdf](https://www.coni.it/images/PTPC_2018-2020_eng.pdf)

3. Risk treatment;
4. Implementation and monitoring over the process operation.

#### **Step 4 – Selection of the criteria to accept or reject the alternative solutions**

In order to choose which one of the 3 different alternatives above is the best solution to solve our problem, an MADM (Multi-Attribute Decision Making) is needed in order to reject any poor alternative.

The following attributes seem the most relevant to show how effective each alternative is:

**-The cost savings obtained thanks to the chosen alternative:** as cost overruns are our main problem, the solution that will be accepted must allow cost savings.

**-The time-saving obtained thanks to the chosen alternative:** as delays are one of our four main problems, the solution that will be accepted must allow time savings

**-The realistic estimation of benefits obtained thanks to the chosen alternative:** as over promising of benefits is the second main problem, the solution that will be accepted must allow good estimation of benefits.

**-The risk of corruption obtained thanks to the chosen alternative:** as corruption is one of the main problem when it comes to attribute the Games to a Country and can lead to a financial disaster.

**-The knowledge transfer about Olympics PM thanks to the chosen alternative:** as "the eternal beginner" syndrome and misconceiving or underestimating scope changes are the last main problems, the solution that will be accepted must allow good transfer of knowledge.

**-The knowledge of mega-project management obtained thanks to the chosen alternative:** as mega-projet requires high-skilled people in order to prevent scope changes.

**-The sustainability obtained thanks to the chosen alternative:** as cost overruns appear for each Olympic game, the solution that will be accepted must be sustainable.

**-The control of process to the chosen alternative:** "Controlling consists of verifying whether everything occurs in conformity with the plans adopted, instructions issued and principles established"<sup>27</sup>. Here the solution that will be accepted must allow to have control on the budget.

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<sup>27</sup> Definition of controlling. (2018, November 21). Retrieved from [https://www.managementstudyguide.com/controlling\\_function.htm](https://www.managementstudyguide.com/controlling_function.htm)

We get the following table to support our decision-making:

Attributes	Focus on existing venues	Create a lesson learned report	Ban the application of developing countries	Hire high-skilled project team	Create a strong anti-corruption plan
Cost saving	Better	Better	Better	Better	Better
Time saving	Better	Better	Worse	Better	Worse
Good estimation of benefits	Better	Better	Worse	Better	Worse
Risk of corruption	Worse	Better	Better	Worse	Better
Knowledge transfer	Worse	Better	Worse	Equal	Worse
Knowledge of MegaProject Management	Worse	Better	Worse	Better	Worse
Sustainability	Better	Better	Equal	Better	Better
Controlling	Better	Better	Equal	Better	Worse

Qualitative analysis – Multi-Attribute Decision Making table<sup>28</sup>

**Commented [DPDG1]:** Don't you think this table would be more LEGIBLE and PROFESIONAL looking if you used WHITE fonts on the Dark Blue background? Either that or leave the fonts black and use a light blue background for the Feasible Alternatives and Attributes?

The table is filled in with a color code, as follow:

- A green score indicates that attribute has the best impact on the Olympic Games organization.
- A yellow score indicates that the attribute has a positive impact on the Olympic Games organizations but implies some changes.
- A red score indicates that the attribute is the worst one among the others in term of a chosen alternative answering our problems.

In conclusion of the matrix table above, we can observe that the best alternative is “to create a lesson learned report”, whereas, the worst alternative is to “create a strong anti-corruption

<sup>28</sup> By Author

**plan"** as it has 3 red scores and 3 yellow scores, it means that it's the worst option in project management compared to the other alternatives, as it will not be enough to avoid cost overruns. Therefore, we can eliminate the fifth alternative.

## FINDINGS

### ***Step 5 – Development and outcomes for each alternative***

In previous steps we have identified the causes that lead Olympic Games to cost overruns and we have established five possible alternatives that could help to solve the problem.

A qualitative analysis determined that the last alternative was the one to be eliminated at first. To confirm it, let's do a quantitative analysis that will help us to define the best solution to answer our problem. To obtain this quantitative analysis, we are keeping previous attributes, converting the color code and qualitative classification into a quantitative analysis.

To be able to process, we need to use a weighted technique. We consider this conversion:

Attribute	Score
Better	1
Equal	0,5
Worse	0

Conversion table<sup>29</sup>

The table below indicates the final score of each attribute related to the possible alternatives:

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<sup>29</sup> By Author

Attributes	Focus on existing venues.	Create a lesson learned report	Ban the application of developing countries	Hire high-skilled project team	Create a strong anti-corruption plan
Cost saving	1	1	1	1	1
Time saving	1	1	0	1	0
Good estimation of benefits	1	1	0	1	0
Risk of corruption	0	1	1	0	1
Knowledge transfert	0	1	0	0,5	0
Knowledge of MegaProject Management	0	1	0	1	0
Sustainability	1	1	0,5	1	0,5
Controlling	1	1	0,5	1	0
<b>TOTAL</b>	5	8	3	6,5	2,5

Quantitative analysis – Multi-Attribute Decision Making table<sup>30</sup>

The quantitative table definitely confirmed us that we can delete the last alternative, but we can also eliminate the alternative number 3 " ban the application of developing countries ". To determine the best alternative among the tree last ones, and their efficiency to put an end our problem, an additive weighting model is needed.

We get the following table:

<sup>30</sup> By the Author

Attributes	Step 1	Step 2			Alternative 1		Alternative 2		Alternative 4	
	Relative rank	Normalized weighted (A)			(B)	(A) x (B)	(C)	(A) x (C)	(D)	(A) x (D)
Cost saving	1	1/36	=	0,028	1	0,028	1	0,028	1	0,028
Time saving	3	3/36	=	0,084	1	0,084	1	0,084	1	0,084
Good estimation of benefits	2	2/36	=	0,056	1	0,056	1	0,056	1	0,056
Risk of corruption	4	4/36	=	0,011	0	0	1	0,011	0	0
Knowledge transfert	5	5/36	=	0,139	0	0	1	0,139	0,5	0,0695
Knowledge of MegaProject management	6	6/36	=	0,167	0	0	1	0,167	1	0,167
Sustainability	7	7/36	=	0,195	1	0,195	1	0,195	1	0,195
Controlling	8	8/36	=	0,23	1	0,23	1	0,23	1	0,23
<b>TOTAL</b>	36		SUM	1,00	SUM	0,593	SUM	0,91	SUM	0,8295

Additive weighting model analysis<sup>31</sup>

**Step 6 – Ranking and selection of the preferred alternatives**

Thanks to the quantitative and qualitative analysis, we can confirm that the second alternative "create a lesson learned report" is by far the best alternative to reduce cost overruns.

However, the fourth alternative was also interesting in term of risk management, but as we can see from the relatively weighted technique, the alternative one is better than the second one. Considering  $8/6,5 = 1,23$  and  $1,23 * 100 = 123\%$ , therefore, the second alternative "create a lesson learned report" is 123% better than the fourth one "hire high-skilled project team".

<sup>31</sup> By the Author

Moreover, if we take into account the importance of the specified attributes and use the figure 4 with the additive weighted technique. Considering  $0,91/0,8295 = 1,097$  and  $1,097*100 = 110\%$ , this time, the second alternative "**create a lesson learned report**" is 110% better than the fourth one "**hire high-skilled project team**".

After analyzing these results, even if the second alternative is recommended, we are able to provide a final ranking of the alternatives:

Ranking order	Color code	Alternatives
1	Green	Create a lesson-learned report.
2	Yellow	Hire high-skilled project team.
3	Orange	Focus on existing venues.
4	Red	Ban the application of developing countries
5	Dark Red	Create a strong anti-corruption plan

#### Step 7 – Performance monitoring and post evaluations of results

The use of a multi-attribute decision model based on satisficing requirements helped us to assess the alternatives in a quantitative model. According to both tables, we can assume the second alternative "create a lesson-learned report" is recommended to solve the thesis problematic.

In order to track the performance of that solution, different strategies exist:

- Ensure that a project is aligned with the warnings of the lesson-learned report.
- Make comparisons between previous projects and actual projects in terms of cost, time and management.
- Use all advices from this report when designing the budget of each project and also take into considerations all scope changes that previously occurred.

#### CONCLUSION

Firstly, thanks to a root cause analysis, we identified four main causes of cost overruns linked to project management: **the delays, the over promising of benefits, the scope changes and the "eternal beginner" syndrome**. In this manner, our research was focused on the alternatives that may be applied and that would allow putting an end to the previous problems.

Secondly, this paper demonstrated that several solutions are easily applicable to project management. Through different research, we came with five feasible alternatives which are:

**focus on existing venues, create a lesson-learned report, ban the application of developing countries, hire high-skilled project team and create a strong anti-corruption plan.**

Thirdly, thanks to qualitative and quantitative tables and based on attributes directly coming from our root cause analysis, we have been able to answer our question and determine the most efficient solution: **create a lesson-learned report based on previous Olympic projects.**

**Indeed**, this alternative was already set up by the International Olympic Committee (IOC) introduced "Olympic Agenda 2020 in 2014"<sup>32</sup> This document is the strategic roadmap which contains 40 recommendations such as reduce the cost of bidding on the Games and maximize the use of existing facilities so as to enhance the sustainability aspect of the Games while reducing infrastructural expenses. This program is currently applied successfully to Tokyo 2020 Olympic Games and the president of the Tokyo Olympic committee declared himself on 18 December 1st: "We received an update that savings of USD 4.3 billion could be achieved thanks to the IOC reforms of Olympic Agenda 2020/New Norm."<sup>33</sup>

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**Commented [DPDG2]:** You have met the technical specifications for the number of references required for the 1<sup>st</sup> draft and your citations are correctly formatted using APA style.

Don't forget to check your technical specifications as the number of required references changes as your paper progresses.

Also be 100% certain that any reference cited in the body of your paper also appears here in your Bibliography. (Why don't I see the references for the Guild's Definitions here?)

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