1. Introduction / Abstract
The present study elucidates the facets of German airport cooperation. They are comprehensively analysed regarding the questioning “dimensioning of airport cooperation”. Furthermore, the theoretical and practical background of airport cooperation in Germany and other European countries is depicted in detail.

The study demonstrates that it is common practice for airport operators to choose cooperation with other airports as a business-strategic tool, in order to be able to successfully meet the requirements of competition. It showed that national airports as well as international airports very often don’t have the managerial potential, but find themselves as partners and participants of cooperation under the roof of an alliance. Furthermore, it revealed that cooperation between airports without legally recognised corporation is still quite common and the collaboration is based on various cooperative initiatives, which are either politically or economically motivated.

In the context of an economical evaluation of cooperation between airports it was found, that generally, the aimed objectives of all participants could not be achieved. It turned out that shareholding cooperation or joining a legally recognised corporation, respectively, in general is more preferred than a loose cooperation, since only these formations seem to allow achievement of the cooperative objectives.

Furthermore, the different forms of airport cooperation were subject to dimensioning and thus analysed in detail. Thereto, selected common airport cooperative formations were evaluated and compared by applying some cooperation criteria. It revealed a high cooperative solidarity at least for the cooperation within airport systems, in a holding or in a Joint Venture. For neighbour airports in a megalopolis, e.g. traffic shifting of airport systems (due to European law) can be the most advantageous of all cooperative formations.

When cooperating within a Holding and a Joint Venture, case studies proved that cooperative solidarity can be quite stable even without the legal support given by traffic shifting of an airport system. Whereas, in a Holding a legally recognised corporation is mandatory, the Joint Venture suits the need for close cooperation between potential co-solicitors without shareholding. From practice it could be seen that cooperation between several airports forming a network and managed by a moderate coordinator can be advantageous and be preferred to an airport alliance (without dominant members) or even an airport group (with dominant management), because the cooperation is tending too much towards market or hierarchy, respectively.

The conclusion of the study comprises, besides the investigation of airport importance as an economical factor, an analysis of the effect of individual economical
motivation for cooperation on the over-all economy. It showed that individual economical motivation for airport cooperation can have a considerable impact on the over-all economy.

2. German Airport Cooperations and Holdings
In theory and practise an increasing competition is supposed to boost the number and significance of cooperation. There are various forms of cooperations between companies aiming to enhance their own competitive capacity. More frequently, airport operators too adopt this concept. This reveals the intensified interest of this branch in cooperation and the subsequently growing number of cooperations between airport operators. To the public the airport operators mainly state reasons like cost reduction, enhancement of efficiency as well as upgrading of performance and competitive capacity of the partner airports by exchange of experience and know-how-transfer. The ranges of cooperation are purchasing, technology, data management, ground traffic services, personnel matters, safety and security. Some forms of airport cooperations are briefly described in the following chapters.

2.1 Cooperation without legally recognised Corporation
Several German airports agreed upon an extensive cooperation in some airport operational segments like the Alliance of South German airports (among others Munich, Dresden, Leipzig, Nuremberg and Stuttgart). This alliance is focused on a mainly practical cooperation while safeguarding independence and avoiding integration or mergence of the cooperating partners by mutual share holding.
In the case of these “open cooperations”, the airports involved cooperate in certain areas like training, qualification, joint purchasing, provision of joint software and general exchange of information, but they continue to appear as competitors on the market.
Although the cooperation within associations and organisations does not fit into the normal scheme of inter-company cooperation, it is significant in airport operators’ practise. Among others, the GERMAN AIRPORT ASSOCIATION (ADV) is typical for this kind of cooperation. It offers a platform for open cooperations of independent airport operators and safeguards and supports the cooperation as well as the interests of its member airports in all airport-related areas.

2.2 Cooperation of Airports with legally recognised Corporation
When cooperating on a one-level share, an airport operator gains company shares of a different airport and thus exerts influence on the company’s strategy and development. Primarily, an extension of business is aimed by the share acquirer. In Germany, the actual airport cooperations are distinguishable by a biased shareholding of a major airport with a small “satellite airport” in its vicinity (Frankfurt-Hahn, Dusseldorf-Gladbach, Munich-Augsburg) or the share holding of a major airport with a remote airport (Frankfurt-Saarbrucken, respectively Hanover).

2.3 Cooperation by Management Contract
Management contract is another type of airport cooperation. It constitutes a technical or operational cooperation by paid exchange of know-how or equivalent services (for example FRAPORT AG management contract with airport Athens-Spata). This kind of cooperation between airport operators is based on contracts, obligating the airport operator to render a certain service or task at a different airport.
2.4 Cooperation by Joint Ventures like PANTARES ALLIANZ
Global competition also reveals the kind of cooperation between the actually severely competing SCHIPHOL-GROUP of Amsterdam airport and Frankfurt airport (FRAPORT). Both airport operators were considered to be potential competitors. In 2000 the directorates of both companies officially announced the first alliance between these international hub airports. On the global market FRAPORT and Amsterdam airport will offer a big variety of services by introducing the new brand. Furthermore, management and financial capacities will be pooled in order to boost the potentiality of FRAPORT and SCHIPHOL and to qualify for the acceptance of tenders for numerous international airport privatization projects. In addition, both equivalent partners will complement their expertise, in order to gain competition vantages on the international market by offering better services and extending their business portfolio. The cooperation also should allow realisation of competition vantages by cost reduction and synergy in the ranges of purchasing, marketing and project management. Lately, there is not much heard of this cooperation anymore.

2.5 Cooperation with Holding Structure, respectively within Airport Systems
The cooperation type of a Holding specifically supports an integrative and extensive performance of partners. The concept of airport Holdings is quite common for European Airport Systems.

2.5.1 Example: Berlin Airports
In this context, the Holding structure of Berlin Airport Systems can be given as an example. The airports of the capital Berlin, such as Schönefeld, Tegel and Tempelhof are part of a major Holding, BERLIN BRANDENBURG AIRPORT HOLDING GMBH (BBF). For its members it assumes tasks like accounting, controlling, marketing, public relations and environmental matters as well as project control for the single airport Berlin-Brandenburg-International (BBI) and the preparation for a substantial privatization of BBF.

2.5.2 Example: CENTRAL GERMAN AIRPORTS GROUP
Under the corporate name CENTRAL GERMAN AIRPORTS GROUP the airports of Dresden and Leipzig-Halle attempt to come into the market. On the basis of a financial Holding this cooperation is supposed to perform a substantial structuring programme as a pre-requisite for future housekeeping and strategic innovations of both airports. The strategy is focused on a refinement of the actual business segments of both airports by pooling similar business segments in order to avoid redundancy and to benefit from size. Anyhow, the airports of Dresden and Leipzig-Halle will continue performing as two separate airports on the market and thus as competitors. The CENTRAL GERMAN AIRPORTS GROUP, entirely belongs to the public property of the local authorities.

2.6 Cooperation by Airport Systems
An Airport System should systematically support the special features of each airport and boost its optimal integration into the system in order to render efficient cooperation for all parties involved. Thus, airlines – while safeguarding their interests – can be exactly supplied with various airport resources, for example hub functions on the one hand and low cost on the other hand. Until now, eight Airport Systems have been approved by the EU-commission. They geographically belong to and are operated in a megalopolis respectively, urban agglomeration.
Overview: EU-approved Airport Systems

- Berlin: Schönefeld, Tegel, Tempelhof (Germany)
- Kopenhagen-Kastrup and Roskilde (Denmark)
- Paris: Charles-de-Gaulle and Le Bourget (France)
- Lyon: Bron and Satolas (France)
- Rome: Fiumicino and Ciampino (Italy)
- Milano: Linate, Malpensa and Bergamo (Italy)
- Venice: Marco Polo and Treviso (Italy)
- London: Heathrow, Gatwick and Stansted (England)

Reference: EU-Regulation No. 2408/92 (1992), Appendix.

Detailed analysis of these examples reveals that airports operated in an Airport System constitute an intensive form of cooperation regarding legal as well as business matters, thus enhancing the achievement of cooperation objectives like synergies and cost reduction. The cooperation offers various fields of activity, which are shown in the following overview.

### Overview: Fields of Activity for Cooperations by Airport Systems

<table>
<thead>
<tr>
<th>In the area of services provided</th>
<th>In the area of services applied</th>
</tr>
</thead>
<tbody>
<tr>
<td>Materials procurement</td>
<td>Prevention of competing attitude</td>
</tr>
<tr>
<td>Training of personnel</td>
<td>Focal point market segments’ trade-off</td>
</tr>
<tr>
<td>Ground traffic services</td>
<td>Coordination of acquisition measures on the air traffic market</td>
</tr>
<tr>
<td>Data management</td>
<td></td>
</tr>
</tbody>
</table>


### 2.7 Cooperation within Airport Networks

A joint Airport Network is another type of airport cooperation. It is set up by companies not mainly operating in the airport business, but joining different airports in an association. The 100% affiliate of the construction company HOCHTIEF AG, the HOCHTIEF AIRPORT GMBH, can be cited as an example for this kind of cooperation. This company invests in airports and airport facilities. The HOCHTIEF AIRPORT GmbH develop and operate airports, independently from the construction activities of their mother company. This is revealed by their involvement in the development of Athens-Spata airport. Together with the Irish airport operator, AERRIANTA INTERNATIONAL, HOCHTIEF AIRPORT GmbH increased the acceptance of bids for airport privatization since 1997. They accepted a bid for the minority equity of the first airport privatizations in Germany, namely Düsseldorf and Hamburg. After the airports’ integration into the network, HOCHTIEF AIRPORT GmbH emphasize the acquisition of additional profit potentials to be gained by the network joining effects of the member airports. Among others, it comprises the benchmarking, due to the shareholders’ knowledge of procedures, organisations and cost structures of the different airport operators. It serves as a tool to systematically close operational gaps by continuous comparison of procedures and methods.8

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Figure 5: Cooperation of German Airports in Europe

3. Dimensioning of Cooperations
The present study is meant to define the significance of cooperations and to allow comparison between market and hierarchy processes by means of several criteria selected according to an inter-dependence profile by TRÖNDLE.9

Figure 2: Cooperation in Market and Hierarchy Processes

![Cooperation in Market and Hierarchy Processes](image)


The distinct forming between these extremes highlights the intensity of cooperative relations (low – high) by means of criteria like mutual dependence (lordship-relation), volume of cooperation (like intensity of the partners’ communication requirements), complexity (like number and inter-dependence of operational functions to be assumed by cooperation partners), cooperation yield (individual or shared between the cooperation partners, thus to be pooled according to a real cooperation), value (e.g. contributions to achieve the business objectives), administering level (e.g. the extent of contractual matters’ settlement), term (long-term cooperation normally comprises more cooperative elements).

Figure 3: Example of the Dimensioning of the South German Airport Alliance

![Example of the Dimensioning of the South German Airport Alliance](image)


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The following table shows an overview on the scale values of the analysed types of cooperation between airports.

<table>
<thead>
<tr>
<th>Cooperation Types</th>
<th>Dependecyt</th>
<th>Volume of Coordination</th>
<th>Complexity</th>
<th>Cooperation Profit Value</th>
<th>Degree of Formalization</th>
<th>Temporal Frame</th>
<th>Average</th>
</tr>
</thead>
<tbody>
<tr>
<td>SOUTH GERMAN Airport Alliance</td>
<td>30</td>
<td>80</td>
<td>70</td>
<td>60</td>
<td>70</td>
<td>50</td>
<td>50</td>
</tr>
<tr>
<td>Airport Association (e.g. ADV)</td>
<td>70</td>
<td>90</td>
<td>80</td>
<td>20</td>
<td>50</td>
<td>10</td>
<td>50</td>
</tr>
<tr>
<td>Airport Cooperation Dusseldorf and Gladbach</td>
<td>90</td>
<td>10</td>
<td>80</td>
<td>90</td>
<td>90</td>
<td>30</td>
<td>100</td>
</tr>
<tr>
<td>Airport Cooperation Frankfurt and Hahn</td>
<td>80</td>
<td>60</td>
<td>90</td>
<td>80</td>
<td>100</td>
<td>40</td>
<td>100</td>
</tr>
<tr>
<td>Airport Cooperation Munich and Augsburg</td>
<td>80</td>
<td>40</td>
<td>30</td>
<td>70</td>
<td>70</td>
<td>60</td>
<td>100</td>
</tr>
<tr>
<td>Airport Cooperation Stuttgart and Baden-Airport</td>
<td>80</td>
<td>30</td>
<td>90</td>
<td>90</td>
<td>90</td>
<td>30</td>
<td>100</td>
</tr>
<tr>
<td>Management Contracts (e.g. FRAPORT/Athen-Spata)</td>
<td>50</td>
<td>10</td>
<td>20</td>
<td>0</td>
<td>60</td>
<td>100</td>
<td>70</td>
</tr>
<tr>
<td>Joint Venture (e.g. PANTARES ALLIANZ)</td>
<td>80</td>
<td>80</td>
<td>100</td>
<td>50</td>
<td>100</td>
<td>100</td>
<td>70</td>
</tr>
<tr>
<td>Holding (e.g. CENTRAL GERMAN AIRPORTS GROUP)</td>
<td>80</td>
<td>90</td>
<td>90</td>
<td>100</td>
<td>90</td>
<td>100</td>
<td>90</td>
</tr>
<tr>
<td>Airport System (general)</td>
<td>100</td>
<td>90</td>
<td>90</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>Airport Network (e.g. HOCHTIEF AIRPORT)</td>
<td>70</td>
<td>50</td>
<td>100</td>
<td>50</td>
<td>100</td>
<td>50</td>
<td>100</td>
</tr>
</tbody>
</table>


The outcomes of the table reveal the effectiveness of cooperative solidarity especially for Joint Ventures (like PANTARES ALLIANZ), Holdings (like CENTRAL GERMAN AIRPORTS GROUP) and Airport Systems (like Berlin Airports). All medians of this first group are higher than 80 scale points. In the second group with still high scale values (medians between 70 and 80) the majority of the selected airport cooperations operate between airport hubs and their satellite airports (airport cooperations of Frankfurt/Hahn, Düsseldorf/Gladbach, Stuttgart/Baden-Airport) as well as the Airport Network of HOCHTIEF AIRPORT GMBH. The Frankfurt airport cooperation and share holding with Hahn airport has a somewhat distinct position in this group (median 80). This is mainly due to the volume of co-ordination (median 60 is distinctly higher than for the other airport cooperations within this group), which is mandatory for the planned upgrading (airport and traffic link) and the given high priority for cooperation with a neighboured airport due to capacity problems in Frankfurt. A high level of cooperative solidarity can be found in an Airport Network compared to other types of
cooperation in this group, especially with regard to the criteria of complexity and quality rating (100 scale points each), (only Frankfurt/Hahn reach a similar level of dimension with 90 respectively 100 points). The term value (near 100) is quite high within this group, because exclusive long-term commitments can be concluded from the shares and investments.

All cooperations showing medians far below 70 scale points can be found in the third group. Among them are the SOUTH GERMAN AIRPORT ALLIANCE and the cooperation of two members, namely Munich and Augsburg. They were analysed separately. The SOUTH GERMAN AIRPORT ALLIANCE only fail to achieve an enhanced cooperative solidarity due to a probably extendable cooperation complexity (70) and the lack of a more detailed cooperation formalising. Thus, a cooperation in further operational areas could be elaborated, and a comprehensive cooperation could be contractually agreed upon. This enhanced cooperation also would improve the criteria values of dependence and term. More complex operational functions of the cooperating partners mean higher dependence (respectively smaller chance of substitution) and thus a larger time frame (term) of cooperation. By comparison, the airport cooperation between Munich and Augsburg, despite its membership of SOUTH GERMAN AIRPORT ALLIANCE, shows quite interactive criteria tendencies. Thus, it shows a much higher dependency value (80) of both partners than within the entire alliance (30), since both airports, Munich and Augsburg, due to their neighbourhood and the financial commitment (on the Munich-side), show a high level of dependency, but the co-ordination-value (40) and the complexity-value (30) is quite low compared to an alliance, because the actual upgrading of Augsburg airport is the only focal point of cooperation until now. Especially, when considering the number and interdependence of business operations, this airport cooperation distinctly stays behind the afore mentioned ones (Frankfurt/Hahn), Stuttgart/Baden-Airport and Düsseldorf/Gladbach).

In the fourth division (medians between 50 and 60) you find the Airport Alliance, ADV, (52.9). In particular, the ADV fail the cooperation criteria of formalising (10) and quality rating (50) in a higher level cooperative solidarity. The reason is given by the non-binding common project agreements for members and the ADV-rule supporting the members’ voluntariness, goodwill and autonomy, thus promoting non-cooperative behaviour and impeding the positive effects of cooperation. In fact, the cooperation yield is almost gained individually (20), since no member is willing to give more (know-how, data etc.) than it can probably gain by the potential competitors within the ADV. Generally spoken, self-interest impedes a strong cooperative solidarity.

The management contract, like practised by FRAPORT AG with airport Athens-Spata, reached the lowest dimensioning of all types of airport cooperations analysed. Particularly, the entirely individual cooperation yield (value 0) revealed the distinct link to barter business (goods: know-how on payment) and the tendency to the continuum market. The complexity of the management contract is only focused on the area of flight operations, thus evoking a low level evaluation. A complexity upgrading of a cooperation can be achieved by amendment or supplement of the actual management contracts.
The outcome of the dimensioning and the attempt to group the analysed types of cooperation are shown in figure 4.

**Figure 4: Grouping of selected Airport Cooperation Types**

<table>
<thead>
<tr>
<th>Scale Values</th>
<th>Group I</th>
<th>Group II</th>
<th>Group III</th>
<th>Group IV</th>
<th>Group V</th>
</tr>
</thead>
<tbody>
<tr>
<td>from 0 to 50</td>
<td>Airport System</td>
<td>Airport Holding</td>
<td>Joint Venture</td>
<td>Airport Network</td>
<td>Airport Cooperation between Hubs and Satellite Airports</td>
</tr>
<tr>
<td>from 50 to 60</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Management-Contract</td>
</tr>
<tr>
<td>from 60 to 70</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Airport Association</td>
</tr>
<tr>
<td>from 70 to 80</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Airport Alliance</td>
</tr>
<tr>
<td>beyond 80 to 100</td>
<td>Group I</td>
<td>Group II</td>
<td>Group III</td>
<td>Group IV</td>
<td>Group V</td>
</tr>
</tbody>
</table>


As a conclusion of theoretical consideration, experiences and the outputs of the dimensioning, it should be stated, that cooperative solidarity is particularly evoked by the cooperation types Airport System, Joint Venture and Holding.

Airport Systems in particular, qualify for good cooperation. Even the significant aspect of potential traffic shifting between neighboured airports – the implementation might be extremely difficult in reality – can be legally achieved within an Airport System. In fact, this aspect affects all criteria and aims to a closer, more complex and upgraded cooperation. However, Airport Systems are subject to approval by the EU-commission and are only appropriate, respectively approved, within a common megalopolis. Therefore, they can only be applied under corresponding conditions.

Excluding the aspect of traffic shifting, the cooperation types Joint Venture as well as the Holding offer similar advantages like an Airport System for a close cooperation between airport operators regarding the complexity of the tangent business fields, significance, and level of formalisation. Therefore, excluding the aspect of traffic shifting, Airport Systems and Holdings can be considered to be congruent, since European Airport Systems are generally organised in a Holding.

The analysed airport cooperation of a hub airport share holding with a satellite airport shows that each situation implies different preconditions, respectively effects on the performance of cooperation. In particular, the volume of co-ordination, respectively the complexity of cooperation areas, show big differences. Partially, the low level and poor quality of formalisation gives the impression of majoring within biased share holding. Thus, potentially agreed cooperation contracts cannot or can slightly become effective.

The cooperation type Airport Network, which has been discussed by the example of HOCHTIEF AIRPORT AG, shows some advantages considering the mutual dependence, complexity, significance and terms of cooperation compared to an Airport Alliance.
Hereby, the distinct cooperation structure and the expert assessment of the entire Airport Network of the so-called centre of HOCHTIEF AIRPORT AG might be decisive factors. The selection of members within this network, the complex benchmarking over all operational divisions, the long terms of cooperation, due to big shares and huge investment, support a stronger cooperative solidarity compared to an Airport Alliance like SOUTH GERMAN AIRPORT ALLIANCE.

4. Summary: German Airport Cooperation in Europe
The present study elucidates the facets of German airport cooperation. The study demonstrates that it is common practice for airport operators to choose cooperation with other airports as a business-strategic tool, in order to be able to successfully meet the requirements of competition. Furthermore, it revealed that cooperation between airports without legally recognised corporation is still quite common and the collaboration is based on various cooperative initiatives, which are either politically or economically motivated. Furthermore, the different forms of airport cooperation were subject to dimensioning and thus analysed in detail. Thereto, selected common airport cooperative formations were evaluated and compared by applying several cooperation criteria. It revealed a high cooperative solidarity at least for the cooperation within airport systems, in a Holding or in a Joint Venture. For neighbour airports in a megalopolis, e.g. traffic shifting of airport systems (due to European law) can be the most advantageous of all cooperative formations. When cooperating within a Holding and a Joint Venture, examples proved that cooperative solidarity can be quite stable even without the legal support given by traffic shifting of an Airport System. Whereas, in a Holding a legally recognised corporation is mandatory, the Joint Venture suits the need for close cooperation between potential co-solicitors without shareholding. From practice it could be seen that cooperation between several airports, forming a network and managed by a moderate coordinator, can be advantageous and be preferred to an Airport Alliance or even an Airport Group.
5. Bibliography


