



Relationship between types of retail management organization and retail revenues of North-American airports¹

Pashkin Roman² (roman.pashkin@gmail.com)

ABSTRACT: The significance of non-aviation revenues, much from retail outlets, has grown significantly. For many airports, non-aviation revenue has today become as important as traditional aviation revenue. The natural question is how best to organize the retail governance structure to satisfy the airport's targets.

The aim of this study is to find out whether there is a relationship between different types of airport retail management organization and the level of retail revenues obtained. The additional task is to distinguish these relationships for different kinds of airports: large hubs, small airports, international, domestic and etc. Based on a sample of about 100 north-American airports it implements statistical and econometrics techniques to determine the effect of different governance structures. The study also conducts dynamic analysis to find out whether the relationship changes over period of years 2002 – 2008.

WWW.GAP-PROJEKT.DE

Prof. Dr. Hans-Martin Niemeier
Hochschule Bremen
Werderstr. 73
28199 Bremen

Prof. Dr. Jürgen Müller
HWR Berlin
Badensche Str. 50-51
10825 Berlin

Prof. Dr. Hansjochen Ehmer
Internationale Fachhochschule Bad Honnef
Mühlheimer Str. 38
53604 Bad Honnef

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² The author is a member of German Airport Performance (GAP) Project at Berlin School of Economics and Law and a Graduate Student at Humboldt University Berlin, email: roman.pashkin@gmail.com

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(Draft)**

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1. Introduction

The last decades saw significant transformations in the airport industry. Changes in the ownership structure, the understanding of an airport's mission, the influence of new market players like LCC companies etc. changed the focus of airport management and lead to an increased focus of non-aeronautical revenue. Thus while management has to pay attention to all the activities of an airport, non-aviation activities have become extremely important for airports to remain profitable and competitive.

There are a lot of articles dealing with airport efficiency and the role of non-aeronautical revenue, but most of them only have a descriptive character. There has been very little modeling of the underlying relationships, mostly because of the limitations of the data. The lack of studies about this issue and their mostly non-quantitative character (surveys or single expert opinions) and the growing economic importance of these activities requires more profound research.

The current study tries to satisfy such needs. The aim of this study is to find out whether there is a relationship between different types of retail management organization and the level of retail revenues obtained. The additional task is to distinguish these relationships for different kinds of airports: large hubs, small airports, international, domestic and etc.

We were fortunate to overcome the problem of data availability by having access to data from a large sample of US airports. Based on a sample of about 100 north-American airports this study implements statistical and econometrics techniques to determine the effect of different governance structures. The study also conducts dynamic analysis to find out whether the relationship changes over period of years 2002 – 2008. We next review the literature on this topic, and then describe our data set and finally carry out an econometric analysis.

2. Review of the literature and development of hypotheses

There are several ways for airport to organize the vertical chain of their retail business

Sorted by decreasing level of vertical integration, they are³:

1. Directly. Airport makes all investments, develops retail facilities and run the business on its own (full vertical integration). To obtain know-how airport can buy services of consultants.
2. Wholly-owned subsidiary.
3. Management company
4. Joint venture
5. Concessionaries / Master concessionaries (-s)
6. Developer

Let's take a closer look at main features of these governance approaches:

- Wholly-owned subsidiary. The purpose of hiring off this activity from the airport authority to a subsidiary is to create a separate corporate identity and thereby attract more experienced staff and managers. The risk is that the subsidiary company will never be large enough to compete effectively with the large-scale retailers or providers of the services in its own field.
- Direct operation. Airports are directly involved in operating commercial outlets, and they are most likely to operate a concession themselves if the activity requires limited commercial skills, if it involves a level of investment which a concessionaire may be hesitant to undertake or if the commercial risk is relatively low. The most critical disadvantage is their lack of managerial expertise in many different areas of retailing.
- Direct lease (or multiple concessionaries). The airport staff is responsible for the competitive solicitation, leasing of space and monitoring of each individual concession operator. Under this mechanism, the individual relationship between lessee and lessor requires the concessionaire to develop, finance, and manage concession facilities, while the airport usually collects rental fees. Direct lease has some advantages in that the airport retains control of individual concessions,

³ According to Hong-bumm Kim, Jee-Hye Shin (2001)

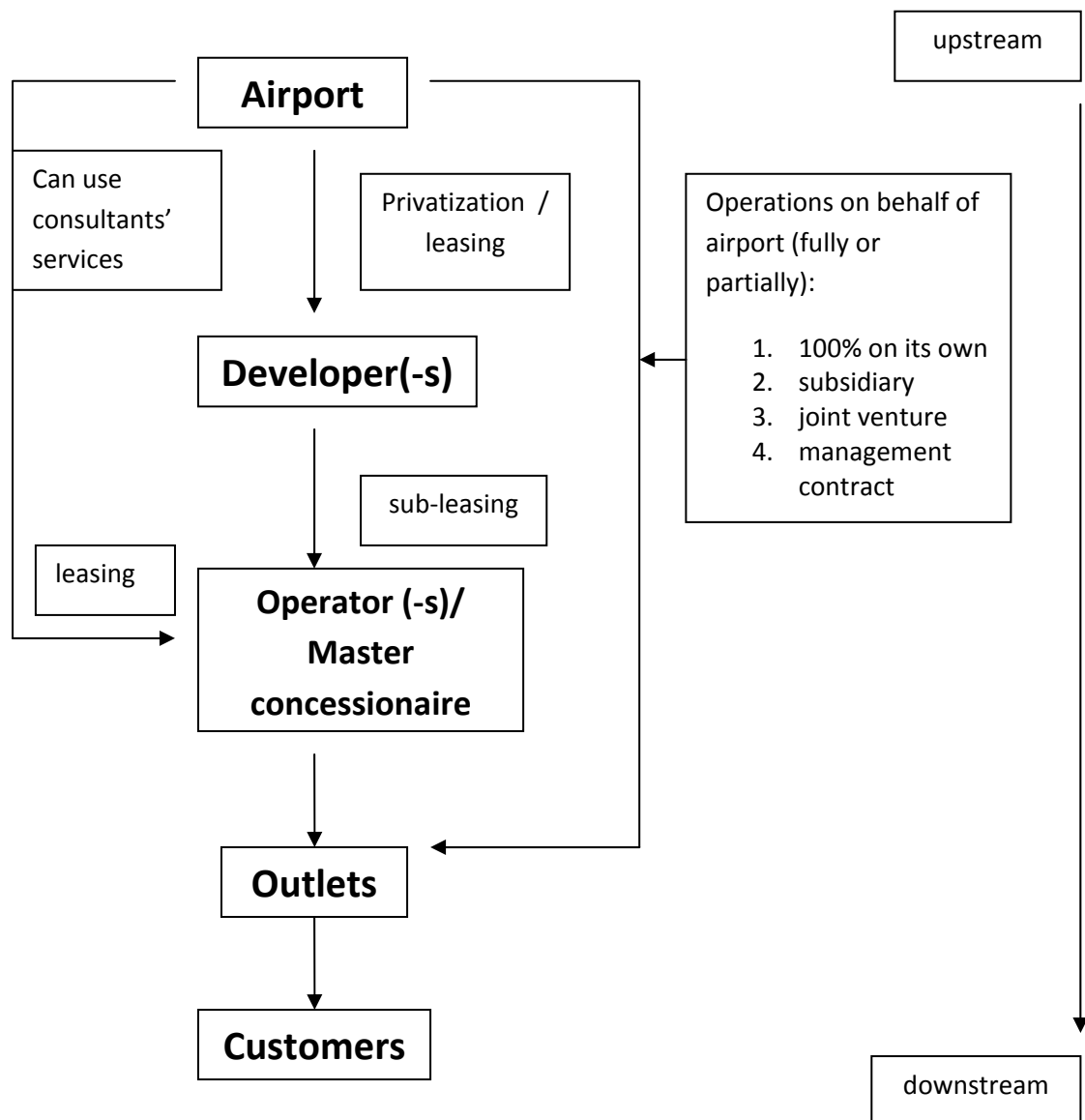
whereas the airport authority assumes the risk of lower lease income and high administrative costs associated with managing multiple lease agreements.

- Joint venture. If an airport authority wishes to encourage external investment in certain facilities while maintaining some direct influence and control, it may set up a joint venture company. In this case, the airport authority can lose its freedom to manage concessionaires because it becomes tied into the joint venture company with which it has a share.
- Fee management contract. One or more management companies are hired to operate concessions on a daily basis, and the airport authority compensates the management company the monthly fees and a percentage of the net operation incomes derived from the concession operation. The airport authority is in charge of financing, providing space, capital improvement, facility design, development and updates, developing operation standards, keeping inventory, tenant relationship, and financial accounting of profitability. The advantage of this contract arrangement is the airport authority's direct control over space, operation, revenue, merchandise, pricing and capital improvement costs. Among possible disadvantages are that the airport authority bears all financial risks for vacancy, capital improvement and operation, and is required to have expert in-house staff on many different facets of concession operation and management.
- Master concessionaire. Some airports award contracts for particular categories of concessions, whereby the principal concessionaire develops and operates a substantial portion of the space. The main advantage is that the airport can take advantage of the know-how of the master concessionaires in their sales, merchandising, and marketing. A disadvantage is the resulting lack of individuality in the operations of the various concessions. Sometimes there is limited availability of qualified master concessionaires.
- Developer approach. A commercial developer is sometimes hired to design and develop the concession facilities much like in the case of traditional retail malls. The developer provides the required financing and administration of all phases of concession operation as well as subleasing of spaces to qualified retailers, i.e. privatization of retail space at the airport. Advantages are streamlined management and administration by nationally recognized operators with primary responsibility and unified capital development of facilities. Disadvantages are the airport's lack of direct control over concession operators and the difficulty of

selecting a qualified and experienced developer with an appreciation for the unique characteristics of airport retail.

All these main options and the whole vertical (value) chain of airport retail industry are depicted on scheme 1.

Scheme 1. Conceptual overview of airport retail vertical chain



Trying to answer the question "What retail governance structure fits better to different retail sectors?" Hong-bumm Kim, Jee-Hye Shin (2001) carried out a survey of 12 selected experts in this field (Table 1). One of their findings is that the perceived

appropriateness of the types of concession management can vary according to three different categories of concessions - duty free, F&B, and retail and convenience - in view of the three different performance perspectives of profitability, managerial efficiency, and passenger satisfaction.

Table 1. Appropriate management type of airport concessions in different product categories

Management type	Duty free			F&B			Retail and convenience		
	Profitability	Managerial efficiency	Customer satisfaction	Profitability	Managerial efficiency	Customer satisfaction	Profitability	Managerial efficiency	Customer satisfaction
Master concessionaire	7 58,3%	8 66,7%	7 58,3%	7 58,3%	8 66,7%	7 58,3%	5 41,7%	7 58,3%	6 50%
Fee management	1 8,3%	2 16,7%	1 8,3%	1 8,3%	2 16,7%	1 8,3%	1 8,3%	3 25%	2 16,7%
Developer approach	- 0%	2 16,7%	2 16,7%	- 0%	2 16,7%	2 16,7%	- 0%	1 8,3%	1 8,3%
Direct lease	4 33,30%	- 0%	2 16,7%	4 33,3%	- 0%	2 16,7%	5 41,7%	1 8,3%	3 25%
Direct management	- 0%	- 0%	- 0%	- 0%	- 0%	- 0%	1 8,3%	- 0%	- 0%

Column (%) represents percentage sum of 12 respondents

The results imply that the master-concessionaire approach would be the best overall alternative for the future operation and management of airport concessions, irrespective of both concession types and performance measures.

The direct lease method is found to be the second most referred management type in airport concessions, and in the case of retail and convenience stores it appears to be a good method for increasing the profitability of airport concessions. One reason may be that retail and convenience stores usually do not require high specialty in producing, merchandising, and selling the product items, compared with that of duty-free shops and F&B catering services.

The direct management approach is found to be the lowest preferred method of managing airport concessions from every aspect of performance.

Thereby this article raises the first hypothesis for the current study.

Hypothesis 1. Master-concessionaire is more efficient than direct lease (several operators), which is more efficient than fee management, which is more efficient than direct operations.

White, Bamberger & others (2009) “Mastering Airport Retail” assert that direct operation, where the airport bypasses operators to deal with brands and operate shops itself, remains embryonic and tends to be implemented only in airports with critical mass and established retail operations (staff, logistics, etc).

According to the research this type of concession operation should remain limited for three main reasons:

- Direct operation requires a critical size (traffic, surface) to ensure return on investment. This limits the model to major hubs.
- Direct operation represents an opportunistic move and cannot result in a long-term diversification strategy. Airports that operate their own retail platform will not be able to gain a competitive advantage that will enable them to operate abroad or extend their retail activities beyond the airport.
- The ability of direct operation to generate higher revenues and margins through more competitive prices has still to be proven. Attractive prices alone are not sufficient to increase revenues and margins; they must be supported by innovative concepts. In addition, opportunities for achieving economies of scale in buying and logistics, etc. are limited in this model.

This brings us the second hypothesis.

Hypothesis 2. For airports under critical mass direct control perform worse than other management structures. For those with critical mass direct control is preferred.

Operator’s scale of business

According to White, Bamberger & others (2009) “Mastering Airport Retail” operators’ local know-how and the way they leverage it to propose the highest concession fees is no longer as important as it has been; airports are increasingly looking for operators

who can demonstrate financial robustness, strong offer flexibility, international know-how and high-quality operational performance. These changes in airports' expectations reinforce global operators' competitive advantage. Indeed, the trend among operators towards internalization and consolidation helps them reach a critical size, allowing them to improve their professionalism, increase their buying power, extend their brand portfolio and offer very competitive and robust concession fees. In order to survive, local operators are repositioning themselves in niche categories or at regional airports or entering joint ventures with global operators. In the long term, however, these smaller operators are strongly exposed.

A number of factors have led to a change in expectations on the part of the airports:

- The internalization of passengers.
- The upgrading of airport retail standards driven by “best in class” Middle East and Asia Pacific airports.
- Poor experience with some local operators (limited offer renewal, overbidding resulting in systematic guaranteed minimum payment)

Financial robustness. The concession fees level remains a major selection criterion for airports. However, the growing pressure on retail operators to achieve higher targets and invest in offer renewal and shop concepts means airports are being more careful in assessing the robustness of the operator's business plan (through deep analysis of both the top and bottom line) and the capacity of the operator to fulfill the plan's objectives. The operator's overall buying power and proposed brand performance benchmarks are key factors for the airports in this regard.

Flexibility and international know-how. With airports' duty-free areas transforming into modern shopping malls where the offer is being constantly adapted to the passenger profile, the relative importance of local know-how is decreasing and operators are facing new challenges.

A dynamic and wide-ranging brand portfolio, strong offer flexibility, new merchandising techniques and concept innovation are becoming key to satisfying both airports' and passengers' expectations. Operators need to demonstrate these attributes in order to respond to fast-changing consumer trends, to react more quickly to brands' performance (in and out strategy) and to optimize the use of space without affecting shop attractiveness and product visibility for passengers.

Good performance. Offer flexibility requires a good level of operational performance, including logistics and supply chain efficiency, and flexible and high-quality human resources management.

The research highlights process standardization as key to successful airport retail operations, along with consistent IT systems and applications. As a result, operators' local know-how is becoming less critical while the extent to which operators can add value to the airport's existing assets through their organizational and operational expertise is becoming a major aspect of retail performance. Operators can optimize processes that smooth the interface with the airport and make collaboration easier.

By achieving critical mass, global operators can improve their professionalism, buying power and brand portfolio range. This enables them to propose competitive concession fees along with an attractive offer abroad. These advantages have resulted in a recent increase in global operators' market share at the expense of local operators.

Local players tend to survive by repositioning themselves in one of three ways:

- In niche categories, such as local gastronomy and souvenirs, where local know-how is a key competitive advantage.
- At regional airports, where the concessions surface is not yet sufficiently attractive to global players and where local operators can use their knowledge of domestic passengers and local operations to secure their competitive position temporarily.
- In core categories at major hubs, through joint ventures with global operators, in order to safeguard their historical position.

Joint venture with local operators is part of global operators' market entry strategy, especially in emerging markets: the local player provides understanding of local regulation and customs and a relationship with local authorities, local brands and local operations (logistics, warehouse, staff, etc.) while the global operator secures purchasing efficiency and up-to-date concepts set-up.

In the long term, however, local operators are strongly exposed: once global players have acquired local know-how, they will compete independently for hubs' tender offers and will also compete for regional airport concessions in order to optimize and amortize their national logistics and purchasing structure.

Hypothesis 3. Large global operators perform better than small local operators

Now let's look at Ahron B. Herring "Current Approaches to the Development of Airport Retail: A sales performance analysis and case study". Using ARN Factbook 1997 – 2000, Sales per EP as a key performance measure author compared the following forms of management (governance) structure in the airport⁴:

1. Airport directly
2. Prime operator (or master-concessionaire)
3. Developer
4. Airport/Operator hybrid
5. Other/developer hybrid

The results are the following:

- In general developer is better
- In some cases concession-run programs outperformed developers.
- Distribution of outcomes for developers was much broader. (difference between percentiles)
- Dynamics of efficiency growth is comparably high for developers
- Hybrids perform better than alone.

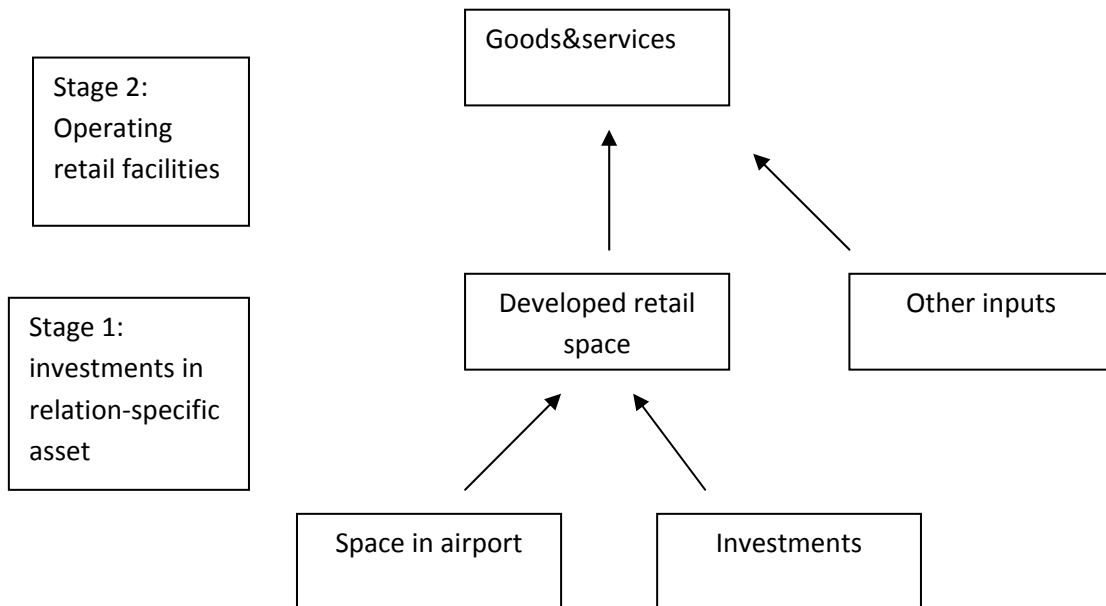
Hypothesis 4. On average developers perform better than other forms and developers improve their efficiency faster than other forms. It's also the most risky approach because of the broad distribution of the outcome.

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3. Review of the vertical chain theory⁵ and development of hypotheses

The process of airport retail organization consists of two stages, investments in retail space development and then running the developed retail facilities

Scheme 2. Value chain of airport retail business



Def. The process that begins with the acquisition of raw materials and ends with the distribution and sale of finished goods and services is known as the vertical chain.

Def. Early steps in the vertical chain are upstream in the production process and later steps are downstream.

Note: Airport retail value chain can be split into 2 stages:

1. Upstream supplier is an airport which provide space as a basic input factor. First value creation process is development of retail space (by airport/ developer/ concessionaries and etc.).

⁵ according to David Besanko and others "Economics of strategy"

2. Then these developed facilities and other inputs are used to bring final value to customers, i.e. selling goods and services.

Def. The production process for a specific good or service exhibits economies of scale over range of output when average cost declines over that range.

Def. Economies of scope exist if the firm achieves savings as it increases the variety of goods and services it produces.

There are four major sources of scale and scope economies:

- Indivisibilities and the spreading of fixed costs. Indivisibility simply means that an input cannot be scaled down by a certain minimum size, even when the level of output is very small. Reduction in average costs due to increases in capacity utilization are short-run economies of scale. Reduction due to adoption of a technology that has high fixed costs but lower variable costs are long-run economies of scale. Indivisibilities are more likely when production is capital intensive.

Note. Investments in retail space development is an example of indivisibilities. They cannot be avoided by stopping operations in outlets. These are sunk costs which have to be taken by airport or concessionaries or developer or partners. It follows that this chain characterizes by economy of scale.

Hypothesis 5. For airports under critical mass developers outperform prime operators which outperform several operators which outperform direct control by an airport approach.

Hypothesis 6. For an airport with critical mass direct control / management company is more efficient than operators or developers.

- Increased productivity of variable inputs (mainly specialization).

Note. This statement supports the idea of disintegration of airport retail vertical chain. In other words “let agents who specialize on different activities altogether operate this value chain”. So, in critical case of specialization 1) airport should operate aviation part, 2) developer should invest to develop the whole retail area and lease it out to operators. Or 2) airport / wholly-owned subsidiary invests according to consultants’ planning and hires management company to run retail business (there is a point to make centralized investments but there is no point of working with operators who don’t invest, hence only management contract fits here).

Hypothesis 7. Developer is more efficient than direct control without consultant (there are specializations on both stages of the chain vs. none). Developer outperform operators (specialization on both vs. on second). Developer outperform consultant + direct control. (on both vs. on first). Consultant + management contract outperform direct control + consultant (specialization on both vs. only on first) and etc.

- Inventories. Inventory costs drive up the average costs of the goods that are actually sold. In general, inventory costs are proportional to the ratio of inventory holdings to sales. The need to carry inventories creates economies of scale because firms doing a high volume of business can usually maintain a lower ratio of inventory to sales while achieving a similar level of stock-outs.

Note. This idea relates to the trading part of the chain. In general, retail operators' business scale is bigger than of a particular airport. Firstly, they can sell more because of know-how, and secondly, probably several airports are supplied from a single warehouse which again decreases the ratio of inventories to sales. So this idea could also be a factor of operators' cost advantage.

Hypothesis 8. In comparable airports (size, number of passengers...) prime operators are more efficient than several operators.

Hypothesis 3 (as before). Large operators (which serve many airports) outperform small operators.

Hypothesis 9. Operators which serve several airports in one region > operators who serve several airports in different regions.

- Engineering principles associated with the "cube-square rule". It states that as we increase the volume of the vessel by a given proportion, the surface area increases by less than this proportion. In many production processes production capacity is proportional to volume of production vessel, whereas the total cost of producing at capacity is proportional to the surface area of the vessel.

Note. This idea relates to the first stage of our chain. Smart and unified development of retail area by developer or airport + consultant is supposed to allocate outlets more efficient as far as goods inside them. In contrast when an airport just offers free space for operators which then develop it on their own the distribution of retail space most likely won't be optimal in regard to volume of goods and services provided there.

Hypothesis 10. Developer is more efficient than operators. Consultant + management > operator and etc.

Special case – Economies of Scale and scope in purchasing

Big businesses that make large purchases from their suppliers may obtain discounts for three possible reasons:

1. It may be less costly to sell to a single buyer if each sale requires some fixed cost, say in writing a contract, setting up a production run, or delivering the product.
2. A bulk purchaser has more to gain from getting the best price and therefore will be more price sensitive.
3. The supplier may fear a costly disruption to operations or even bankruptcy if it fails to do business with a large purchaser.

But sometimes small shops don't stock products for which they are unable to obtain favorable wholesale prices.

Note. Outlets in a particular airport should aim to purchase from suppliers a specific product mix which reflexes preferences of customers and shouldn't choose products according only to the price advantage. Agents need to know what to buy (experienced ones such as operators which serve many airports or critic mass airports or developers Then all these 3 ideas support the hypothesis of large operators' efficiency against airport direct retailing. The only exception is airport with critical mass.

Hypothesis 8 (as before).

Hypothesis 6 (as before).

Hypothesis 11. Large prime operator (with several airports) which work with same supplier in these airports outperform those who work with different suppliers.

Special case – Economies of Scale and scope in advertising

The advertising cost per consumer of a product may be expressed by the following formula:

Cost of sending a message per number of potential consumers receiving the message / number of actual consumers as a result of message per number of potential consumers receiving the message

Larger firms may enjoy lower advertising costs per consumer either because they have lower costs of sending messages per potential consumer (the first term) or because they have higher advertising reach (the second term).

Note. Large operators have access to large amount of potential customers and carrying out advertisement companies simultaneously in several airports can decrease the cost of a message.

Hypothesis 8 (as before).

Hypothesis 12. Large operators or developers which work with the same adv. agency in different airports outperform with diff. agencies

Umbrella branding

It's effective when consumers use the information in an advertisement about one product to make inferences about other products with the same brand name, thereby reducing advertising costs per effective image.

Note. For example, operators who work under "Travel value" brand. In case of airport direct operations the possibility of creating umbrella brand only for 1 airport doesn't make much sense.

Hypothesis 13. Operators which use umbrella branding outperform those which don't

Complementarities and Strategic Fit

Organizational practices display complementarities (or strategic fit) when the benefits of introducing one practice are enhanced by the presence of others. It's essential to firms seeking a long-term competitive advantage over their rivals.

Note. This very general idea can refer to many processes which overall can be described as strategy. For example, more outlets' concentration makes their maintenance and supply cheaper. Also some types of outlets can serve as magnets of customers for other types of outlets which should be taken into account when planning retail mix. The only hypothesis here is that such optimum strategy is more likely implemented by agents with experience and not by airport itself.

Make-or-buy decision

Def. A firm's decision to perform an activity itself or to purchase it from an independent firm.

Def. Agency costs are the costs associated with slack effort and with the administrative controls to deter it.

Def. Influence costs – costs of manager's influence on allocation of scarce internal resources among departments or divisions.

Benefits of using the market ("buy" decision):

- Market firms can achieve economies of scale, learning economies that in-house departments producing only for their own needs cannot. They also eliminate "bureaucracy" (agency costs and influence costs).
- Market firms are subject to the discipline of the market and must be efficient and innovative to survive. Overall corporate success may hide the inefficiencies and lack of innovativeness of in-house departments.

Costs of using the market ("buy" decision):

- Coordination of production flows through the vertical chain may be compromised when an activity is purchased from an independent market firm rather than performed in-house.
- Private information can be leaked. Reluctance of trading partners to develop and share valuable information.
- Additional cost of transacting with independent market firms may exist because of:
 1. Relation-specific assets (An investment made to support a given transaction. Firms that have invested in relation-specific assets cannot switch trading partners without seeing a decline in the value of these assets). Forms of asset specificity:
 - Site specificity (refers to assets that are located side-by-side to economize on transportation or inventory costs or to take advantage of processing efficiencies)
 - Physical asset specificity (refers to assets whose physical or engineering properties are specifically tailored to a particular transaction)

- Dedicated assets (an investment in plant and equipment made to satisfy a particular buyer)
- Human asset specificity (refers to cases in which a worker, or group of workers, has acquired skills, know-how, and information that are more valuable inside a particular relationship than outside it)

Note. If an airport invests in retail area development (specific asset), for example on terms of joint venture with operators, then these additional risks are relevant.

2. Quasi-rents (it's the extra profit in case the deal goes ahead as planned, versus the profit in case of next-best alternative)

Note. This is also relevant. For example, if the area was designed as restaurant but airport has to open a news&gifts shop there then it loses quasi-rent.

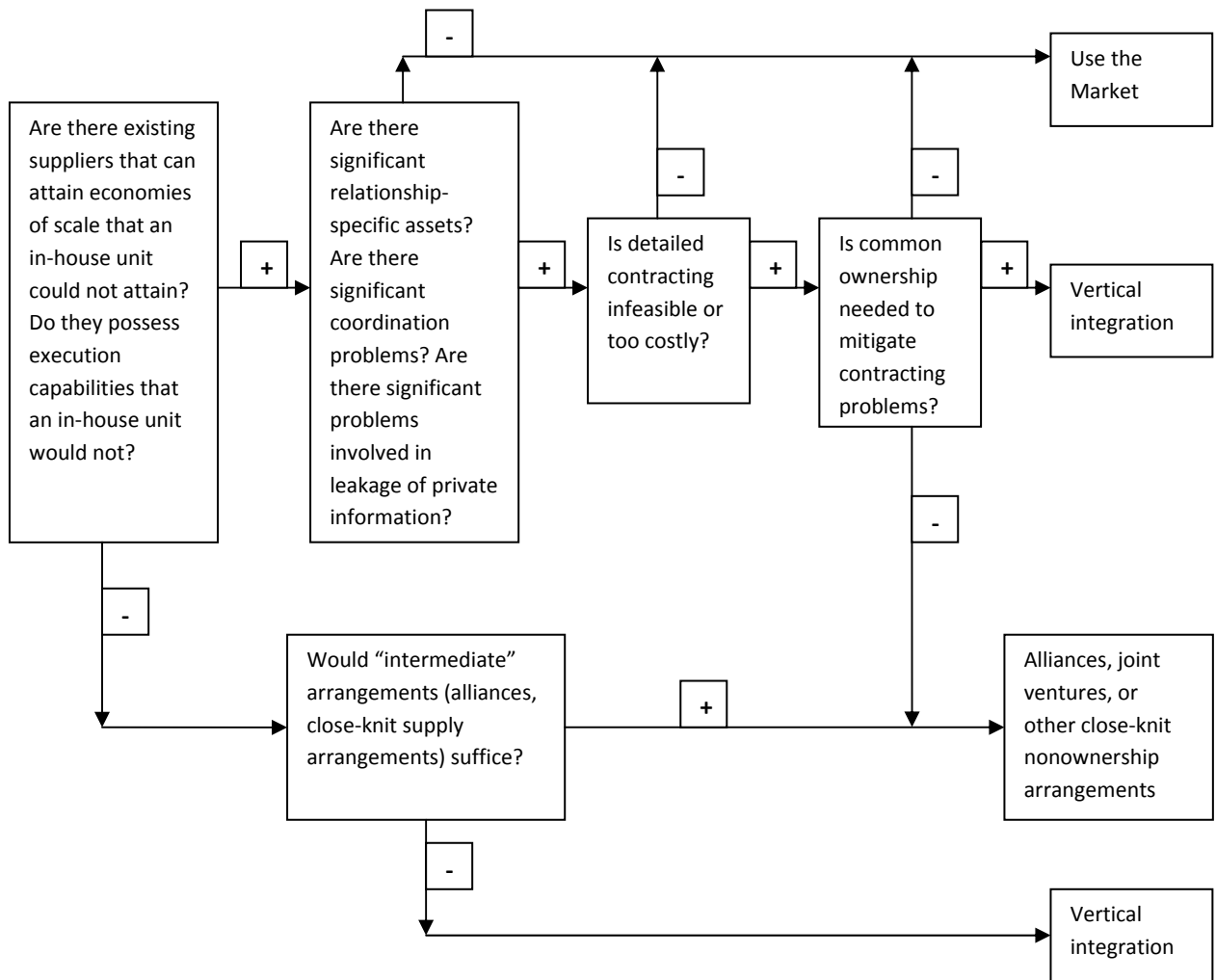
3. Holdup problem (a firm holds up its trading partner by attempting to renegotiate the terms of a deal. A firm can profit by holding up its trading partner when contracts are incomplete and when the deal generates quasi-rents for its trading partner). It raises the cost of transacting in four ways:

- More difficult contract negotiations and more frequent renegotiations
- Investments to improve ex post bargaining positions (costs of hedging against holdup)
- Distrust (first, it raises direct costs of negotiating as parties insist on more formal safeguards be written into the contract; second, it impedes sharing information or ideas to achieve production efficiencies or quality improvements)
- Reduced investment in relationship-specific investments (the result is likely to be lower productivity and higher production costs)

There are 3 factors that prevent complete contracting (which eliminates opportunistic behavior):

1. Bounded rationality (refers to limits on the capacity of individuals to process information, deal with complexity and pursue rational aims)
2. Difficulties specifying or measuring performance.
3. Asymmetric information.

Scheme 3. Summary of Make-or-Buy decisions



Asset ownership and vertical integration

GHM (Grossman, Hart, Moore) model establishes that the form of integration affects the incentives of parties to invest in relationship-specific assets. By having control over other unit's assets, a unit has a better bargaining position when it negotiates with the other unit over the operating decisions that they could not contract on. With a better bargaining position, the unit can capture more of the economic value created by the transaction, thus boosting its willingness to make relationship-specific investments.

The theory implies that vertical integration is desirable when one unit's investment in relationship-specific assets has a significantly greater impact on the value created in the vertical chain than the other's investment does. When the investments of both units are of comparable importance, nonintegration is the best arrangement.

There are three ways to organize the transaction:

1. Non-integration: The two units are independent firms, each with control over its own assets.
2. Forward integration: The upstream unit owns the assets of the downstream unit.
3. Backward integration: The downstream unit owns the assets of the upstream unit.

Note. The model concerns the first stage of our chain where two units invest in relation-specific asset. These could be the cases:

1. Developer which rent the space VS. Airport
2. Developer who privatizes the space VS. Airport
3. Concessionaries VS. Airport
4. Joint venture

Developer who privatizes retail space in the airport is an example of backward integration in this chain. Concessionaires contracts and developer which rent the retail space – non-integration cases. From this model it follows that:

Agent who owns other agent's assets => has more bargaining power => hence creates more value as result of investments in relation-specific assets

It supports an idea that cases 2 and 4 should make more value as a result of investments in retail space development. Of course the final value depends also on the second stage.

What we can learn from Technical + Agency efficiency based analysis?

1. If the firm is considering whether to make or buy an input requiring significant upfront setup costs, and there is a large market outside the firm for the input, then the firm should buy the input from outside market specialists.

Note. Taking into account that number of operators, management companies, developers available for a particular airport in general is quite large they are supposed to benefit from technical and agency efficiencies. Airport should choose these market options when planning governance structure.

2. A firm with a larger share of the product market will benefit more from vertical integration than a firm with a smaller share of the product market. A firm with multiple product lines will benefit more from being vertically integrated in the

production of components for those products in which it can achieve significant market scale.

Note. It's possible that airports with critical mass can simultaneously benefit from efficiencies of market agents and avoid costs of disintegration structure.

3. A firm gains more from vertical integration when production of inputs involves investments in relationship-specific assets.

Note. This again states in favor of integration at first stage of the chain.

In-between forms of organizing production processes.

Def. Tapered integration - a firm may produce some quantity of input and purchase the remaining portion from independent firms. It might sell some of its product through an in-house sales force and rely on independent representatives to sell the rest.

Three benefits:

1. It expands the firm's input/output channels without requiring substantial capital outlays. This is helpful to growing firms.
2. The firm can use information about the cost and profitability of its internal channels to help negotiate contracts with independent channels.
3. The firm may also develop internal input supply capabilities to protect itself against holdup by independent input suppliers.

Disadvantages:

1. Both internal and external channels may not achieve sufficient scale to produce efficiently
2. Shared production may lead to coordination problems because the two production units must agree on product specifications and delivery times.
3. The firm may mistakenly establish the performance of an inefficient internal supplier as the standard to be met by external suppliers.
4. Managers may maintain inefficient internal capacity rather than close facilities that had formerly been critical to the firm.

Note. Tapered integration in our chain is one of types of hybrid structure where airport direct operations exist along with concessionaire contracts. According to previous researches this type of retail organization may be very efficient. (Ahron B. Herring "Current approaches to the development of airport retail: a sales performance analysis and case study")

Strategic alliances:

- Horizontal
- Vertical
- Neither horizontal nor vertical

Def. Joint venture is a particular type of strategic alliance in which two or more firms create, and jointly own, a new independent organization.

Transaction-candidates for alliances:

1. The transaction involves impediments to comprehensive contracting (because of uncertainty and the parties' bounded rationality, the parties cannot write a proper contract)
2. The transaction is complex, not routine. Standard commercial and contract law could not easily "fill the gaps" of incomplete contracts.
3. The transaction involves the creation of relationship-specific assets by both parties in the relationship, and each party to the transaction could hold up the other.
4. It is excessively costly for one party to develop all of the necessary expertise to carry out all of the activities itself. This might be due to indivisibilities and the presence of an experience curve.
5. The market opportunity that creates the need of transaction is either transitory, or it is uncertain that it will continue on an ongoing basis. This makes it impractical for the independent parties to merge or even commit themselves to a long-term contract.
6. The transaction or market opportunity occurs in a contracting or regulatory environment with unique features that require a local partner who has access to relationships in that environment.

Note. At least one can say that argument 3, 4 are relevant to our chain, so as 6, because an operator really can make a joint venture company with an airport to obtain local know-how.

Potential disadvantages:

- Information leakage
- Compromised coordination between the firms
- Agency costs (free-rider problem)

- Influence costs (because of the absence of a formal hierarchy and administrative system within an alliance employees might be engage in influence activity, such as lobbying, to augmenting their resources and enhance their status)

The Principal/Agent problem

Type of concession fee

The main types of concession fee and their popularity are the following (Airport retail study 2006/2007 by Moodie Report):

- Stepped percentage of gross sales (36% of airports)
- Fixed percentage of gross sales (31% of airports)
- Combination of per square rate and percentage of gross sales rate (26% of airports)
- Per square rate (7% of airports)

Stepped percentage rents - fees expressed as a percentage of gross sales increasing at various sales thresholds.

Fixed percentage rents - the fee is set at a fixed percentage of gross sales.

Moreover to protect themselves from revenue drops airports often use minimum annual guaranties.

According to Hong-bumm Kim, Jee-Hye Shin (2001) "A contextual investigation of the operation and management of airport concessions" the characteristics rental fees may affect the revenue of a concessionaire. Most concessions at large airports currently generate fees based on a percentage of the concessionaires' total annual sales or turnover. The simplest method is a percentage irrespective of the type of tenant and ultimate level of turnover. This is most likely to be used where the products or services being sold cannot be differentiated. Where the products are more varied, an airport generates higher concession fees if it stipulates a different percentage for each group of products. Most contracts ensure that the percentage fee increases as higher turnover thresholds are reached. This can be justified on the grounds that once the concessionaire's fixed costs have been covered by a certain volume of sales then his own profit margin rises and he can afford to pay a higher concession fee. The survey of 12 experts revealed the following results.

Table 2. Appropriate contract types of airport concessions in different concession types

Components of the contract		Duty-free	F&B	Retail and convenience
Contract type	Percentage of annual sales	4 (34%)	6 (50%)	4 (34%)
	Minimum guaranteed rate	1 (8%)	1 (8%)	2 (16%)
	Mixed method of the above	7 (58%)	5 (42%)	2 (50%)

First, with regard to contract type, both the percentage of annual sales and the mixed approach of this and minimum guaranteed rate or royalty (MGR) are highly referred to as the most appropriate contract types. Many international airports are currently employing both the

MGR and the percentage of sales methods to receive concession fees based on their relative performances, and sometimes they employ just MGR for such items as alcohol/tobacco and perfume/cosmetic products. In other cases, they apply the proposed percentage of annual sales method for airport concession fees. In applying both the MGR and the percentage of sales methods, most airports compare two figures, and then ask for the higher of the two. The results suggest that the mixed type would be better, especially for duty-free shops and retail and convenience stores. In the case of F&B catering, half of the respondents indicated that the percentage of annual sales method would be appropriate for the airport authorities to manage the concessions effectively.

Geographic and airport size differentiation of rental structure popularity (Airport retail study 2006/2007 by Moodie Report)

Rental structures differ markedly between the three regions. No airport in Europe uses only percentage rents and only a small number did in North America, whereas a number of airports in Asia Pacific/Rest of the World did (17%). Across all regions, percentage rents are used by the majority of airports, although European and Asia Pacific/Rest of the World airports preferring stepped percentage rents, while North American airports seem to prefer fixed percentage rents. That said, the proportion of airports relying on

percentage rents (both fixed and stepped) is highest in North America (83%), compared to Europe (60%) and Asia Pacific/ROW (55%).

Percentage rents (fixed and stepped) are most commonly used in smaller airports with less than 10 million passengers (75%), compared to 65% in larger airports (more than 20 million passengers) and 57% for mid size airports.

Minimum annual guarantees popularity, geographic and airport size differentiation
(Airport retail study 2006/2007 by Moodie Report)

Across the board, the vast majority of airports continue to use minimum annual guarantees in their concession agreements, although a small number, 11%, did report having moved away from the use of minimum guarantees. The continued reliance on minimum annual guarantees highlights the economic power that airports have in their relationships with concessionaires. That is despite the prolonged supplier and retailer calls for reform of the use of the minimum annual guarantee model through industry conferences such as the Trinity Forum. Of those airports that use minimum annual guarantees, the majority (66%) use an absolute fixed amount as the guarantee. While a similar proportion of airports report using per passenger guarantees as in the 3rd edition of the Airport Retail Study (24% versus 26%), there appears to be have been a substantial shift away from using guarantees that are a combination of per passenger guarantees and fixed amounts.

The use of minimum annual guarantees is almost uniform across the regions. The structure of minimum annual guarantees is also relatively similar, although absolute guarantees are more popular in North America and per passenger guarantees more popular in Europe.

There are no significant differences in either the use of minimum annual guarantees or the structure of such guarantees by airport size.

Other contract preferences

Another aspect of concession is the length of the contract period. Concessionaires' preference for longer periods, particularly in the case where they need to invest heavily in fixtures and fittings, may conflict with the airport's desire to benefit from more frequent tendering for concessions. Ideally, the length of the contract should reflect the level of investment required of the concessionaire.

The survey by Hong-bumm Kim, Jee-Hye Shin (2001) shows the following results.

Table 3. Appropriate contract preferences in different concession types

Components of the contract		Duty-free	F&B	Retail and convenience
Contract period		5 (42%)	5 (42%)	2 (16%)
Recontract type	Priority to existing operator	7 (58%)	7 (58%)	7 (58%)
	Open and competitive bid	5 (42%)	5 (42%)	5 (42%)
	Mixed method of the above	-	-	-
Recontract period	Same as previous contract period	8 (66%)	8 (66%)	8 (66%)
	Less than previous contract period	4 (34%)	4 (34%)	4 (34%)
	More that previous contract period	-	-	-

The contract period is generally known to be 3-10 years for duty-free shops and F&B stores, and 5 years for retail and convenience stores. Table 3 shows that 4-5 years period is suitable for duty-free shops, and 2-3 years period for retail and convenience stores. Seven out of 12 respondents answered that the airport authority should give the existing operator priority in recontracting at the end of the current contract period. Five respondents replied that the airport authority should employ an open bid without any special priority given to anyone. Finally, two-thirds of the respondents replied that in the case of recontracting, the new contract period should be the same as the existing contract period. The other one-third answered that the recontract period should be shorter than the current one. This seems to stem from the conventional business contract practice that the recontract period be shorter than or at least the same as the existing contract.

Now let's look at most common concession contract lengths in 2006/2007 according to Moodie's report.

Across all categories, concession lengths have shortened compared to the results recorded in the previous edition of the Airport Retail Study, despite some airports adopting the developer model with longer term concessions that reflect investment in

other infrastructure and facilities (e.g. terminals). The longest concession length was in the food & beverage segment, with contracts running for an average length of 6.3 years. This compares to eight years in the 3rd edition. Food & beverage typically has the longest concession length because of higher fit out costs than other retail segments (kitchens, etc). The most common concession length in food & beverage is five to six years (41 %), with no concessions let for only one to two years, reflecting investment levels. The longest concession length was 15 years. Duty free has the second longest average concession length at 5.3 years - down from eight years in the 3rd edition of the Airport Retail Study. The most common concession length in duty free is five to six years (41 %), with only a very small number of concessions let for less than four years (6%). The longest concession length was 15 years. Speciality retail average concession length is 3.9 years, compared to six years in the 3rd edition. The most common concession length in speciality retail is five to six years (77%), but with a reasonable number of concessions let for less than four years (16%). The longest concession length was 15 years.

The news/gifts average concession length is 4.9 years (news/gifts was not measured separately in the 3rd edition of the Airport Retail Study). The most common concession length in news/gifts is five to six years (57%), but with a reasonable number of concessions let for less than four years (13%). The longest concession length was 15 years.

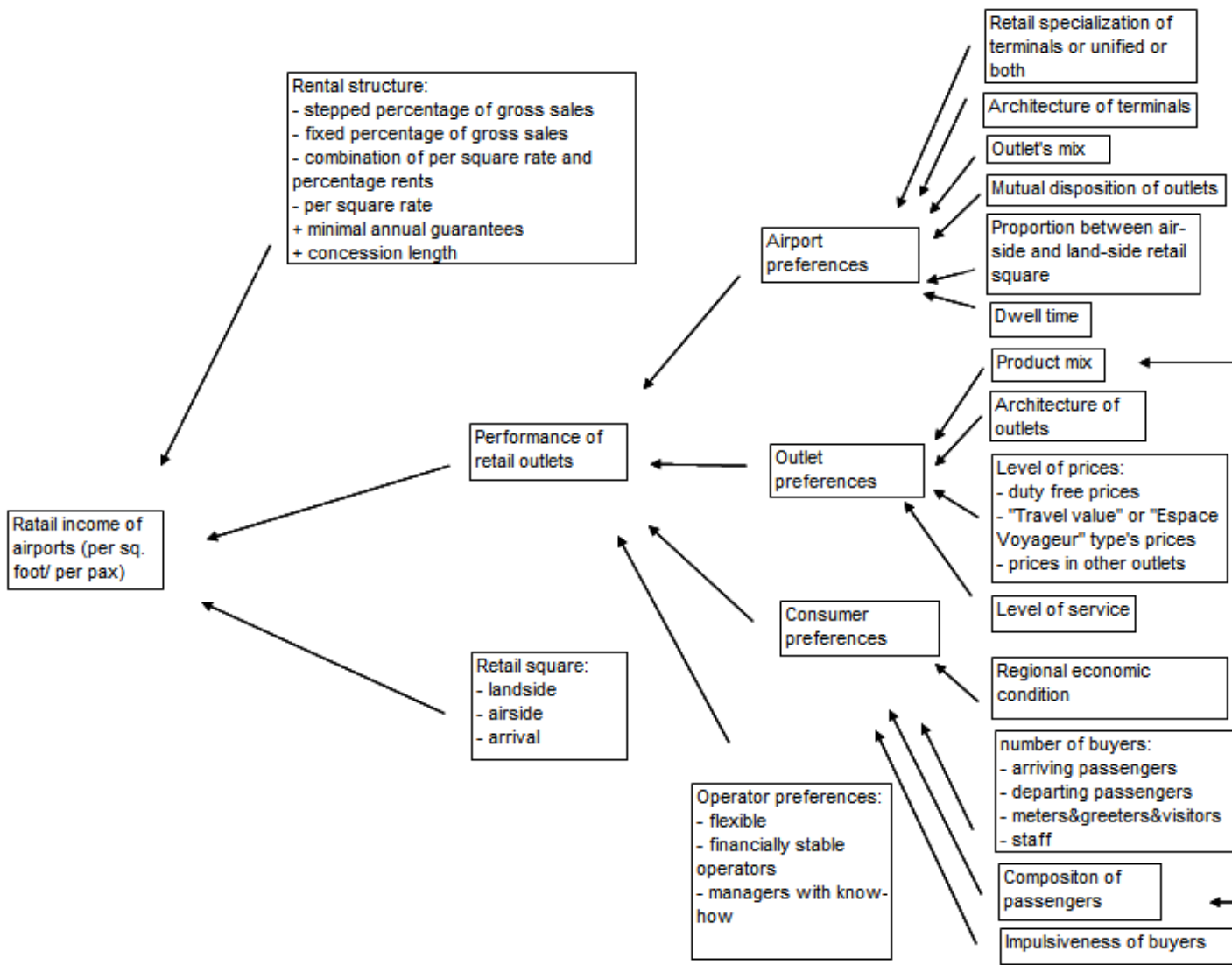
Currency change average concession length has also fallen from six years in the 3rd edition to 3.9 years currently. The most common concession length in currency change is five to six years (69%), but with a reasonable number of concessions let for less than four years (15%). The longest concession length was 15 years.

Across the board, North American airports tend to have the longest concession lengths. Average concession lengths in North America are 9.5 years for food & beverage (3.2 years longer than average), 8.1 years for duty free (2.8 years longer than average), nine years for speciality retail (5.1 years longer than average), 8.5 years for news/gifts (3.6 years longer than average) and 5.9 years for currency change (two years longer than average).

Of the three airport size categories, medium sized airports tend to have shorter concession lengths. Larger airports (in passenger terms) tended to have longer

concession lengths, mostly because many North American airports participating in the Airport Retail Study fall into this category.

Scheme 4. Retail income explanatory variables



4. Data

In our analysis we use data from **ARN Fact Book**, which are published by the **Armbrust Aviation Group (AAG)**. The sample consists of 97 US airports during the years 1999 and 2008. All data is on a terminal-by-terminal basis and covers 272 terminals. The data includes Duty Free, Specialty Retail, News/Gifts, General services and F&B sales and space. For a large part of airports dwell time data is available. Passengers data divided into different categories: enplaning, deplaning, international, domestic, O&D, transfer, business and leisure pax volumes. Sample also includes data on management structure and airport configuration. To complete our analysis we also include demographical data such as population and income per capita in the metropolitan area to which belong the airport.

5. Interpretation of calculations

5.1 Descriptive statistics

Pooled sample

Sample size grows from 78 airports in 2002 to 97 in 2008. (24% growth)

Popularity of management approaches – pooled sample:

	2002	2003	2004	2005	2006	2007	2008
1	Airport directly (36%)	Airport directly (36%)	Airport directly (35%)	Airport directly (36%)	Airport directly (43%)	Airport directly (44%)	Airport directly (39%)
2	Hybrid structure (21%)	Hybrid structure (20%)	Hybrid structure (22%)	Hybrid structure (23%)	Hybrid structure (20%)	Hybrid structure (19%)	Multiple prime (23%)
3	Multiple prime (21%)	Multiple prime (19%)	Multiple prime (20%)	Multiple prime (18%)	Multiple prime (16%)	Multiple prime (17%)	Hybrid structure (18%)
4	Prime operator	Prime operator	Prime operator	Prime operator	Prime operator	Prime operator	Prime operator

	(15%)	(16%)	(15%)	(13%)	(13%)	(12%)	(11%)
5	Private developer(s) (6%)	Private developer(s) (8%)	Private developer(s) (7%)	Private developer(s) (7%)	Private developer(s) (6%)	Private developer(s) (6%)	Management company (5%)
6	Management company (1%)	Management company (1%)	Management company (1%)	Management company (2%)	Management company (3%)	Management company (2%)	Private developer(s) (4%)

The rating is based on frequency of a particular management approach usage in pooled sample of airports.

The rating is almost dynamically stable (changes are marked with color)

Only small changes in 2008.

Popularity on average:

1. Directly (36%)
2. Hybrids (20.2%)
3. Multiple (19%)
4. Prime (14%)
5. Developers (6.3%)
6. Management (2.4%)

Performance of management approaches – pooled sample:

	2002	2003	2004	2005	2006	2007	2008
6	management (4.7)	prime (4.8)	prime (5.7)	prime (5.5)	prime (5.8)	multiple (6.2)	prime (6.0)
5	prime (4.9)	management (5.0)	multiple (5.8)	multiple (5.7)	multiple (6.2)	directly (6.5)	multiple (6.7)
4	multiple (5.6)	multiple (5.6)	management (6.3)	directly (7.1)	directly (7.0)	prime (6.9)	directly (7.4)
3	directly	directly	directly (7.0)	management	management	management	hybrids (9.3)

	(6.3)	(6.5)		(7.6)	(7.6)	(7.8)	
2	hybrids (7.1)	hybrids (7.3)	hybrids (7.9)	hybrids (8.3)	hybrids (8.5)	developers (9.1)	management (10.2)
1	developers (7.2)	developers (7.6)	developers (8.1)	developers (8.7)	developers (9.0)	hybrids (9.2)	developers (10.4)

The rating is based on airport retail revenues per enplaning passenger (in brackets)

Interpretation:

- developers outperform hybrids and they improve performance fast (from 7 euro to 10 euro during the given period of time)
- management approach improves performance faster than other types (from 4.7 euro to 10 euro / from 6th to 2nd place)
- direct approach shows average results (6-7 euro) and decreases its relative efficiency
- multiple and prime operator approaches show worst results and decrease their relative efficiency
- but: developers and management approaches' observations are few so their measures are not enough trustworthy.

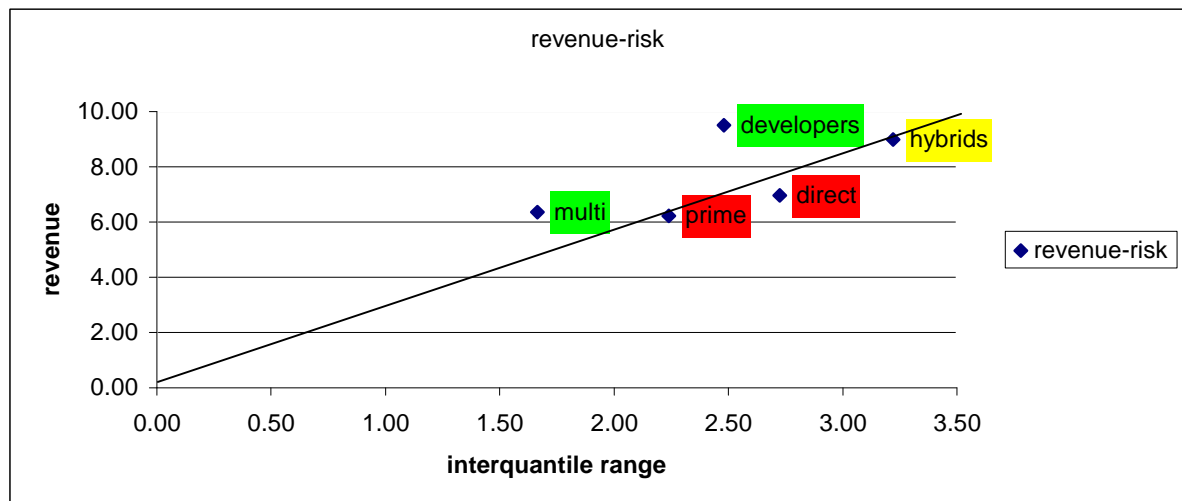
Riskiness of management approaches (pooled sample)

	2002	2003	2004	2005	2006	2007	2008
1	Developers (0.91)	prime (1.30)	developers (0.83)	prime (0.82)	multi (1.70)	multi (1.48)	multi (1.81)
2	direct (1.27)	multi (1.76)	multi (1.42)	multi (1.39)	developers (1.85)	prime (1.78)	developers (2.91)
3	prime (1.56)	developers (1.85)	direct (1.60)	developers (1.65)	prime (1.97)	direct (2.09)	prime (2.97)
4	multi (1.65)	direct (2.08)	prime (2.22)	direct (2.05)	hybrid (2.06)	developers (2.68)	direct (3.33)
5	hybrid (2.90)	hybrid (2.81)	hybrid (2.75)	hybrid (3.17)	direct (2.75)	hybrid (3.39)	hybrid (4.21)

The number of observations is not enough for stable variation so **interquartile range** is used as a measure of riskiness.

Performance – risk structure (pooled sample)

	Revenue per EP	risk
multi	6.37	1.66
developers	9.50	2.48
prime	6.23	2.24
hybrids	9.00	3.22
direct	6.97	2.72



Interpretation:

- Multiple operators approach outperforms prime operator approach by less risk with the same revenue.
- Developers approach outperforms direct control approach by risk and revenue.
- Hybrid approach is most risky, a bit less effective but more trusted (because of larger than developers' observation sample)

Changes of structure during the given time period

In brackets:

- First sign is “+” if in the year of change of approach Revenue per EP increase more than average annual rate of growth before change.
- Second sign is “+” if in the first year after the change revenue per EP has increased.
- Third sign analogically reflects the second year after the change.

	multi	developers	direct	prime	management	hybrid
Multi	###	(-, #)	(-, +, +)	(+, +, #)	###	(+, +, +)
Developers	###	###	(0, -, #)	###	(-, -, +)	###
Direct	(+, #)	(+, #)	###	(-, +, +)	(0, #)	(+, +, +)
Prime	(-, +, +)	(+, +, +)	(-, +, -)	###	(+, #)	(-, +, +)
management	###	###	###	(-, -)	###	###
Hybrid	(-, -, +)	(+, +, +)	(+, +, +)	###	###	###

Changes from one governance type to those marked with red are not successful in general.

Changes from one governance type to those marked with green are successful in general.

Changes from one governance type to those marked with yellow are questionable in general.

Changes marked with ### are not observed.

Sample splitted by hub size

Popularity rating in group is dynamically stable (except small hubs which use more often direct approach in expense of prime operator approach in a given period of time) and on average:

	<u>Large hubs (35% of all)</u>	<u>Medium hubs (37%)</u>	<u>Small hubs (23% of all)</u>	<u>Non hubs (5% of all)</u>
1	Hybrids (43%)	Direct (40%)	Multiple (40%)	Direct (70%)
2	Direct (33%)	Multiple (20%)	Direct (35%)	Multiple (21%)
3	Developers (10%)	Prime (18%)	Prime (17%)	Prime (6%)
4	Prime (8%)	Hybrids (11%)	Hybrids (5%)	Management (3%)
5	Multiple (4%)	Developers (7%)	Developers (2%)	
6	Management (2%)	Management (4%)	Management (1%)	

Interpretation:

- Majority of large hubs prefer Hybrids and Direct control
- Majority of medium hubs prefer Direct control and operators approaches
- Majority of small hubs prefer multiple operator approach and direct control
- Non hubs sample is very small and can be non-representative.
- The more popular is an approach (more observations) the more trustworthy is the corresponding result.

Large hubs

Performance of management approaches – large hubs group:

	2002	2003	2004	2005	2006	2007	2008
6	prime (5.2)	prime (5.2)	prime (4.7)	prime (3.6)	prime (4.9)	prime (5.3)	prime (4.3)
5	Multiple (6.6)	multiple (6.2)	multiple (6.3)	multiple (6.4)	multiple (7.2)	multiple (7.3)	multiple (7.4)
4		developer s (6.6)		developers (7.6)	developers (8.0)	developers (8.0)	direct (8.5)
3	Developers (7.2)		developer s (7.5)	management (8.4)	management (8.0)	management (8.5)	developers (10.2)

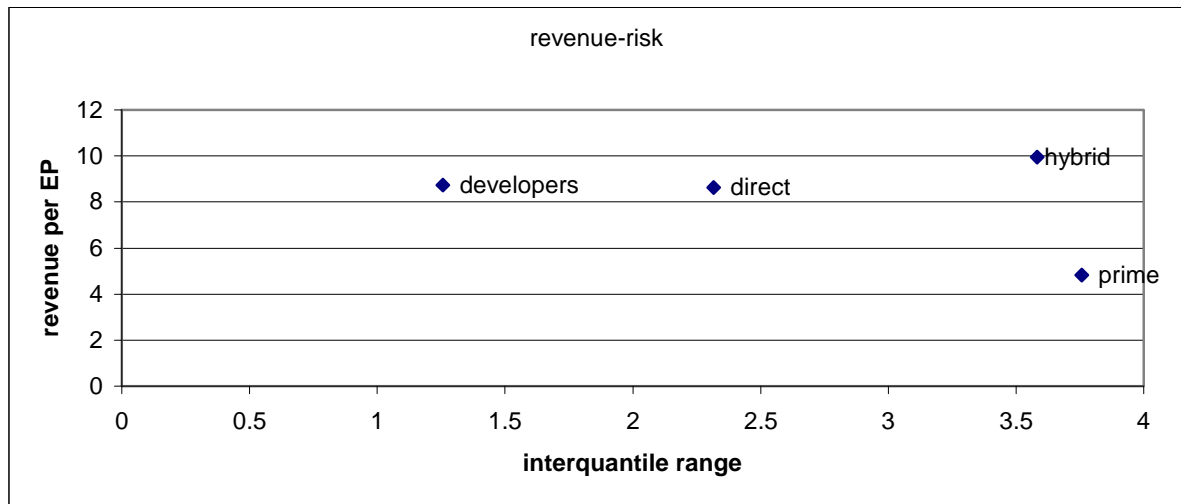
2	hybrid (7.7)	hybrid (7.9)	hybrid (8.4)	hybrid (9.0)	direct (8.9)	direct (8.5)	management (10.9)
1	direct (8.1)	direct (8.2)	direct (9.0)	direct (9.3)	hybrid (9.1)	hybrid (9.9)	hybrid (10.9)

Interpretation:

- Direct control is traditionally best for large hubs and shows stable results but slowly loses its superiority.
- Hybrid approach increase efficiency and relative efficiency becoming # 1
- Developers and management approaches show middle-level performance but in 2008 take 3rd and 2nd places correspondingly. But observations are few and such a result is not very trustworthy.
- Prime and multiple operators approaches are least effective and not common for large hubs.

Performance – risk structure (large hubs group)

	revenue	risk
developers	8.740401647	1.256146497
prime	4.821408892	3.756241824
hybrids	9.956748938	3.582504857
direct	8.641010949	2.316099532



Interpretation: Direct approach outperform others except more risky hybrid approach

Medium hubs

Performance of management approaches – medium hubs group:

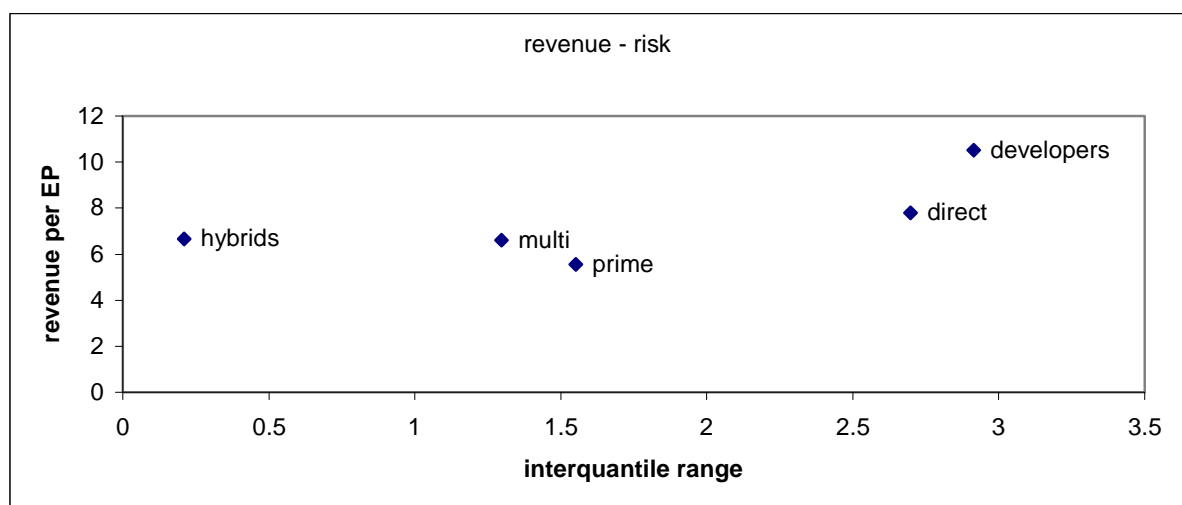
	2002	2003	2004	2005	2006	2007	2008
6	prime (3.5)	prime (3.5)	prime (5.2)	prime (5.1)	prime (5.0)	prime (6.0)	prime (5.7)
5	management (4.7)	management (5.0)	hybrids (6.1)	multiple (6.0)	multiple (6.8)	multiple (6.1)	hybrids (6.3)
4	hybrids (5.1)	hybrids (5.5)	management (6.3)	hybrids (6.6)	hybrids (6.8)	hybrids (6.9)	multiple (6.9)
3	multiple (6.1)	multiple (5.8)	multiple (6.3)	management (6.7)	management (7.4)	direct (7.0)	management (8.0)
2	direct (6.2)	direct (6.4)	direct (7.1)	direct (7.0)	direct (7.8)	management (7.1)	direct (8.6)
1	developers (8.5)	developers (9.6)	developers (9.4)	developers (9.8)	developers (10.4)	developers (10.6)	developers (10.6)

Interpretation:

- Developer approach is the best
- Direct is the second best
- Multiple approach loses relative performance, becoming below average level from 2005.
- Hybrids are pretty stable but also below average level
- Management approach improves performance fast and gets in above average group in 2005.
- Prime operator approach is the worst.

Performance – risk structure (medium hubs group)

	revenue	risk
multi	6.600217303	1.29706446
prime	5.567724954	1.551318219
hybrids	6.652734383	0.210377288
direct	7.792849585	2.697634137
developers	10.52931238	2.914882187



Interpretation:

- Multi-operator approaches is the best among low-risk options.
- Direct approach is appropriate middle-risk option.
- Developer approach is the appropriate high-risk option.

Small hubs

Performance of management approaches – small hubs group:

	2002	2003	2004	2005	2006	2007	2008
4	prime (3.3)	prime (3.4)	prime (3.4)	prime (3.5)	prime (3.8)	prime (4.7)	prime (2.7)
3	direct (3.3)	direct (4.9)	direct (5.4)	multiple (5.7)	direct (5.3)	direct (5.3)	direct (5.4)
2	management (4.7)	management (5.0)	multiple (5.5)	direct (5.8)	multiple (5.9)	multiple (6.3)	multiple (6.5)
1	multiple (5.1)	multiple (5.6)	management (6.3)	management (6.7)	management (7.4)	management (7.1)	management (8.0)

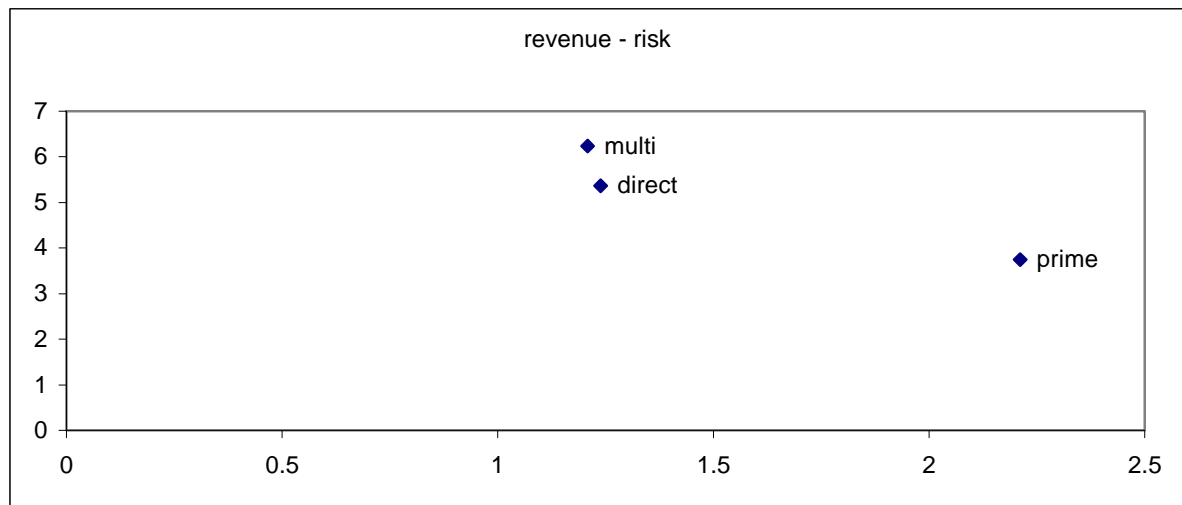
Interpretation:

- Multiple approach goes from 1st to 2nd position
- Management becomes a leader
- Direct approach almost always below average level
- Prime approach is worst.
- Developer and hybrid approaches' observation are too few to take them into account in small hubs group.

Non hubs group contains too few observations to consider it.

Performance – risk structure (small hubs group)

	revenue	risk
multi	6.237900265	1.208901643
prime	3.741672511	2.210966166
direct	5.366021003	1.238294903



Best approach summary (on average for last 3 years):

	Large hubs	Medium hubs	Small hubs
Best approach	Hybrids (10.0)	Developers (10.5)	Management (7.5)
Best trusted approach	Hybrids (10.0)	Direct (7.8)	Multiple (6.2)

- The level of trust reflexes the sufficiency of number of observations
- The riskiness of approaches is not taken into account

Rate of performance improvement

	Average annual growth rate			
	general	large hubs	medium hubs	small hubs
prime	3.4%	- 3.1%	8.6%	- 3.0%
multi	3.0%	2.0%	2.0%	4.1%
developer	6.2%	5.9%	3.8%	###
directly	2.7%	0.9%	5.5%	8.6%
hybrid	4.7%	6.0%	3.6%	2.9%
management	13.7%	###	9.2%	###

Best trusted results are marked with color.

Descriptive statistics approach improvements (in progress):

- group by consultant's services usage
- group by large or small operator/ developer /
- group by global or domestic operator
- group by international vs domestic airports
- group by suppliers variety + adverticing agency
- group by travel value and other umbrella branding
- look at retail revenue per sq.ft as performance measure instead of revenue per EP
- look at different retail divisions: F&B, Duty free, specialty shops ...

5.2 Econometric approach (in progress in the moment)

This part of the research is still in progress.

The idea is to construct a regression.

Dependent variable: Retail revenue per enplaning passenger or retail revenue per sq. ft.

Explanatory variables: Dummy-variables for each type of governance structure, drivers of airport retail revenue, such as ratio of international passenger, ratio of O&D, dwell time, income per capita, etc.

Estimation of this regression will show how significant different types of governance are in comparison with other factors.

6. Summary of results

To research a relationship between different types of airport retail governance structure and the level of retail revenues two approaches have been used. The first is based on descriptive statistics techniques. The main idea here is to split the whole sample of performance measure (retail revenue per enplaning passenger or retail revenue per sq.ft) into sub-samples by a particular factor. Describing statistical characteristics of such sub-samples and comparing them afterwards tells us how this factor affects on performance measure. The second approach is econometric estimation of a regression. The same performance measure as in the first approach stands for dependent variable. Different drivers of airport retail revenue (ratio of international passenger, ratio of O&D, dwell time, income per capita, etc.) and dummy-variables for types of governance are used as explanatory variables. Estimation of this regression shows how significant the relationship between different types of governance and revenue is in comparison with other factors.

Using the first approach the following results are obtained:

- Types of retail governance do affect retail revenues.
- The best approaches for large hubs are direct control (for risk averse airports) and hybrids (for risk lovers). Management approach also shows good results but corresponding observations are few so this conclusion is not trustworthy.
- For medium hubs multi-operator approach is the best among low-risk options. Direct approach is appropriate (higher risk is rewarded with higher revenue) middle-risk option. Developer approach is an appropriate (higher risk is rewarded with higher revenue) high-risk option.
- Within small hubs group management approach outperforms the others but multiple-operator is the best trusted option (because of sufficient number of observations) and low-risk one in the same time.

Implementation of the second approach is in progress.

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