THE FUTURE OF SKI IN AOSTA VALLEY. TECHINCAL AND ECONOMIC PRATICABILITY OF ADAPTATION STRATEGIES FOR GLOBAL WARMING.

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–ABSTRACT-

The economy of Aosta Valley finds in tourism its fundamental asset. The majority of tourists join the region in two year's periods: the summer and the winter. Winter season, from December to March / April, attracts many "snow tourists", which is to say skiers. In what could be called a "good" winter, in Aosta Valley there are approximately three million of "first passages" in the ski resorts (this data is comparable to daily skipass tickets selling). The absolute majority of presents skiers in region do alpine ski (97%), whereas the rest of them do cross-country ski (3%). The distribution of skiers is most heterogeneous on 21 alpine ski stations and 24 cross-country ski stations.

For ski practice, snow is necessary; in order to open ski tracks at least 30 centimetres of snow are needed. Also the duration of snow is an essential aspect; economic sustainability for a ski station has been calculated in 100 days of ski tracks opening (Abeeg, 2007). Unfortunately, global warming negative effects hit snow precipitations and duration of snow at ground. In the European Alps, a latitudinal zone which is particularly affected by global warming , an increase of negative Statistic Anomaly Index for snow precipitations and its duration at ground has been registrated since the 80's. This concrete environment risk leads ski resorts companies to invest more and more in adaptation strategies against lack of natural snow: in particular snowmaking machines and new ropeway at a higher altitude (strategies analysed in my graduation thesis).

Starting with these considerations, my graduation thesis aims at assuming how will ski supply be in Aosta Valley with an average temperature increase and new investments in snowmaking machines. At first I fixed a minimum altitude border of natural snow for ski practice; (in the case of Aosta Valley 1500 metres above sea level with +0°C and 2100 metres above sea level with +4°C) (Abeeg, 2007). After, I calculated the hectares of ski tracks under the minimum border of natural snow and, in particular, those devoid to snowmaking systems. This part of analysis allowed calculating the impact of the lack of natural snow for ski resorts (Figures 1 and 4). In the second part of the analysis I calculated the costs for installation (to amortize in 8 years) and cost management of new snowmaking machines: 50.000 €/ hectare/year (CIPRA, 2009) (Figures 3 and 6) and costs for new ropeway lines at higher altitude (these costs are different and depending on the project and morphological situation). These new costs are added to ordinary management costs of the ski station. The last part of the analysis compared two hypothetic decisions of ski resort's managers: "invest" or "not invest". In the first: profits of skipass selling will be remain stable but management costs will increase. In the second: profits of skipass selling will reduce proportionately at ski resort's sensitivity at lack of natural snow (Figures 2 and 5), but management costs will be stable. Those hypothesis were calculated for ski stations one by one and the results were summed in order to have a regional situation of ski supply in every temperature increase scenario.

The results demonstrate that cross-country ski sector will have considerable damages with just an increase of 1°C, because the majority of ski tracks are located at lower altitudes and cross-country ski stations don't have many snowmaking systems. In addition, new investments in snowmaking machines will be not economically sustainable for this ski sector because of the little profits created during winter seasons. The situation for ski alpine sector is more complex to look at big ski resorts and medium and little ski stations. Generally, the ski alpine sector will remain stable until an increase of +4°C; but only big ski resorts will have enough capitals for investments in adaptation strategies. In this case, only five big ski resorts would have the resources to invest in different strategies of adaptation: Courmayeur-Mont-Blanc; La-Thuile; Pila; Monterosa Ski and Cervinia. For this reasons it will be fundamental a reorganisation of the regional ski

supply through two assets. The first will concern a different targeting of sliers (international skiers and tourists with higher budgets in big ski resorts; and skiers with lower budget for medium ski stations). The second asset will be homogenous ski supply in regional territory (saving local tourism induced activities). For cross-country ski sector will be important to invest in snowmaking machines in big ski stations Cogne; Brusson; Saint-Barthélèmy and Courmayeur-Val Ferret. The little ski stations will have to change their winter tourism mission, they will target different tourists (relax, wellness and cultural tourism are some ideas). In this process of ski supply reorganisation, the big ski companies will have a key position in industrial fusions and common management because of theirs economic strength. Also the regional government will play an important role in creating a unified marketing and touristic promotion.

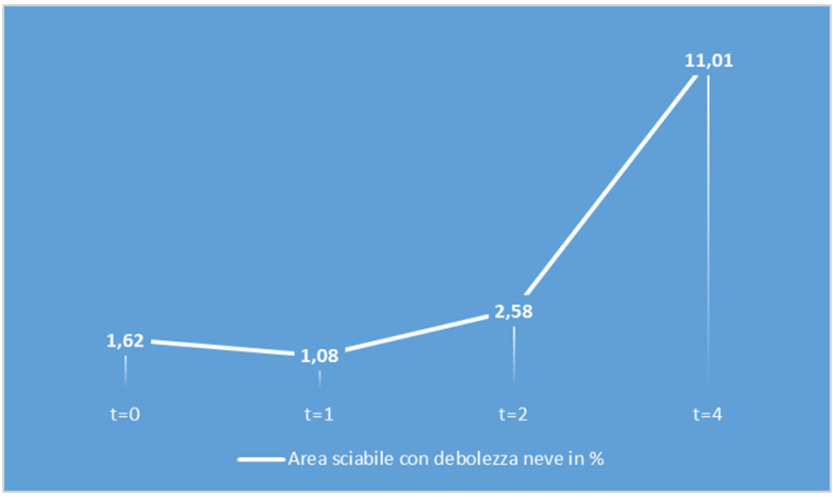

Figure 1 Alpine ski hectares lack of natural snow (in %). Date: Marcello Joly 2016

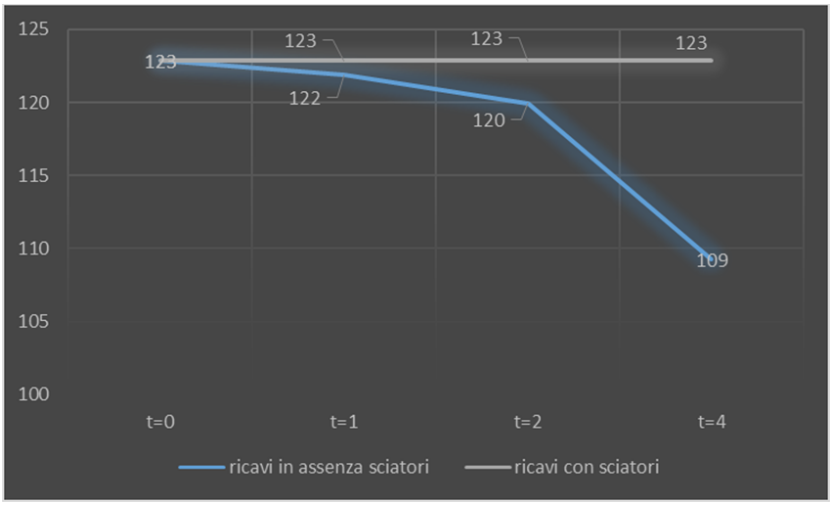

Figure 2 Alpine ski loss of ski's profits with snow lack (in million €). Date: Marcello Joly 2016

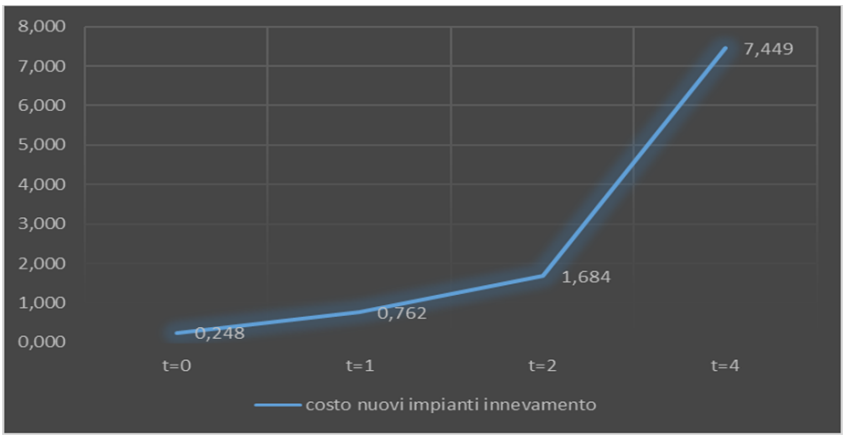

Figure 3 Alpine ski, investment cost of new snowmaking system (in million €). Date: Marcello Joly 2016

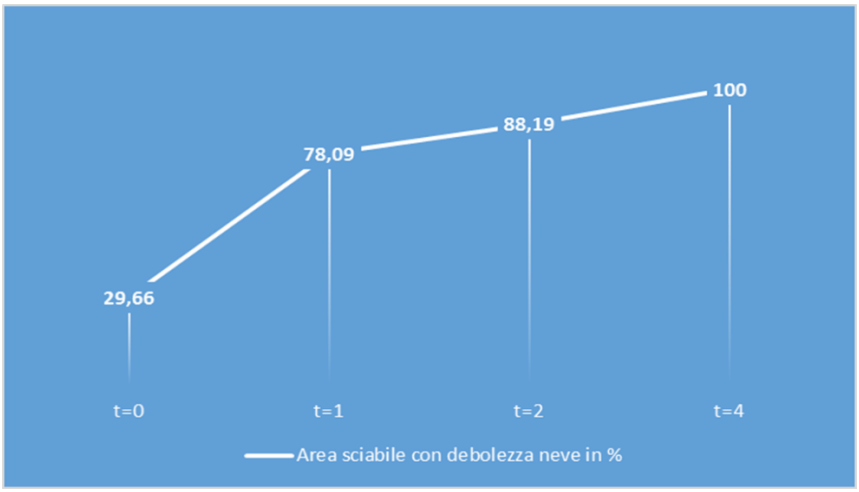

Figure 4 Cross-country ski hectares with lack of natural snow (in %). Date: Marcello Joly 2016

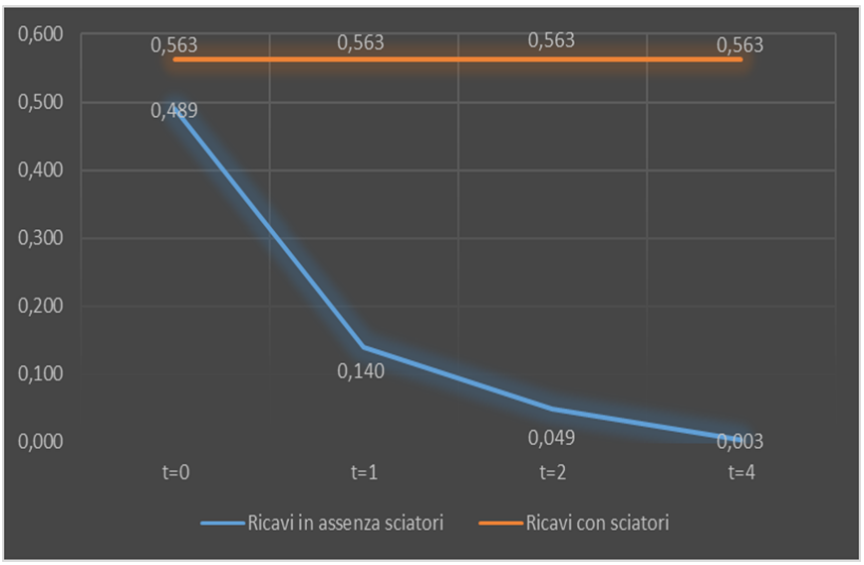

Figure 5 Cross-country ski loss of ski's profits with snow lack (in million €). Date: Marcello Joly 2016

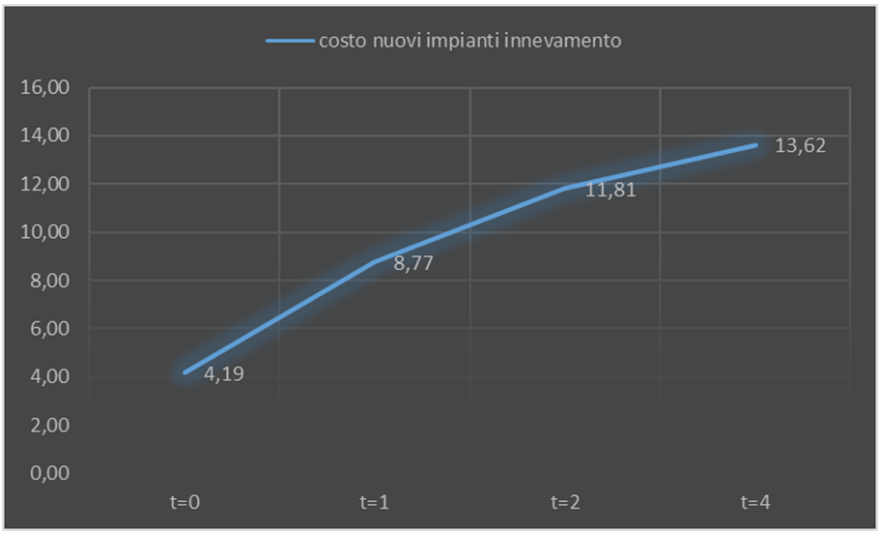

Figure 6 Cross-country ski investment cost of new snowmaking system (in million €). Date: Marcello Joly 2016