FINANCIAL NETWORKS AND SUSTAINABLE TRANSPORTATION SYSTEMS

CONNECTION BETWEEN THE TWO SKIING AREAS SCHWAZ AND HOCHFÜGEN

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Introduction:

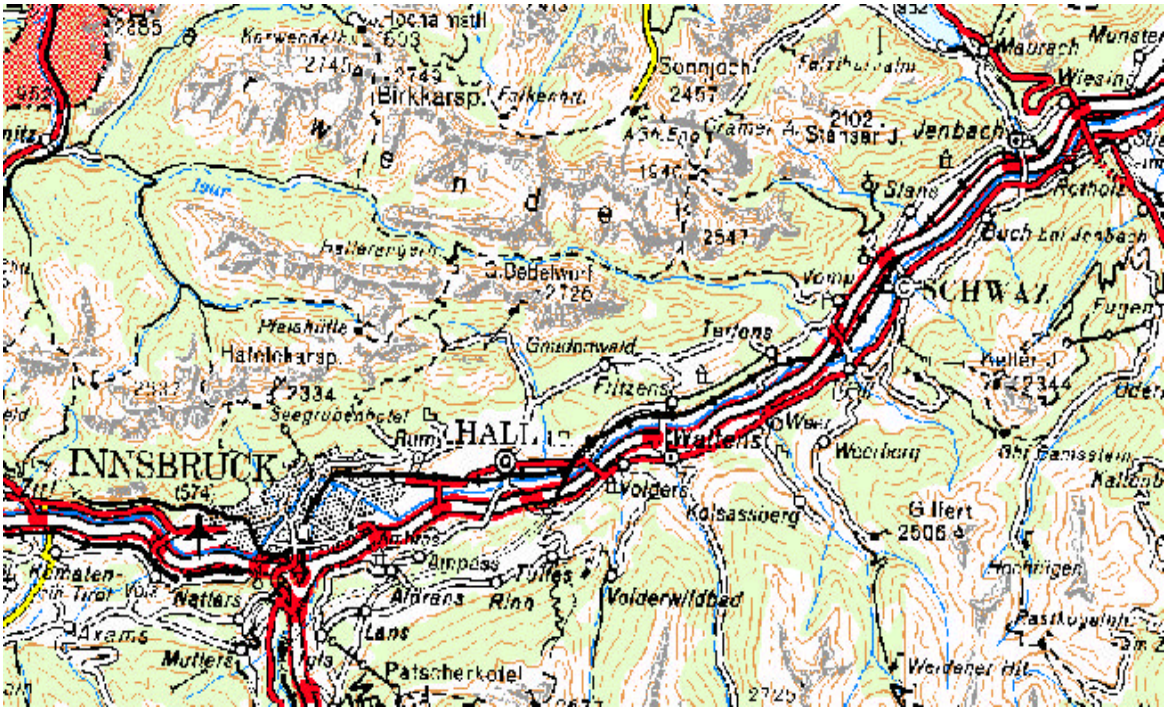
When we thought about a topic for this seminar paper and presentation, we were pretty sure that it should be about something that takes place somewhere close. We had the idea of writing about a skiing area, because we thought ski lifts actually serve as transportation networks, and in Austria, especially in Tyrol, there are lots of skiing areas.

Stefan came up with our final topic which is the connection of two skiing areas, Schwaz and Hochfügen. Because Stefan lives in Schwaz it was a lot easier for us to get all the information needed, and of course he had all the background information.

Before going into detail we'll tell you a little bit about the skiing areas, show you on maps where those places are located, and then will finally get to all the aspects of the final connection and what it's actually about.

Description of Schwaz:

Well, not everybody knows where Schwaz is located, therefore a little map to make this clearer. Schwaz is about 15 miles east of Innsbruck. It's a rather small town with about 13.000 inhabitants.

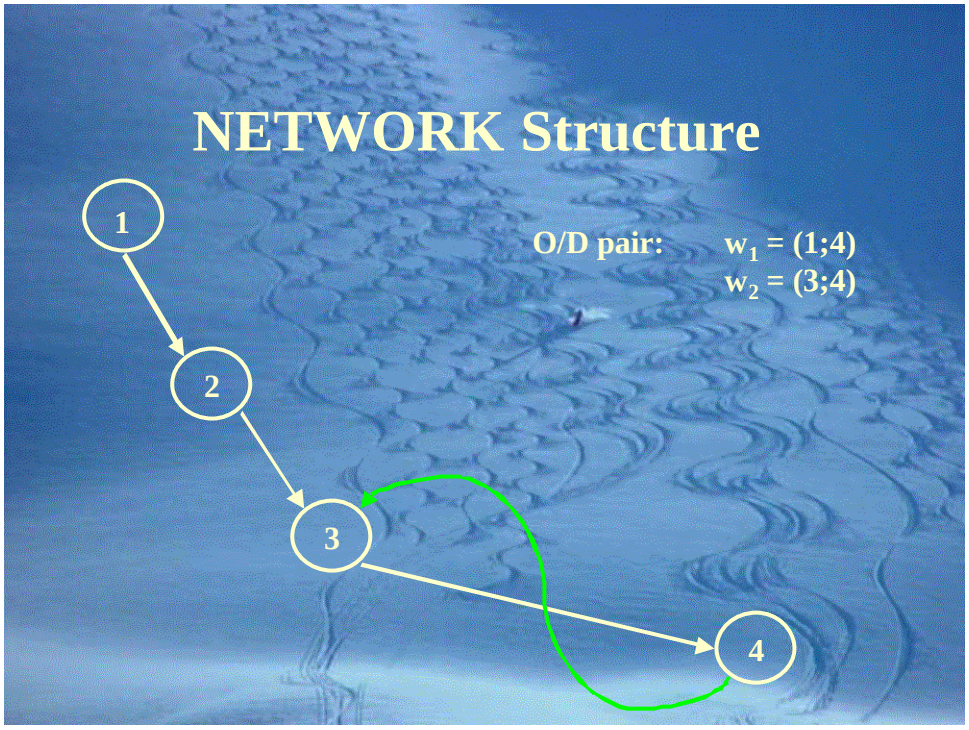


Schwaz has only a small skiing area which is called Kellerjoch. There are only three really old chairlifts which are totally out of date, very slow, and therefore not attractive to tourists or even the inhabitants at all. Believe it or not it takes you almost an hour until you're on top of the mountain where you can finally start skiing. Because of these circumstances hardly anyone, and if almost only the inhabitants of Schwaz and the surrounding villages, use these ski lifts, and therefore the whole skiing area is not profitable at all. The ski lifts are in such bad condition, that something has to be done within the next couple of years, otherwise the operating permissions will be withdrawn. We'll show you all of the lifts on this map. This map shows you how it's actually supposed to be, but three of these ski lifts have already been closed, or they were never built.

That's not really interesting for anyone, therefore hardly any tourists go on skiing vacation there, and because of that the skiing area doesn't make any profit, as said before. Well, the city of Schwaz thought that something had to be done to improve this situation.

If nothing's done we definitely don't see a future for this skiing area.

Before we'll tell you more about the main thoughts, let me show you the structure of the existing ski lift network.



What are the possibilities for the skiing area Kellerjoch?

The first solution is of course that all of the chair lifts could simply be shut down, because that wouldn't cost any money, and if hardly anyone uses them anyhow, no one would really miss them.

Sure enough there has to be a better solution around, because nobody would be better off if all the lifts are closed.

Another possibility would be to build completely new lifts in Schwaz, but this idea is also not very useful, because the area is just too small and there isn't any space for new lifts and slopes.

So, how can it be achieved then that Schwaz becomes more interesting for winter tourism?

The solution to this problem is actually very simple: **A connection to a bigger skiing area** would solve all of the problems!

The development of the last couple of years has shown that skiing areas can only be competitive if the ski runs qualitatively and quantitatively satisfy the growing demands of the tourists. As you all know tourists nowadays want bigger skiing areas, longer slopes, good hotels, and the skiing area should be easily reachable by highway.

This assumption led the tourist office and the town council of Schwaz to give this assignment to a consulting agency to do research on this subject and find possible connections.

In the summer of 2000 there were already thoughts in the air about the possibility to connect Schwaz and Hochfügen. We thought this is a really good idea, and started to think about this connection more in depth, about the positive and negative aspects that would come up if such a connection were established.

The first thoughts were of course: what should be the main aim of such a connection? Therefore we started by defining a couple of basic goals.

- As said before the main goal should definitely be that the city of Schwaz becomes more interesting for winter tourism

- The skiing area Schwaz should be a real part of the planned connection and should not only serve as a feeder service for the skiing area Hochfügen-Kaltenbach.

- Of course the existing ski lifts have to be improved too.

- Traffic through the Ziller Valley should be reduced.

What are the requirements of the other skiing area?

- It should be in relatively close distance; it wouldn't be very easy to build lifts if there are five mountains in-between.

- The area has to be avalanche secure, of course avalanche fences will have to be set up, but the area should be pretty avalanche secure to start with, otherwise you wouldn't be allowed to build lifts there

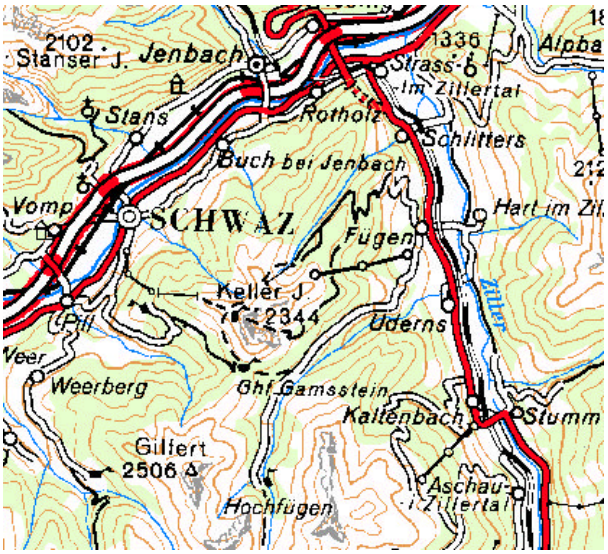
- .The connection if established has to be advantageous for both skiing areas

- Of course it has to be profitable in the long run, because a lot of money will be invested in a project like that.

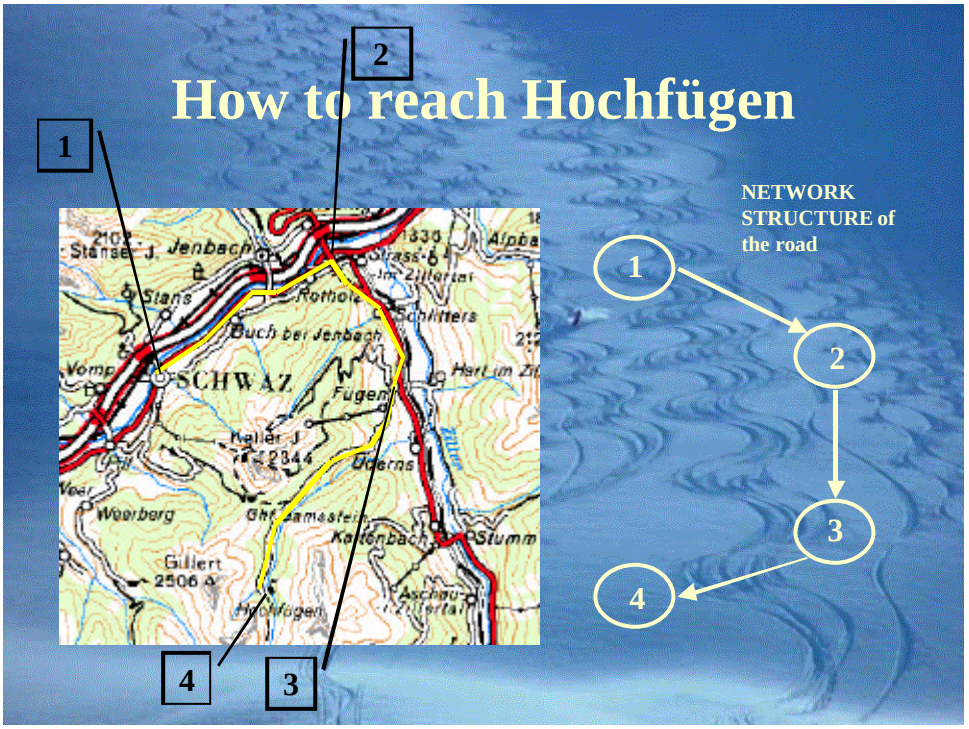
- It should also have positive externalities

We thought about all the points, and we came to the conclusion that there exists only one possibility of a connection to another area that makes sense.
This area is Hochfügen, which is located in the Ziller Valley.

There are several reasons why this will be the best choice:
First of all Hochfügen is already a pretty big skiing area, and it's not that far away from Schwaz, and it's going to get connected to another skiing area (Kaltenbach) this winter.
To give you an idea where Hochfügen is located, here a little map and of course a map which shows you the ski lifts.



Until now Hochfügen can only be reached by using this road, as you can see here. That's the network structure of the road:



This way of getting there has a lot of disadvantages, because the road is very narrow and steep. During the winter there are traffic jams lots of times, and because of the snow the road is often in bad condition. You need tyre chains, or a four-wheel drive. This is lot of times a problem for tourists who are not prepared for that and might not even have winter tyres on their cars. If there's too much snow and avalanche warning, this road has to be closed, because it would be too dangerous, and because of that there's no possibility to get to Hochfügen. A couple of years ago this happened, and the only possibility for people to get out of there was by helicopter.

Of course car emissions would be reduced too, because people won't have to take the car to get to Hochfügen.

And another aspect is that it's pretty time consuming to get there, it takes you about 40 minutes by car from the highway or from Schwaz. As you can see this road is definitely a problem.

Advantages of the connection:

One of the most important advantages is certainly that Hochfügen can be reached by using only ski-lifts from Schwaz – better said from the Inn-valley, which has a very good traffic network infrastructure, as you can think of the highway or the railway. This point has also an influence on the Ziller-valley, the village Fügen and on the steep road to Hochfügen. As you know, nowadays, the people have to use this road, because there aren't any other possibilities to get there. By establishing this connection the traffic situation can be improved: there will be less congestion, less traffic jams, less air pollution and much more comfort for the visitors of the skiing area.

To show you these advantages, let me give you a small example, how you'll get to the new skiing area:

> You leave the highway, drive 1,5 kilometres to the lift station, park your car in the parking-house, take your key card, enter a gondola and then within ten minutes you can enjoy the fun of skiing. Instead of driving 45 kilometres further and losing 40 minutes of your time, you are relaxed and had no problems at all with the snowy road. And of course these 40 minutes are the time profit for you.

In addition to this, the project would also have positive externalities for Schwaz. Due to the project Schwaz could also become more attractive for winter tourism, not only for summer tourism. There are hopes that after having finished this project that there will arise a new big tourist area with new hotels, restaurants, shops etc.

Another point, which should also be considered, is that the road to Hochfügen isn't always avalanche secure. So if it is a snowy winter, the road has to be closed. So the people aren't able to reach the skiing area and so the ski lifts have to be shut down.

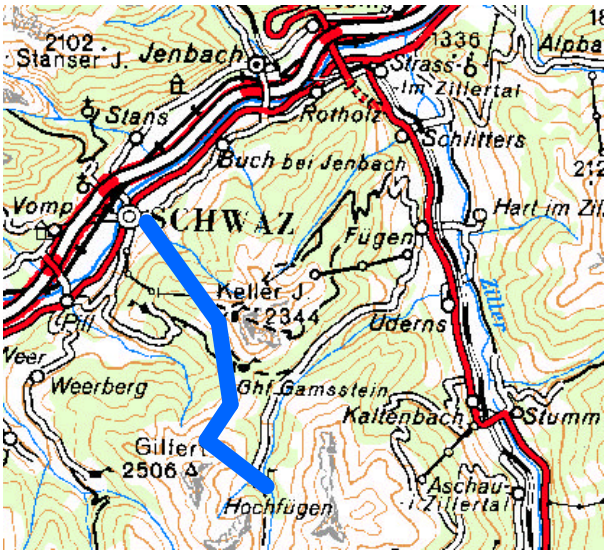
CONNECTION

How can it work:

The next issue is, how such a connection would work. As you can see on the graphic below there is the small skiing area of Schwaz, which consists more or less of only one chair-lift, which can be used for skiing. The second area, which is quite huge, is Hochfügen, where you can find some of the most modern ski lifts in Tirol. Another point of interest could be that a connection between Hochfügen and Kaltenbach, which is even bigger than Hochfügen, will

be constructed this summer. This also opens new perspectives for the connection between Schwaz and Hochfügen.

On the graphic below it shows you the scheme of the connection project. It starts in the East-end of Schwaz and goes on to the centre of Hochfügen.

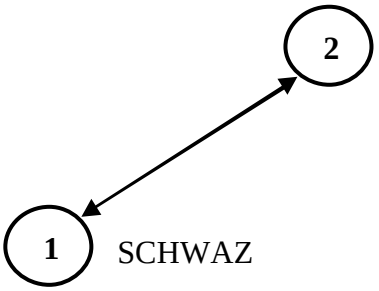


What do we need for this connection?

- 8 ski lifts

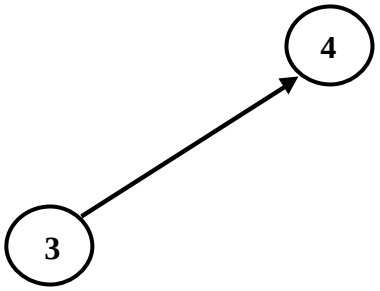
ARBESER

Type:	8 seats gondola cable car
Flow rate:	2.200 persons/h
Height of the lower station:	540m
Height of the upper station:	1700m
Height difference:	1160m
Length:	3800m
Speed:	6 m/s
Ride time:	10,5 Min
Costs:	Ca. € 10.537.560,-



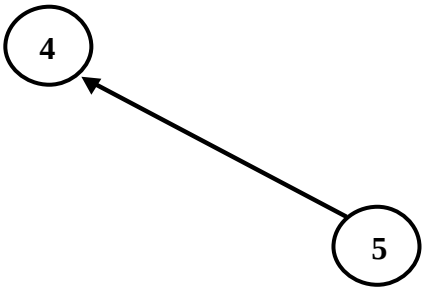
HECHER

Type:	6 seat chair lift
Flow rate:	2000 persons/h
Height of the lower station:	1420m
Height of the upper station:	2020m
Height difference:	600m
Length:	2100m
Speed:	5 m/s
Ride time:	7 min
Costs:	Ca. € 3.270.500,-



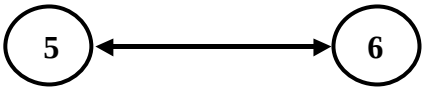
NAUNZ

Type:	4 seat chair lift
Flow rate:	2000 persons/h
Height of the lower station:	1485m
Height of the upper station:	2020m
Height difference:	535m
Length:	1100m
Speed:	4 m/s
Ride time:	4,5 min
Costs:	Ca. € 2.180.000,-



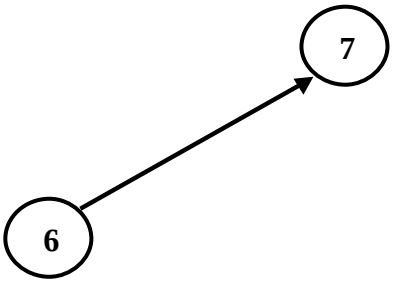
SCHWARZWALD

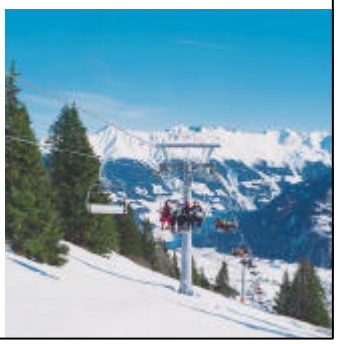
Type:	8 seat gondola cable car
Flow rate:	2000 persons/h
Height of the lower station:	1330m
Height of the upper station:	1480m
Height difference:	150m
Length:	2000m
Speed:	6 m/s
Ride time:	5,5 min
Costs:	Ca. € 5.450.500,-



SCHNEEBRUGG

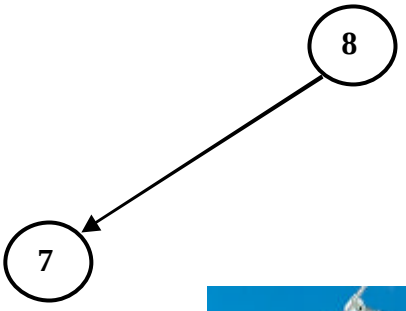
Type:	4 seat chair lift
Flow rate:	2000 persons/h
Height of the lower station:	1480m
Height of the upper station:	1900m
Height difference:	420m
Length:	1500m
Speed:	2 m/s
Ride time:	12,5 min
Costs:	Ca. € 2.180.000,-





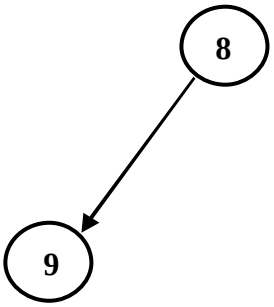
GAMSSTEIN

Type:	4 seat chair lift
Flow rate:	2000 persons/h
Height of the lower station:	1580m
Height of the upper station:	1900m
Height difference:	320m
Length:	1000m
Speed:	2 m/s
Ride time:	8,5 min
Costs:	Ca. € 2.180.000,-



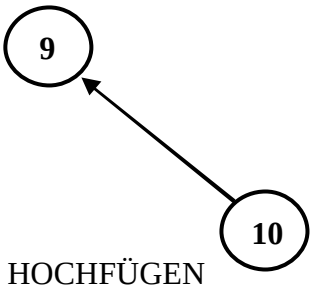
MASCHENALM

Type:	4 seat chair lift
Flow rate:	1800 persons/h
Height of the lower station:	1580m
Height of the upper station:	1925m
Height difference:	345m
Length:	1050m
Speed:	2 m/s
Ride time:	9 min
Costs:	Ca. € 1.816.800,-



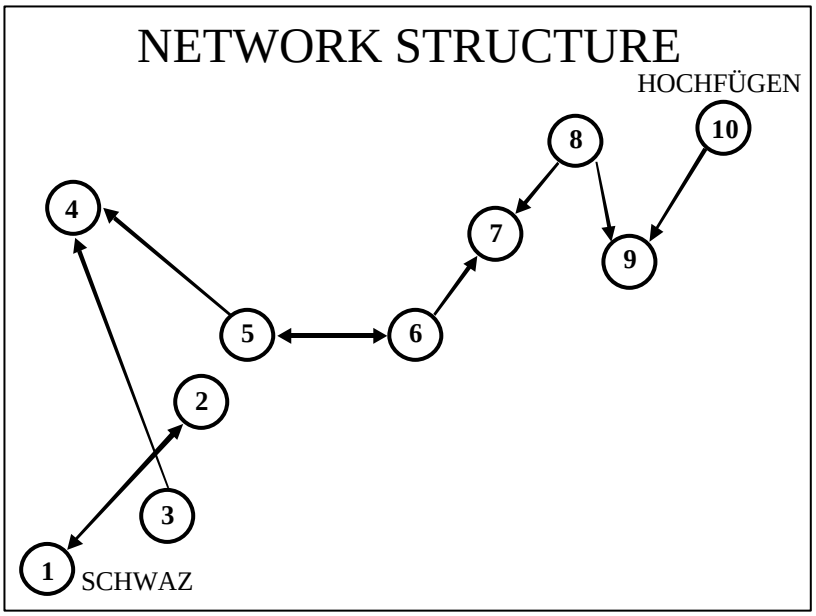
SONNTAGSKÖPFL

Type:	6 seat chair lift
Flow rate:	1800 persons/h
Height of the lower station:	1460m
Height of the upper station:	1925m
Height difference:	465m
Length:	1450m
Speed:	4 m/s
Ride time:	6 min
Costs:	Ca. € 3.270.500,-

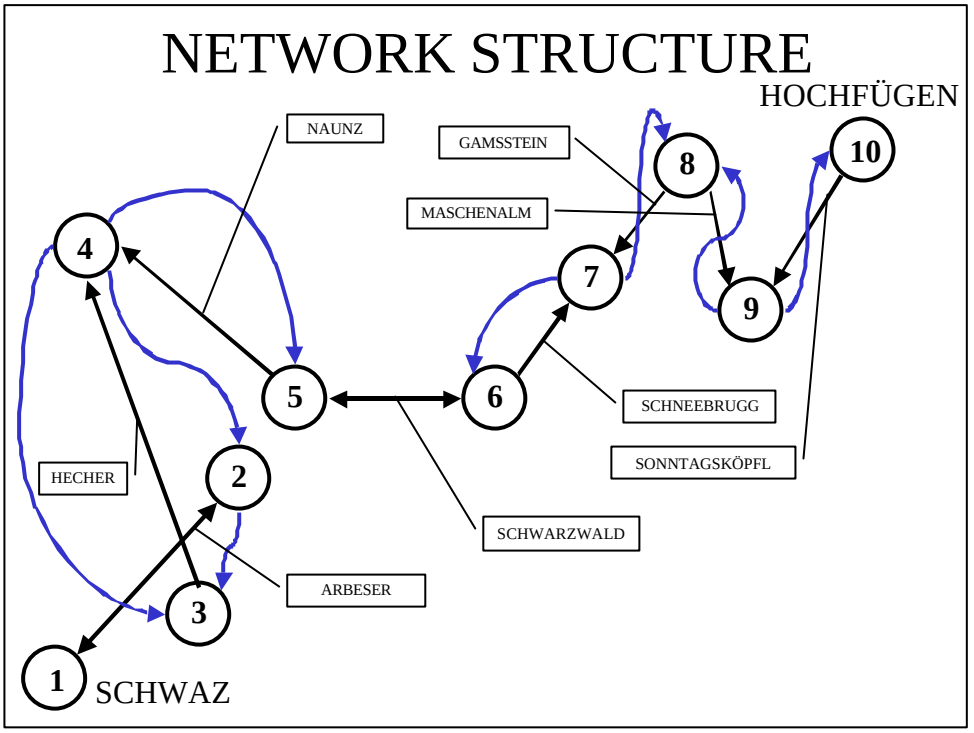


NETWORK STRUCTURE

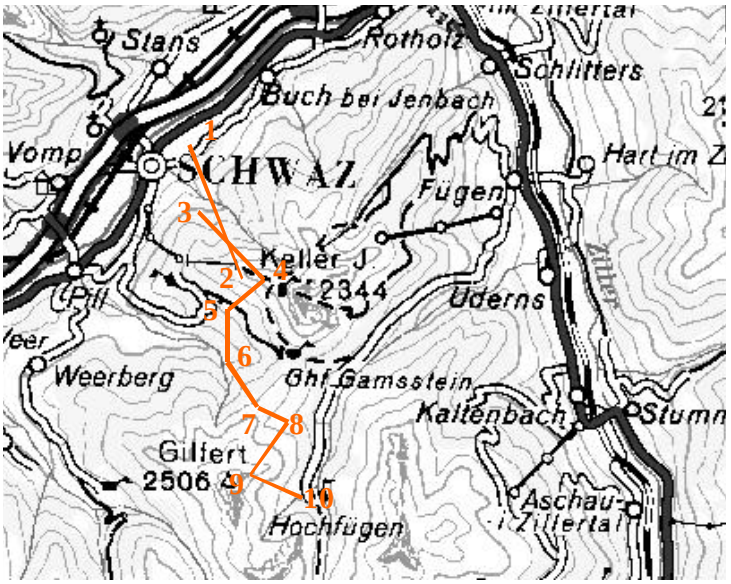
Here you can see the Network Structure of the project. When you look at it, you certainly think: how can it work? You can start at node 1 (which is Schwaz) and you can go on to node 2, but there is no link to node 3.



So let us add a small detail: The ski runs or ski tracks – now it's getting clearer.



Example: You can start here in Schwaz and take a modern gondola ski lift directly into the heart of the skiing area of Schwaz. This lift should work as a feeder line. At next you can ski down to a, at least, six-seat chair lift and then you have the choice of taking various ski tracks or you can go on to Hochfügen. If you reach the node 10 you can use all of the facilities of Hochfügen.



Construction of the COST-FUNCTIONS and O/D PAIRS

In our next step we tried to make some cost functions for the links. But we weren't really able to construct them. The only result of our cost function research was that in such sort of a network the flow hasn't much influence on the costs, because there isn't much difference between when 2 people or 100 people use a ski lift. So there are more or less only fixed costs.

Another problem was to construct the O/D pairs, because the origin is nearly always the same than the destination. So this was a little bit tricky for us.

THE RESULTING PROBLEMS

Of course if such a connection is made, several poblems will come up.

Environmental:

- To guarantee the avalanche security for the ski runs, a huge amount of avalanche fences is necessary (round about 11.500 metres)

- Obviously, because of the fences, the construction of the ski tracks and lifts, there will be an impairment of nature and landscape.

- A lot of forest has to be cut down, because the skiing facilities need a lot of space, which has also externalities for the agriculture and furthermore the landscape won't be so attractive for hikers in summer (because of the pylons and fences).

- Which is also very important, there's a need of a lot of water for the artificial snow machines; this could be a problem, because drink water has to be used for that.

Governmental:

- Because of the strict regulations about the enlargement of the skiing areas, the approval of the local government for the project is not certain.

- Another point is that the Green Party will definitely protest against the project, which could prolong the process of the realization of the project.

- And also other societies, like the Alp Society will probably protest too, as they recently announced in the newspapers.

Financial:

- Here you can see the approximated costs:

Ski lifts:	€ 32.400.000,-
Infrastructure:	€ 1.090.000,-
Ski tracks and avalanche security:	€ 6.800.000,-
Planning, unforeseen events	€ 4.005.000,-
SUM	**€ 44.295.000,-**

- But these costs aren't really a big problem because there are already two local investors, who will finance this project.

Conclusion

In our opinion the realization of this project is definitely a good idea, because of all the positive effects we mentioned. Of course there are all sorts of problems that will come up, and a lot of money has to be invested, but we think it would definitely be worth it. Before this connection is finally realized, a lot of research and planning has still to be done, to be sure that everything will work out fine.