# INNOVATION AS A SUCCESS FACTOR IN TOURISM: EMPIRICAL EVIDENCE FROM WESTERN AUSTRIAN CABLE-CAR COMPANIES

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With 3 figures, 5 tables and 1 photo
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**Summary**: With demand for winter sport stagnating cable-car innovations implemented by tourism entrepreneurs can serve as a means of differentiating the product to meet new consumer preferences. Taking into consideration their nature, spatial diffusion and distribution, the most important cable-car innovations in Austria are examined within a systematic empirical analysis. The quantitative approach is supplemented by qualitative analysis of expert interviews. Cable-cars are suitable examples for innovations in tourism but they are not tourist innovations in the narrow sense. The early adopters of innovations are able to realize certain advantages in contrast to laggards. But it should be clear that important investments in infrastructure are not sufficient to meet increasing customer expectations. A modern cable-car system represents a constitutive basic factor for ski tourism which is taken for granted by the guests. In general, cable-cars today do not constitute a tourist attraction per se any more. Incremental innovations establish too quickly as nearly ubiquitous standards. But it is possible to generate added value for customers in form of innovative features provoked by especially innovative cable-cars.

**Zusammenfassung:** Um bei stagnierender Wintersportnachfrage neuen Konsumentenpräferenzen zu genügen, können von touristischen Unternehmern eingeführte Seilbahninnovationen zur Produktdifferenzierung dienen. Die bedeutendsten Seilbahninnovationen in Österreich werden bezüglich ihres Wesens, ihrer räumlichen Ausbreitung und Verteilung systematisch empirisch analysiert. Der quantitativ-statistische Ansatz wird durch die qualitative Analyse von Expertengesprächen ergänzt. Seilbahnen sind geeignete Anschauungsobjekte für Innovationen im Tourismus, aber sie sind keine touristischen Innovationen im engeren Sinne. Die frühen Adoptoren von Innovationen sind in der Lage gewisse komparative Wettbewerbsvorteile gegenüber den Nachzüglern zu erlangen. Aber es sollte klar gemacht werden, dass bedeutende Investitionen in die Infrastruktur nicht ausreichend sind, um den steigenden Erwartungen der Kunden zu begegnen. Ein zeitgemäßes Seilbahnsystem stellt einen konstitutiven Basisfaktor für den Skitourismus dar, der von den Gästen vorausgesetzt wird. Heutzutage stellen Seilbahnen an sich keine touristische Attraktion mehr dar. Aber es ist möglich, durch innovative Angebotselemente besonders neuartiger Seilbahnen, Zusatznutzen für die Gäste zu generieren.

**Key words**: Innovation, tourism, cable-cars, entrepreneurship, Austria

## 1 Introduction

Since the 1930s, cable-cars have been one of the main driving forces behind alpine tourism, because they enable the use of ski resorts, foster mountain tourism, and induce huge direct and indirect monetary benefits in peripheral areas (Bieger 1999). There is a consensus that cable-car companies have faced a number of severe problems since the beginning of the 1990s, such as stagnating demand, consolidation of the industry, an unfavourable financial situation, and rising investment costs (Keller 2003; Tuppen 2000; McCune 1994; Pechlaner and Tschurtschenthaler 2003).

Yet in contrast to the above mentioned, the number of winter overnight stays in Tyrol between 1996/97 and 2007/2008 increased by 26%, up to 25.6 million (LANDESSTATISTIK TIROL 2008). Furthermore, EUR 523 million was invested in the cable-car industry in 2007/08 (of which at least half was earmarked for new cable-cars) and the industry experienced a record turnover of EUR 1.026 billion (FACHVERBAND DER SEILBAHNEN ÖSTERREICHS 2008). How should these statistics be interpreted? Can the Austrian winter sports industry hold its market position because of its consequent investments in the improvement of the main tourist infrastructure? Is innovation the key to success, by enabling adaptation to increased customer demands and the differentiation of tourist products[1)]?

[1)] As a recent example illustrates, innovation can be a central factor for success in tourism: in the 2004/05 season, the Bergbahn AG Kitzbühel linked their two formerly separate ski

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Although innovation is often characterised as a critical factor for success in tourism (Hall and Williams 2008), the effectiveness and importance of innovation in tourism is difficult to quantify and has seldom been analyzed. In this context, it is astonishing that the issue of the economic relevance of innovation in the cable-car industry has not been a matter of research more often, though Pikkemaat and Weiermair (2007) included cable-car companies in their qualitative study about the innovativeness of tourism in Tyrol.

The research questions raised in this paper are the following:

- How can the study of innovative cable-cars be integrated into approaches to research on innovation in tourism?
- In what manner did the quantitative and qualitative diffusion process of innovative cable-cars take place in Austria?
- What importance do innovative cable-cars have for the development of successful winter sports destinations?

The remainder of the paper is organized as follows. Section 2 presents a theoretical framework and its application to cable-cars and ski lifts. Section 3 presents the methods used. Sections 4 and 5 presents the results, which are discussed in Section 6. Section 7 concludes.

**Photo 1: Since the season 2004/05 the Tricable Gondola Detachable „3-S" (Kitzbühel, Tyrol, Austria) links the two formerly separate ski areas Hahnenkamm-Pengelstein and Jochberg-Pass Thurn and doubles the accessible ski area. The glass bottom-gondola #1 unveils a daunting view of the ground a steep 400 meters below.**
**Photo by Michael Neufeld 2005**

## 2 Theoretical framework

Tourism and innovation is only now emerging as a topic of interest for academic researchers (Hall and Williams 2008), although the literature constantly refers to change or growth in tourism. Considerable progress has been made in recent years (Hjalager 1997, 2002; Sundbo et al. 2007; Stamboulis and Skayannis 2003; Orfila-Sintes et al. 2005; Orfila-Sintes and Mattsson 2009; Pikkemaat and Weiermair 2007; Keller 2005), but in general, there is, as Hall and Williams (2008, 4) point it out, "surprisingly little research in this field".

Schumpeter is generally recognised as the originator of innovation research. He identified the "emergence of new combinations of means of production" (1993 [1911], 100) as the main source of economic growth. This paper follows Rodgers' clear terminology, which is also based on a broad definition of innovation, as is Schumpeter's original notion: "An innovation is an idea, practice, or object that is perceived as new by an individual or other unit of adoption" (Rodgers 1983, 11). Diffusion is defined as "the process by which an innovation spreads", while adoption is defined as "the decision to continue full use of an innovation" (Rodgers 1962, 19f.).

### 2.1 Tourism as an industry with low innovation activities

General complaints about a lack of innovation in the tourism industry have been found to be justified by empirical studies (Hjalager 2002; Weiermair 2003). Peters and Weiermair (2002, 163f.) mention the following reasons for the slow and inertial innovation behaviour in the tourism industry:

areas by implementing the Tricable Gondola Detachable "3-S" (Photo 1) and doubled the accessible ski area. In this manner, EUR 0.4 million can be saved annually through the reduction of a costly ski bus shuttle system. The first season after the EUR 13.5 million investment in the new "aorta" delivered the desired success: an 11% increase in turnover compared to +/-0% of the industry benchmark (Kitzbüheler Anzeiger 2004).

- Demand side: conservative (mass-)tourists search for simple mass products that feature high publicity and guaranteed quality.
- Absence of competition: the size relations in the market neither provide market entry barriers nor allow the punishment of competitors that imitate innovations.
- High costs and risks: in case of innovativeness, SMEs would be confronted with these inconveniences in a market in which the danger of imitation is almost constant.
- Firm size: traditional SMEs limit their growth to the sheer accumulation of hardware, to increase capacities.
- Slow adoption of new technology.

Tschurtschenthaler (2005, 9ff.) adds that tourism especially lacks process innovations to increase productivity, because it is normally much more difficult to rationalize services than manufacturing processes.

### 2.2 Approaches to innovation in tourism as part of the service sector

Traditionally, innovation analysis has focused on manufacturing firms (Rogers 2004). Without doubt, tourism is generally considered as part of the service sector. Thus, Sundbo et al. (2007) conclude that the characteristics of service innovations should be applied to tourism, because they are fundamental for the understanding of innovation processes in tourism (Hall and Williams 2008; Hjalager 2002; Gallouj and Weinstein 1997):

- Tourism experience consists of bundles of encounters with service providers (cumulative quality perception).
- Tourist products are intangible and cannot be stored, which leads to the co-terminality of production and consumption (uno-actu-principle). That implies the customer's active or passive participation in the service production and leads to uncertainty of quality because quality control is much more difficult to implement.
- Due to the fast spread of knowledge, the nature of tourism (i.e. among others, nobody could be excluded from participation), and the impossibility of patent protection, innovations are easy to imitate.
- Tourism destinations have fixed locations. Nature and cultural heritage are constitutive supply components that are not completely transferable.

Given that tourism is a service industry, it needs to be determined whether the theories, methods, and results for the manufacturing sector can be applied to tourism.

Coombs and Miles (2000) distinguish between three different approaches to research on innovation in services: (1) an assimilation approach, which treats services as similar to manufacturing; (2) a demarcation approach, according to which service innovation is distinctively different from innovation in manufacturing; and (3) a synthesis approach, according to which service innovation brings to the forefront so far neglected elements of innovation that are relevant for manufacturing as well as services (Drejer 2004).

The service-specific studies are in strict accordance with Schumpeter when they argue that innovation is much more than technological product innovation and processes innovation (Drejer 2004, see Tab. 1), for example significant changes in organisational, management or institutional structures that matter especially in the service sector. Consequently, research on tourism innovation should be based on the synthesis approach, which integrates the particularities of the service sector and tourism into the widely established, broad concepts of Schumpeterian innovation research that are used in the manufacturing sector. This consideration is borne out by the empirical example of cable-car innovation. There are thus strong grounds for the general claim that theories from the manufacturing sector cannot be applied to tourism without adjusting to the sector's characteristics (Schamp 2007; Lessmeister 2008).

Table 1 shows the application to tourism of innovation typologies that were mainly developed in manufacturing.

### 2.3 Supplier-driven innovation in tourism

As Orfila-Sintes et al. (2005) generalise, decisions about innovations with respect to tourism activities are supplier-driven. It has been thought that tourism firms are not themselves involved in innovation research, because suppliers are responsible for research and their activities facilitate the subsequent innovation processes in tourism firms. Hjalager (2002) characterises the hotel industry as a supplier dominated sector that innovates throughout the incorporation of technological elements that are developed by its suppliers. This hypothesis is in line with empirical findings on technological innovation in the service industry, which show that most companies

**Table 1: Innovation typologies in tourism**

| Innovation types | Schematisation | Examples |
|---|---|---|
| Product Innovation | | Customer loyalty programmes |
| Process Innovation | | Computerised booking systems |
| Organisational Innovation | Emergence of new combinations of means of production (Schumpeter) | Vertical integration through take-over of own accommodation by cable-car companies |
| Management Innovation | | Introduction of scientifically substantiated management methods |
| Logistics Innovation | | Enhancement of airport hub systems |
| Institutional Innovation | | Reform of the financial incentives that restructure health or social tourism concepts |
| Basic Innovation | Impact and range | Cable-cars as means of transportation |
| Radical Innovation | | Detachable chairlifts as express cable-cars |
| Incremental Innovation | | Introduction of the 8-seater chairlift |
| Technology-push | Source/Initiator/Point of origin | Introduction of the jet plane |
| Need-Pull/Demand-push | | Introduction of high-capacity cable-cars reduces waiting time |
| Consumer Innovation | Target group | Seat heating for chairlifts |
| Firm Innovation | | Direct drive for chairlifts |
| Continuous innovation | Effect on established patterns of consumption (Robertson) | Annual update of a tourist catalogue |
| Dynamically continuous innovation | | Online version of the catalogue |
| Discontinuous innovation | | Introduction of the catalogue itself |
| Regular Innovation | Business linkages and competences/knowledge (Abernathy/Clark) | Upgrading quality standards in hotels from a two- to a three-star classification |
| Niche Innovation | | Establishment of marketing alliances |
| Revolutionary Innovation | | Electronic marketing replaces distributing brochures, but the customer orientation may well be the same |
| Architectural Innovation | | Exploitation of new resources, e.g. space tourism |

Source: Own compilation following Hjalager 2002, 465ff.; Koschatzky 2001, 58ff.; Robertson 1971, 7; Brown 1981, 2

innovate by purchasing equipment, components, and materials from their suppliers (Barras 1986). We may conclude that most technological innovations that are used in tourism come from outside of the industry and can be labelled as innovations in tourism, while organisational changes are explicitly tourism innovations.

## 2.4 The role of firm size and innovation in tourism

As Sundbo et al. (2007) state, it is not known which firms are innovative and which are not; nor has any satisfactory explanation for these differences been proposed. An important hint concerning this gap is given by the widely known Schumpeterian innovation models Mark I and II, which have been verified in the manufacturing sector (Malerba 2002). Schumpeter Mark I is characterized by "creative destruction" with technological ease of entry and a major role played by entrepreneurs and new firms in innovative activities. Schumpeter Mark II is characterized by "creative accumulation" with the prevalence of large established firms and the presence of relevant barriers to entry for new innovators (Breschi et al. 2000). Technological regimes and Schumpeterian patterns of innovation change over time. In industry life cycles, Schumpeter Mark I pattern of innovative activities may turn into a Schumpeter Mark II (Klepper 1996), which is certainly the case as well in the development of the tourism industry. Empirical findings by Rogers (2004), Orfila-Sintes et al. (2005) and Sundbo et al. (2007) seem to confirm a Schumpeter Mark II pattern for the mostly mature tourism markets, because larger firms are nowadays in general more innovative than others – it is claimed that the process and determinants of innovation vary allegedly across firm size.

### 2.5 Measurement of innovation in tourism

Few studies have addressed the issue of measuring innovation in tourism. Some existing studies (e.g. Orfila-Sintes et al. 2005; Sundbo et al. 2007) measure innovativeness simply on a dichotomous scale by considering whether or not firms had introduced unspecified improvements in the years preceding the study. They thus neglect the crucial temporal and spatial differences that characterise the diffusion wave itself. Rogers adds the further shortcoming that both firms that released a series of highly valuable new products and firms that released a single improvement in one product or service would be labelled innovative (Rogers 2004). Furthermore, the subjective assessment of innovation by researchers using a Likert scale (Pikkemaat and Weiermair 2007) seems to be neither intersubjectively comprehensible nor transparent. Therefore, the subjective assessment of innovation by researchers and interviewees should be avoided. Whether or not a product or service constitutes an innovation and whether or not it is important needs to be measured by some predefined, objective standard; otherwise, firms or destinations will not be commensurable.

### 2.6 Cable-cars as innovations in tourism

Cable-cars are technological innovations applied in mountain tourism originating from the machine construction industry that is specialised on passenger transport. Cable-cars are not a tourism innovation *per se;* in fact, pure tourism innovations are extremely rare. One reason for this may be that tourism is a cross-sectional industry. Innovative cable-cars are innovations *in* tourism to the same extent as were the jet planes of the late 1960s. Following Mattsson et al. (2005), firms at the "edge" of tourism, such as transport firms that are not the typical tourism-SMEs of the accommodation industry, are most likely to be termed 'innovative'. Two main drivers of innovation can be identified that influence the operators: (i) the propagation of technological improvements (which can also be based on proprietary developments or ideas of the operators) by the manufacturers, and (ii) customer requirements (Bieger et al. 2005).

Bieger et al. (2005) classify cable-car companies as location-bound attractions that offer recreational experiences to their customers and that are part of the service sector (because the uno-actu principle holds true for them). Cable-car innovations have many target groups: the operating companies see them as firm innovations, the skiers as consumer innovations. The latter have nothing to do with the operation *per se* and do not necessarily make things easier for the operators in terms of costs. There are also technological innovations that were not realized for the benefit of guests, but for the purpose of saving costs for the operators. Some innovations offer benefits to both guests and the operators. However, in general, the operators' main focus lies in adding value for their guests.

What cable-car innovations should be incorporated in an empirical study, given the outlined findings? Only such novelties should be included in the measure of innovativeness that constitute a noticeable enhancement for the customers. Innovative cable-cars surpass their predecessors in at least one of the following criteria: speed, capacity, comfort, and safety. They are suitable for being marketed and have, to a certain degree, reached area-wide adoption, which indicates their economic importance.

## 3 Methods

This study only considers decentralised decisions regarding innovation. Austria is a suitable study area due to the fact that there is a general absence of externally driven growth, such as resorts constructed *ex nihilo* by external actors (Bätzing 2003). Ski tourism in Austria is especially concentrated on the Western federal states of Vorarlberg, Tyrol, and Salzburg, where it enjoys widespread dominance. The administrative units of investigation are the municipalities, which, in general, correspond to the winter sports destinations. Divergences due to topographic features remain exceptional.

All Austrian cable-cars constructed since 1880 have been compiled in a database (BMVIT 1913–1938 and 1950–2002; AMT DER TIROLER LANDESREGIERUNG 2006; AMT DER VORARLBERGER LANDESREGIERUNG 2008d; own updates). Using this database, diffusion curves for the different cable-car types can be calculated that show the changes of the Austrian cable-car infrastructure in the different periods (Fig. 1). For each of the identified innovative types of cable-car, a ranking list is provided. With every year following the first adoption of a particular type of cable-car, a higher rank is assigned to the respective destination. Only the first adoption of a type in a municipality is considered. The innovativeness of a destination is measured by the time-lag in relation to the first adoption (Morrill et al. 1988).

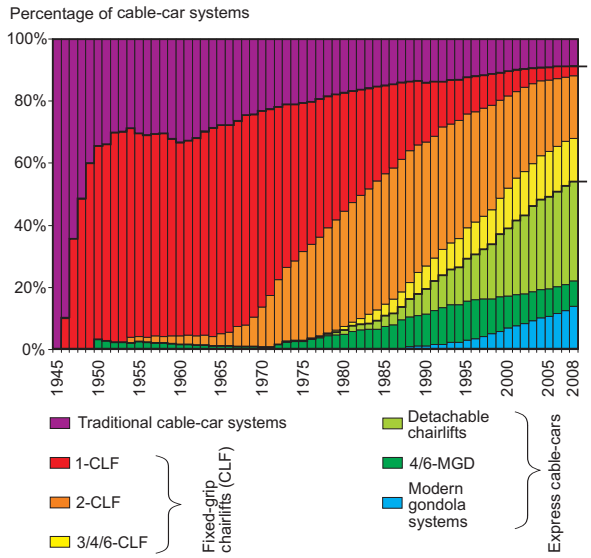


**Fig. 1: Development of the Austrian cable-car system 1945–2008. In 2008, the Austrian cable-car system showed a differentiated and balanced structure: 8.6% of the installations could be assigned to the traditional cable-car systems, the 1-CLF (single-seat fixed-grip chairlifts) represent not more than 3.1% (compared to 67.1% in 1975), the 2-CLF reach 20.1%, 13.8% are high-capacity fixed-grip chairlifts (3-/4-/6-CLF), 32.0% are detachable chairlifts, 8.6% 4- and 6-MDG (Monocable Gondola Detachable) and 13.8% count to the modern gondola systems with eight or more persons per carrier.**
Source: BMVIT 1950–2002; AMT DER TIROLER LANDESREGIERUNG 2006; AMT DER VORARLBERGER LANDESREGIERUNG 2008; own updates

In order to relate the socio-economic characteristics of destinations to their innovativeness, a second database is needed which is based on secondary data[2]. This database contains all municipalities with cable-cars and the ranking lists, with data on ski tourism infrastructure and tourism statistics (until 2007/2008). Considering the rank of only one innovative cable-car type is not enough to explain the long-term success of a destination. For this reason, the ranks of every destination are added up for all 11 analysed innovations and are divided by the number of innovations implemented in each case. This accumulated innovativeness ranking gives the average rank of a destination over the complete time period and allows conclusions to be drawn regarding the effective affinity to innovations (on an ordinal scale for innovativeness). Consequently, innovative destinations can be defined as follows: a destination is innovative if (i) it has always adopted a cable-car innovation at the earliest possible date (measured by the time-lag between first adoption and the respective adoption in the considered destination) and (ii) it has a mean ranking position as low as possible between the mid-1950s and 2007 (resulting from the arithmetic mean of all ranking positions of all innovations).

For the identification of groups of similar adoption behaviour within the ranking list, RODGERS' conception of adopter categories is applied (RODGERS 1983). The number of adopted innovations per municipality should be kept in mind. For this reason, the innovativeness classes are contrasted with the number of innovations per municipality. To explain the identified innovativeness and to measure the importance for the destinations, the connection between the innovativeness ranking, the tourism success of destinations, and ski-infrastructural facts is analysed by using correlation and regression analysis.

First analyses showed that the complexity of the issues that was exposed in chap. 2 cannot be mastered with mere statistical evaluations, e.g. there is no quantitative measure to assess corporate strategy. In order to complement the quantitative analysis, several qualitative expert interviews with operators, manufacturers, and functionaries of cable-cars were conducted to identify particularities of the winter sports industry and nexuses that were not evident from the data analysis (FLICK 2000). The assessment of cable-car innovations and the ranking mentioned above are not influenced by these qualitative results.

## 4 Quantitative diffusion and qualitative development of innovative cable-cars in Austria

The structure of the Austrian cable-car system has undergone profound change over the past few decades (Fig. 1). Between 1945 and 2008 approximately 1,660 cable-cars were built.

The decades from 1950 to 1970, which constituted the development phase, were largely dominated by traditional cable-car systems and 1-CLF (single-seat fixed-grip chairlifts). The extension phase, which has continued to the present day, began in the mid-1970s with the rise of multiple-seater chairlifts and express cable-cars (JOB 2005).

[2] The main data sources are BMVIT 1975–2002 with own updates; AMT DER TIROLER LANDESREGIERUNG 2006, 2007, 2008a,b,c; AMT DER VORARLBERGER LANDESREGIERUNG 2008a,b,c,d; AMT DER SALZBURGER LANDESREGIERUNG 2007, 2008a,b; STATISTIK AUSTRIA 2008; TIROL ATLAS (special analysis 2005); R. STEIGER (fieldwork 2008).

Between 1975 and 2008, the share of fixed-grip chairlifts sank from 75.1% to 37.0%. In contrast, the express cable-cars increased their share more than tenfold, from 4.8% to 54.4%.

In 2005/06, 30.2% of the 4-CLF (four-seater fixed-grip chairlifts) were equipped with features, such as comfort upholstery and conveyor belt entrances (55.2%) to speed up transport and smoothen the entry to the lift. With weather protection (72.3% of the 6-CLD (six-seater detachable chairlifts) in 2005/06) and comfort upholstery (61.7%) being virtually standard in Austria since the late 1990s and other qualitative features such as seat heating (8.5%) being introduced in 2004, detachable chairlifts can be considered as the most comfortable and efficient cable-cars for transporting skiers. This high quality standard generates an important advantage for the Austrian ski destinations, especially compared to competing destinations (e.g. USA, France) where the abovementioned comfort features are not common.

In conclusion, the cable-car capacity in the 250 municipalities increased by more than 3.5 times, from 204.1 million vertical transport metres per hour (VTMH) in the season 1974/75 to 741.8 million VTMH in 2007/2008 (+263%). Figure 2 shows how the mean capacity of newly built cable-cars rose from 1,120 to 2,200 persons per hour (p/h) between 1975 and 2007. Underlying a linear trend, too, the share of express cable-cars increased from 10.5% to 91.7% at the same time.

In summary, the following tendencies can be confirmed empirically:

- **Quantity**: (a) While the total number of cable-cars and ski lifts is declining, the number of chairlifts and gondolas is continually increasing. (b) The mean capacity per cable-car, as well as overall capacity, are rising strongly.
- **Quality**: The trend is towards more comfort, less waiting time (increased capacities), and more time for skiing (shorter lift-riding time).

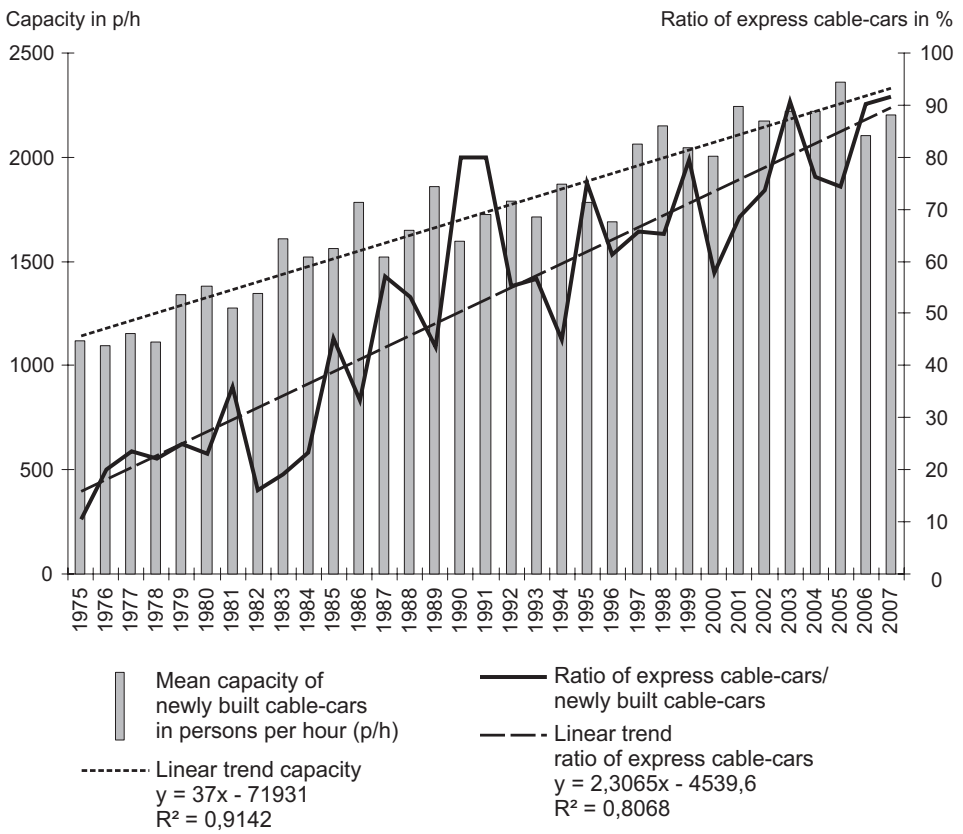


**Fig. 2: Mean capacity development of newly built cable-cars and ratio of express cable-cars to newly built cable-cars 1975–2007 as a percentage**
Source: BMVIT 1975–2002; AMT DER TIROLER LANDESREGIERUNG 2006; AMT DER VORARLBERGER LANDESREGIERUNG 2008; own updates

## 5 Success in tourism due to innovativeness or vice versa?

### 5.1 Location and attributes of innovative destinations

In order to evaluate the real innovativeness of destinations in the long run, the destination's innovativeness in several innovation cycles has to be considered. The hypothesis that the greater the number of innovations adopted per municipality, the greater the size and/or success of a destination cannot be falsified. The correlation between indicators such as cable-car capacity (Spearman-Rho 0.915; $p<0.001$) and overnight stays (Spearman-Rho 0.758; $p<0.001$) is nearly perfect or very strong. The number of innovations adopted per destination can consequently be considered as an indicator of destination size – and the other way round. Given the foregoing, in figure 3, which shows data for Vorarlberg, Tyrol, and Salzburg, where innovativeness as well as 70.5% of the Austrian winter overnight stays are concentrated (STATISTIK AUSTRIA 2008), the overnight stays in the winter season are combined with the innovativeness classification. With some exceptions, the most persistently innovative destinations have a long and successful tourism history. Kitzbühel, Lech, and St. Anton am Arlberg are even pioneer destinations. However, the direction of the connection between innovation and length of tourism history is not quite clear. Are these destinations successful in the long run because they have been very innovative for decades and could offer a modern cable-car system? Or were the investments in risky innovations only possible because the great success created the necessary financial resources?

It is obvious that in the innovativeness ranking, large as well as small destinations occupy the top ranks, while the group of laggards or non-innovators is represented exclusively by small destinations (i.e. with low overnight stays). Success in winter tourism is feasible for small destinations that have high innovativeness and a niche strategy, while it is practically impossible to reach a high number of winter overnight stays without innovative cable-cars, and vice versa.

Is the impression deceptive that the most innovative destinations are at the same time the most

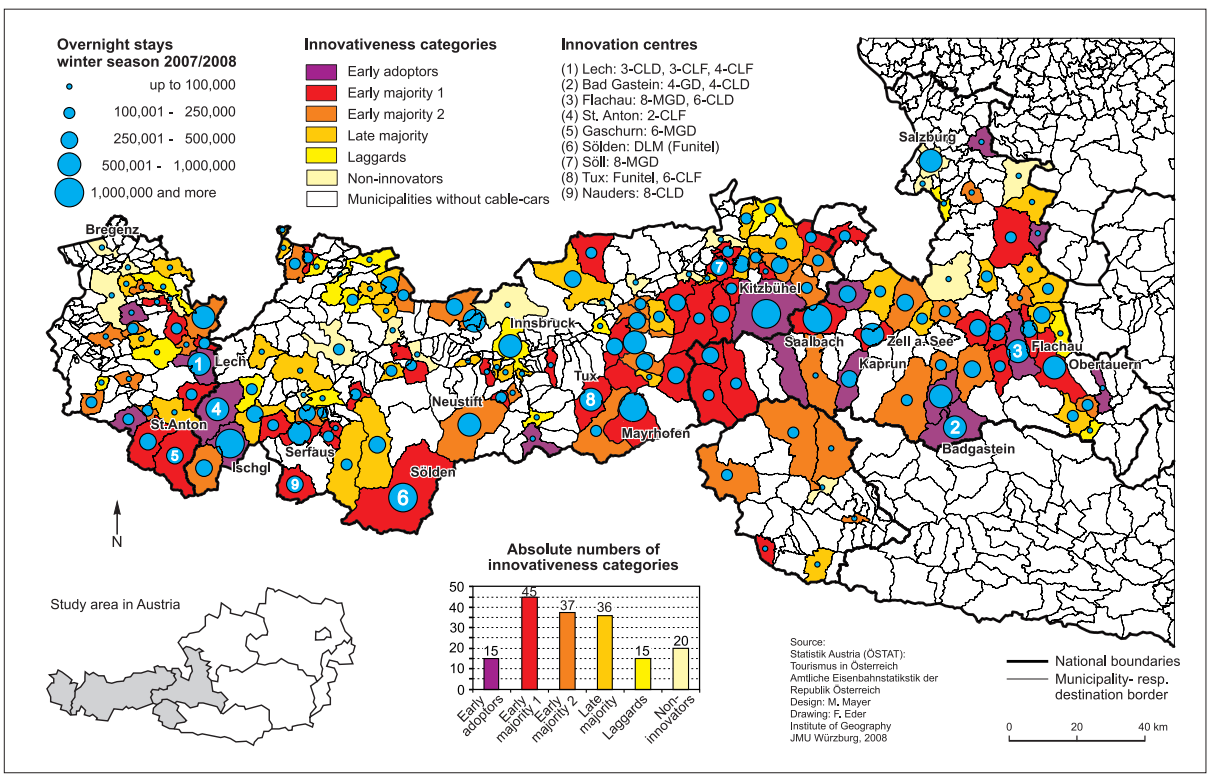


**Fig. 3: Innovativeness and overnight stays in West-Austrian winter sport destinations. Concerning the spatial dispersion of the "early adopters", the concentration near the Vorarlberg-Tyrolean border in the Arlberg region as well as the innovation centers in the Pinzgau/Pongau and the more isolated destination of Kitzbühel stand out. Except for Ischgl, Flachau, Leogang and Kaprun the most persistently innovative destinations have a long and successful tourism history.**

**Table 2: Means and discriminating variables for the adopter categories**

| | Number of cable-cars 2007/08 | Transport capacity of cable-cars and ski lifts in million VTMH[1] 2007/08 | Mean transportation capacity in p/h per cable-car (2007/08) | Overnight stays in the winter season 2007/08 in 1,000 | Tourist beds 2007/08 |
|---|---|---|---|---|---|
| Early adoptors | 11.00 | 10.699 | 1,618 | 506.9 | 5,791 |
| Early majority 1 | 7.93 | 7.648 | 1,519 | 348.9 | 4,178 |
| Early majority 2 | 4.46 | 4.109 | 1,329 | 219.3 | 3,281 |
| Late majority | 2.72 | 2.236 | 1,216 | 124.9 | 1,926 |
| Laggards | 2.27 | 1.439 | 1,025 | 98.3 | 1,593 |
| Non-innovators | 0.65 | 0.365 | ,636 | 83.4 | 1,541 |
| F | 12,0*** | 12,7*** | 25,3*** | 7,7*** | 6,8*** |
| N | 168 | 160 | 160 | 167 | 167 |

| | Tourism intensity 2007/08 in overnight stays per 1,000 inhabitants | Share of overnight stays in the winter season 2007/08 in percent | Average occu-pancy rate 1974/75-2007/08 in percent | Slope surface equipped with snowmaking facilities in hectare 2006 (Tyrol only) | Number of adopted innovations (until 2007/08) |
|---|---|---|---|---|---|
| Early adoptors | 228,026 | 64.7 | 35.9 | 183.4 | 4.6 |
| Early majority 1 | 262,562 | 64.0 | 35.1 | 66.5 | 4.4 |
| Early majority 2 | 189,462 | 58.2 | 31.6 | 35.6 | 3.2 |
| Late majority | 150,520 | 55.5 | 27.7 | 26.8 | 2.1 |
| Laggards | 88,257 | 52.2 | 24.7 | 17.9 | 1.4 |
| Non-innovators | 27,883 | 34.7 | 18.9 | 22.7 | 0.0 |
| F | 5,8*** | 18,7*** | 10,8*** | 12,3*** | 25,1*** |
| N | 167 | 167 | 167 | 75 | 168 |

[1] VTMH: Vertical transport meters per hour

Level of significance ***p<0,1%, ** p<1%, * p<5%

Source: BMVIT 1975-2002; AMT DER TIROLER LANDESREGIERUNG 2006, 2007, 2008a,b,c; AMT DER VORARLBERGER LANDESREGIERUNG 2008a,b,c,d; AMT DER SALZBURGER LANDESREGIERUNG 2007, 2008a,b; STATISTIK AUSTRIA 2008; TIROL ATLAS (special analysis 2005); R. Steiger (fieldwork 2008); own updates.

important winter sports destinations? A comparison of means combined with an analysis of variances (ANOVA) was conducted (Tab. 2) to reveal discriminating attributes between the adopter categories.

As table 2 shows, a number of variables have mean differences at a high significance level. They highlight obvious differences between the adopter categories. The ski resorts of innovative destinations are bigger, better equipped, and more modern. The early adopters have more overnight stays and accommodation facilities. These are, at the same time, the larger and in the long run more successful destinations, which show higher occupancy rates over the years.

### 5.2 Explanation of innovativeness: test of the second Schumpeter hypothesis

The second Schumpeter hypothesis, related closely to Mark II, posits that big companies are more innovative than small ones (Koschatzky 2001). Due to a strong negative correlation at a very high significance level (Spearman-Rho -0.727, $p<0.001$) between innovativeness and size of the ski resort (measured in cable-car capacity), the second Schumpeter hypothesis cannot be dismissed (Tab. 3). The bigger cable-car companies, respectively destinations, tend to be more innovative concerning the adoption of cable-car innovations.

**Table 3: Connections between innovativeness and selected variables**

| Variables | Number of innovations (until 2007/08) | Number of cable-cars (2007/08) | Transportation capacity (2007/08) | Mean capacity per cable-car (2007/08) | Share of overnight stays in winter season (2007/08) |
|---|---|---|---|---|---|
| Innovativeness 2007/08 (Spearman-Rho) | -0,670*** | -0,600*** | -0,727*** | -0,625*** | -0,512*** |

| Variables | Overnight stays winter season 2007/08 | Average occupancy rate 1974/75-2007/08 | Occupancy rate 2007/08 | Slope surface 2006 (Tyrol only) | Slope surface 2006 with snowmaking (Tyrol only) |
|---|---|---|---|---|---|
| Innovativeness 2007/08 (Spearman-Rho) | -0,509*** | -0,460*** | -0,441*** | -0,609*** | -0,646*** |

Level of significance ***p<0,1%, ** p<1%, * p<5%

Source: BMVIT 1975-2002; AMT DER TIROLER LANDESREGIERUNG 2006, 2007, 2008b,c; AMT DER VORARLBERGER LANDESREGIERUNG 2008a,b,d; AMT DER SALZBURGER LANDESREGIERUNG 2007, 2008b; STATISTIK AUSTRIA 2008; TIROL ATLAS (special analysis 2005); R. Steiger (fieldwork 2008); own updates.

Rogers (2004, 142f.) sums up that "large firms have stronger cash flows to fund innovation", they have "higher assets to use as collateral for loans", a "larger volume of sales implies that the fixed costs of innovation can be spread over a larger sales base", and they "may have access to a wider range of knowledge and human capital skills". A scatter plot shows an L-shaped dispersion, which hints at a continuum of innovative destinations in all size classes, because there are a number of factors that suggest that small firms may have also advantages: they recognise opportunities faster and are more flexible in the implementation phase (Rogers 2004). None of the larger destinations is part of the late majority or a laggard. Innovative pioneer-destinations invest their limited financial resources in context-specific adequate innovations to achieve considerable competitive advantages. As expected, the bigger destinations participate in a greater number of innovations; between innovativeness and the number of innovations adopted per destination (Tab. 3) there is a highly significant, strongly negative correlation (Spearman-Rho -0.670, p<0.001).

It is now clear that not only do the bigger destinations participate in more numerous innovation cycles, but that these adoptions must have taken place early in the respective diffusion cycle. The second Schumpeter hypothesis is substantiated primarily by the fact that the bigger companies have greater financial resources (Beritelli et al. 2007). Bigger ski resorts also have greater operating experience with complicated novelties, because they have (in most cases) already introduced several new cable-car types. Economically speaking, the correlation between innovativeness and firm size makes sense, because the smaller companies cannot realise the kinds of profits that are required to maintain constant stand-by innovativeness, while, on the other hand, bigger companies can cope better with the costs that are incurred due to a misallocation. However, sheer size is no guarantee of profits. There are less successful innovations in the cable-car business, too.

We have seen that a number of variables are correlated with innovativeness. However, it remains unclear which one(s) might explain innovativeness. For these purposes, a regression model was applied, of which the coefficient of determination $R^2$ (adjusted) reached 0.485 and the explanatory content of which (scarcely the half of the statistical spread) is satisfying (Tab. 4a).

The coefficients 'mean transportation capacity per cable-car' and 'number of adopted innovations', of which the background variables are 'modernity of the cable-car system' and 'destination size', provide the strongest explanation. Hence, tourist success seems to be insufficient to explain the innovativeness of a destination. Obviously, a much more complex mixture of factors and dependencies that are not considered here has to play the main role. The limitations of solely quantitative modelling are revealed explicitly and, as Rogers (2004, 151) concludes from his (somewhat) comparable study, either the models used are "too simplistic and fail to do justice to the complex nature of innovation" or "the problems of measuring innovation and the explanatory variables introduce too much 'noise' into the regressions."

### 5.3 Explaining success in tourism by innovativeness?

Can the success of a ski destination be explained by the innovativeness of the cable-car system? What other variables influence the number of overnight stays? Between success in tourism and the innovativeness of the cable-car system, there is a highly significant negative correlation of medium strength (Spearman Rho -0.509; $p<0.001$) (Tab. 5). The scatter plot shows the same L-shaped-curve as the connection between innovativeness and destination size. Only destinations that have a low mean innovativeness rank might reach above-average numbers of overnight stays, while the success of the late majority and laggards is obviously limited.

Of course, the direction of causality between the correlated factors remains unclear. While innovativeness may lead to an increase in overnight stays, it is just as likely that the success of high numbers of overnight stays allows the cable-car companies in these destinations to invest in innovative installations (Rogers 2004). Furthermore, a certain pseudo-correlation might be present. Innovativeness correlates strongly with destination size (cable-car capacity), which in turn is related almost perfectly to tourist success (Pearson correlation 0.890; $p<0.001$).

**Table 4a and 4b: Regression models for the explanation of innovativeness (above) and success in tourism (below)**

| **Independent Variables** | **Standardised β-coefficients** | | | | |
|---|---|---|---|---|---|
| | Innovativeness ranking (N=167) | | | | |
| | Model 1 | Model 2 | Model 3 | Model 4 | Model 5 |
| Transportation Capacity of Cable-cars | **-0,444*** ** | **-0,216** ** | 0,161 | 0,115 | |
| Share of Overnight Stays in Winter | | **-0,453*** ** | | | **-0,192*** |
| Number of Innovations | | | **-0,749*** ** | **-0,608*** ** | **-0,246** ** |
| Duration of Stay | | | | **-0,289*** ** | |
| Capacity per Cable-car | | | | | **-0,360*** ** |
| **$R^2$ (adjusted)** | **0,192** | **0,342** | **0,384** | **0,453** | **0,485** |
| **F** | **38,7*** ** | **42,3*** ** | **50,5*** ** | **44,9*** ** | **50,1*** ** |

Level of significance: *** < 0,1 %, ** < 1 %, * < 5 %

| **Independent Variables** | **Standardised β-coefficients** | | | | | |
|---|---|---|---|---|---|---|
| | Overnight stays in the winter season 2007/2008 (N=167) | | | | | |
| | Model 1 | Model 2 | Model 3 | Model 4 | Model 5 | Model 6 |
| Innovativeness Ranking | **-0,337*** ** | -0,029 | 0,021 | | 0,018 | |
| Slope Surface with Snowmaking | | **0,792*** ** | | | 0,121 | |
| Transportation Capacity | | | **0,900*** ** | **0,890*** ** | **0,799*** ** | **0,303*** |
| Number of Cable-cars | | | | | | **0,611*** ** |
| **$R^2$ (adjusted)** | **0,108** | **0,640** | **0,791** | **0,792** | **0,798** | **0,819** |
| **F** | **21,2*** ** | **66,9*** ** | **301,1*** ** | **604,8*** ** | **98,5*** ** | **361,7*** ** |

Level of significance: *** < 0,1 %, ** < 1 %, * < 5 %

Source: BMVIT 1975-2002; AMT DER TIROLER LANDESREGIERUNG 2006, 2007, 2008a,b,c; AMT DER VORARLBERGER LANDESREGIERUNG 2008a,b,c,d; AMT DER SALZBURGER LANDESREGIERUNG 2007, 2008a,b; STATISTIK AUSTRIA 2008; TIROL ATLAS (special analysis 2005); R. Steiger (fieldwork 2008); own updates.

To evaluate the influence of innovativeness or destination size on tourist success, several regression models were tested. The second best explanatory content (adjusted $R^2$ 0.798) is offered by a model that contained the coefficients 'cable-car capacity', 'slope surface with snowmaking' and 'innovativeness'. This model explains nearly 80% of the statistical spread of overnight stays (Tab. 4b). However, only 'destination size' reaches a level of high significance ($p<0.001$), while innovativeness remains at an unacceptable level concerning both the significance and the explanatory content. The relative success of tourist destinations cannot be explained sufficiently by the technical innovativeness considered in this study, as model 1 (Tab. 4b) shows. In particular, as MATZLER et al. (2007) found, cable-car comfort is not a relevant driver of total customer satisfaction and hence customer loyalty. Other variables, such as a large selection of slopes, the price to quality ratio, the information policy, and personal factors play a greater role.

## 6 Discussion

### 6.1 Cable-car development and innovation theory in tourism

Before determining the implications of the empirical results for theory, we consider whether the particularities of the service sector apply fully to winter sports tourism.

- The service of transport in tourism is not intangible: guests can perceive time spent on waiting and transport, and comfort features. Further, transport is less characterised by uncertainties of quality than other services.
- In contrast to knowledge-based services, technology plays the central role in winter sports tourism. Because the transport of customers does not show differences, i.e. it is the same for every user, cable-car companies can be localised in SUNDBO and GALLOUJ's (1998, 8) service sector matrix as a standardised and technology-intensive service, i.e., as a typical mass-produced service.

**Table 5: Connections between success in tourism and other variables**

| Success in tourism (Pearson correlation) \ Variables | Innovativeness (2007/08) (Spearman-Rho) | Number of innovations (until 2007/08) | Number of cable-cars (2007/08) | Transportation capacity in VTMH (2007/08) | Mean capacity per cable-car in p/h (2007/08) |
|---|---|---|---|---|---|
| Overnight stays winter season 2007/08 | -0,509*** | 0,736*** | 0,880*** | 0,890*** | 0,468*** |
| Guest arrivals winter 2007/08 | -0,453*** | 0,547*** | 0,705*** | 0,827*** | 0,410*** |
| Average occupancy rate 1974/75-2007/08 | -0,460*** | 0,654*** | 0,585*** | 0,575*** | 0,569*** |
| Occupancy rate 2007/08 | -0,441*** | 0,630*** | 0,568*** | 0,567*** | 0,546*** |

| Success in tourism (Pearson correlation) \ Variables | Tourism intensity (2007/08) | Share of overnight stays in winter (2007/08) | Slope surface 2006 (Tyrol only) | Share of slope surface with snowmaking 2006 (Tyrol only) | Slope surface with snowmaking 2006 (Tyrol only) |
|---|---|---|---|---|---|
| Overnight stays winter season 2007/08 | 0,545*** | 0,464*** | 0,840*** | -0,202 | 0,806*** |
| Guest arrivals winter 2007/08 | 0,394*** | 0,319*** | 0,758*** | -0,231* | 0,800*** |
| Average occupancy rate 1974/75-2007/08 | 0,740*** | 0,760*** | 0,570*** | -0,023 | 0,597*** |
| Occupancy rate 2007/08 | 0,690*** | 0,735*** | 0,499*** | -0,046 | 0,528*** |

Level of Significance ***p<0,1%, ** p<1%, * p<5%

Source: BMVIT 1975–2002; AMT DER TIROLER LANDESREGIERUNG 2006, 2007, 2008a,b,c; AMT DER VORARLBERGER LANDESREGIERUNG 2008a,b,c,d; AMT DER SALZBURGER LANDESREGIERUNG 2007, 2008a,b; STATISTIK AUSTRIA 2008; TIROL ATLAS (special analysis 2005); R. STEIGER (fieldwork 2008); own updates.

In contrast to other tourism industries, the cable-car industry as a whole has to be considered as innovative because a couple of obstacles to innovation do not exist in this sector or are considerably lower:

- Demand rises continually, constituting one of the main drivers of innovation because customers do not persist on traditional structures but quickly get used to higher standards and require them.
- Firm size is a crucial obstacle to innovation, especially for smaller ski resorts. However, in contrast to typical accommodation SME, there are also a number of bigger and financially powerful cable-car companies.
- It is impossible to prevent the imitation of cable-car innovations, because manufacturers long to sell as many products as possible. Thus, innovation is mainly driven by the suppliers, which is why the diffusion process should be considered with respect to Brown's (1975) market and infrastructure perspective.
- The slow adoption of new technologies cannot be verified for Austrian cable-car companies.

The mature market of cable-car manufacturers engenders a Schumpeter Mark II type of innovation, in which "large firms with monopolistic power come to the forefront of the innovation process" (Malerba 2002, 253). Only two big market leaders and a few smaller manufacturers remain operative today, following an intensive process of concentration in which a multitude of mergers were conducted. Initially, the market leaders were not automatically the innovators in all cases, but they were the companies that best developed standardised modular cable-car types, which are more affordable and easier to build and maintain. Nowadays, only the R&D-intensive market leaders are able to afford the costly development phase of completely new types of cable-car. Their continuous incremental technological improvements reduce investment costs for the operators, which fostered the diffusion process of high-end cable-cars, such as tricable ropeways or the funitel.

### 6.2 Cable-car innovation and other success factors in winter sports tourism

As the empirical results show, it is very likely that the innovativeness of the cable car-system does not influence the success of a ski destination directly, but plays an indirect role. That being so, there must be other factors that are more important for success:

- Snow reliability is surely one of the most decisive criteria for skiing guests to visit a destination, as guest surveys show (Teich et al. 2007). Any kind of snow guarantee has a higher priority than cable-cars for both skiers and operators (Mayer et al. 2007; Steiger and Mayer 2008), which is shown by model 2 (Tab. 4b).
- Image of a destination: A positive image may be able to compensate for weaknesses in the cable-car system in the short term, but not in the long run. If image and reality diverge for a long time, the operator will experience severe problems of credibility. However, a world-famous brand could also turn out to be a problem for a cable-car company, because the high-class and high-price image might keep out the masses necessary for running modern ski resorts rentable. As the transport in cable-cars is the same for every customer, operators cannot charge higher prices on their top-end visitor segment.
- Tourists' perception of innovation: The marginal utility of new cable-cars with respect to customer satisfaction is definitely diminishing. If a new cable-car is to be perceived as a positive novelty, it needs to provide a perceivable additional benefit for the guests, such as solving bottlenecks. Innovative installations very quickly become established as industry standards. Nowadays, state-of-the-art infrastructure is expected and not a matter for special appreciation any more, whereas older installations are perceived as annoying, perhaps in the sense of a negative selection. Innovative or modern cable-cars can normally be considered as basic factors in the KANO-model of customer satisfaction (Pechlaner et al. 2005).
- Appropriateness of innovative cable-cars for the marketing of destinations: The promoting of cable-cars is, in all cases, appropriate for the marketing of a destination. However, there are crucial differences concerning the impact, duration, and range of the marketing efforts. These differences arise from the size-, effect- and innovativeness-dimension of the new installation. Particularly innovative or outstanding cable-cars may also be transformed into brands, because they are recognized by the tourists. An additional benefit of innovative cable-cars is the marketing of the unique ride experience as unique selling proposition (Otto and Ritchie 1996).
- Innovativeness vs. modernity of a cable-car system: Can individual outstanding innovations compensate for a generally outdated cable-car infrastructure? Tourism success does not depend

on single innovative installations, but on the ski tourist package as a whole. The package could be modernized little by little, over a period of time, through continual innovativeness, i.e. resulting in a modern cable-car system, but the crucial point is that the service chain as a whole has to be perfect and cable-cars are only one part of it (MÜLLER and MICHEL 2001).

## 7 Conclusion

Cable-cars are not tourism innovations in the narrow sense, because they represent technical novelties that are applied in tourism. This is why cable-cars they occupy a middle position between the manufacturing (origin) and service (application) sectors. The second Schumpeter hypothesis, according to which greater innovativeness should be found in larger destinations, is not falsified. In close correlation with this result stands the dominant diffusion pattern of innovative cable-cars, which generally proceeds in a hierarchical order. The hierarchy effects can be explained by the size of the destination/firm and the financial capabilities of the cable-car companies, which are correlated with the size of the destination. However, particularly in the valleys, the neighbourhood effect of contagious diffusion (HÄGERSTRAND 1967) is observed. Thus, it could be useful for future research to integrate the findings of geographical diffusion theory into research on innovation in tourism.

To succeed in winter tourism nowadays, it is not sufficient to invest large amounts of money in the cable-car infrastructure. The overall consumer package has to meet the increased level of expectation of experienced customers. Cable-cars kept up-to-date by continuous innovativeness are only one part of the service-chain (FLAGESTAD and HOPE 2001). A modern cable-car system is a constitutive basic factor of ski tourism that is taken for granted by the guests, just as are technical snow reliability that is guaranteed by the use of snowmaking and a certain size of ski resort. If these basic requirements are not met, or not met completely, tourists will be dissatisfied and may not return to the resort. The long-standing success of Austrian destinations indicates that these lessons allegedly have been learnt by the persons in charge.

Nowadays, cable-cars do not represent a point of attraction *per se*, because incremental innovations become established too quickly as almost ubiquitous industry standards. However, particularly innovative and unique cable-cars generate added value for guests and operators, which permits the marketing of the transport itself as a special experience. Even so, this will not work at every mountain and with every cable-car. Thus, it would be unwise to derive general strategic guidelines from our findings.

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