A METHODOLOGICAL FRAMEWORK FOR AIRLINES HUB PERFORMANCE MEASUREMENTS

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Purpose: The purpose of this study is to identify criteria and to provide a methodology so as to evaluate an airlines hub.

Design/methodology/approach:A methodology is presented with a process flow diagram. Then, criteria are determined in two groups: internal and external criteria. Internal criteria refer to specific measures to one airport like the number of passengers. External criteria underline threats and opportunities, like an important economic growth in the country or seasonality issues in the area. Afterwards, benchmarking is used for internal criteria. Benchmarking is divided in two tools: internal (or self-) benchmarking and external (or peer group) benchmarking in aims to gaincompetitive results.

Findings:Based on the proposed methodological framework, we were able to apply it on Thailand as a case study. The result has helped to clarify the competitive strategy of the airline company as well as to gain a deeper understanding of the drivers of efficiency.

Research limitations/implications: This research is a qualitative exploration of the performance criteria of airlines hub and intends to bring a model of evaluation. The contributing criteria are mainly derived from context analysis.

Practical implications: In combining these three analyses, it's possible to obtain a basis of a SWOT analysis of the airport which can help managers to plan actions. The proposed methodological framework is aimed to provide a solid foundation in measuring the performance of an airport.

Originality/value:This research has attempt to use multiple analytical methods to gather more precise data and improvement solutions for airline hub performance measurements.

Keywords: Methodological framework, airline hubs, benchmarking, performance measurement

Paper type: Conceptual research paper

Introduction

Following the globalisation trend in modern economies, air transport is expected to grow in double digits in the next 20 years and the main flow is expected to move toward Asia-Pacific region (Boeing 2012). According toSkytrax's World's Airport Awards 2013 index, several Asian-Pacific airports have been appointed in the top 40 airports of the world (Word's Airports Awards, 2013).However, when using these indices as an indicator for airport hub performances, the question of validity, reliability and usability are questioned.The objective of this research is toidentify therelated criteria in analysing the performance of an airport hub through a methodological framework.The methodological framework consists, SWOT, PESTLE and Benchmarking. The methodological framework is designed formanagersto determinestrategic actions plans.

Methodology

Once Peter Drucker, famous American management consultant said: "What gets measured, gets managed." (*The Practice of Management American, 1954*).Indeed, to be able to manage and so, to define a planning, it's necessary to measure different indicators. The aim of this research is to obtain an overall vision of an airlines hub. For that, criteria will be classified in two main parts: organisational criteria (internal criteria) and environmental criteria (external criteria). Once the initial analysisis complete, the strengths and weaknesses will be emphasised by internal criteria and opportunity and threats by external criteria in an SWOT analysis.Following, the methodology,adapted from ICAO, 2013"Airport Economics Manual", isexplained after point by point.

Internal measurements

A. Identifications of key performance areas and indicators

The criteria are divided up in different key performance areas (KPAs). Each KPA includes a variety of indicators named key performance indicators (KPIs). Key performance indicators allow measuring the airport. ICAO's policies (ICAO, 2012. Doc 9082) recommended underlining four KPAs, i.e. safety, quality of service, productivity and cost-effectiveness. However, managers may select additional KPAs according to their objectives.

B. Establishment A performance objective and targets for each KPA and KPI

According to "Airport Economics Manual" (ICAO, 2013) it's essential to express a goal that improves on today's performances in a qualitative and focused way. At least one objective for each KPA should be defined. Moreover, one unique realistic and achievable target value has to be set for each KPI.

C. Data collection and results

Obtainingvaluable information is fundamental to have accurate source data, clear definitions of services and units of measures and to be transparent with methodologies employed. If the data are not precise and accurate, the results will be incorrect and useless.

D. Benchmarking

Benchmarking can be defined as the search for best practices for organisations of all sizes to achieve better performance. It isan effective structural approach which allows toanalyse and to evaluate one industry'soperation for opportunities so as to implement an action plan.(Robert J., Boxwell Jr.,1994). Three different type of benchmarking can be portrayed: (Cicero J., 2012.)

Internal Benchmarking is to compare processes, products or services within the organisation (inter departments, sites, departments, subsidiaries) in order to increase performances.The data accessible to collect and allowdescribing the current general "state of play". Competitive Benchmarking is to compare a process or function with competitors. This study is more delicate because the information collection about practices of competitors is challenging. Therefore, it's necessary to have good relations with its competitors.Generic Benchmarking is to compare a process with a company belonging to a different sector.This kind of benchmarking is very productive. Indeed, companies can gain a lot with sharing information with non-competing businesses to develop networks of exchange and collaboration. In this research, we will be focusing on the first twobenchmarkings.

External measurements

PESTLE is a useful tool for identifying the threats and opportunities of a company (external criteria) which can appear in its environment through some major structural forces: Political, Economic, Social, Technology, Environmental and the Legislation. Following, a list of questionsof non exhaustive that the airport can use to detect current threats and opportunities are provided in the annexe.To get good quality information is fundamental to have accurate source data, clear definitions of services and units of measures and to be transparent with methodologies employed. If the data are not precise and accurate, the results will be incorrect and useless.The PESTLE results emphasise opportunities to maximise and the threats in order to increase the organisation's potential. It helps managers to make decisions and to plan for future events.

SWOT analysis

SWOT as an analytical tool to get the Strengths, Weaknesses, Opportunities and Threats of an organisation.The external and internal benchmarking emphasize the internal drivers (strengths and weaknesses). Whereas, the PESTLE analysis underlines essentially the external environment (Opportunities and Threats). In combining these three analyses, it's possible to obtain a basis of the SWOT analysis of the airport.Once this study above carried out, it's time for planning and forecasting. The SWOT analysis brings results about weaknesses, threats, but also opportunities. New initiatives can be planned. Furthermore, performance assessments can help support and justify investment decisions. Forecasts are an important input to cost-benefit analyses.Information disclosure is an important component and often an obligation. Moreover, an appropriate disclosure of performance information can build public confidence.

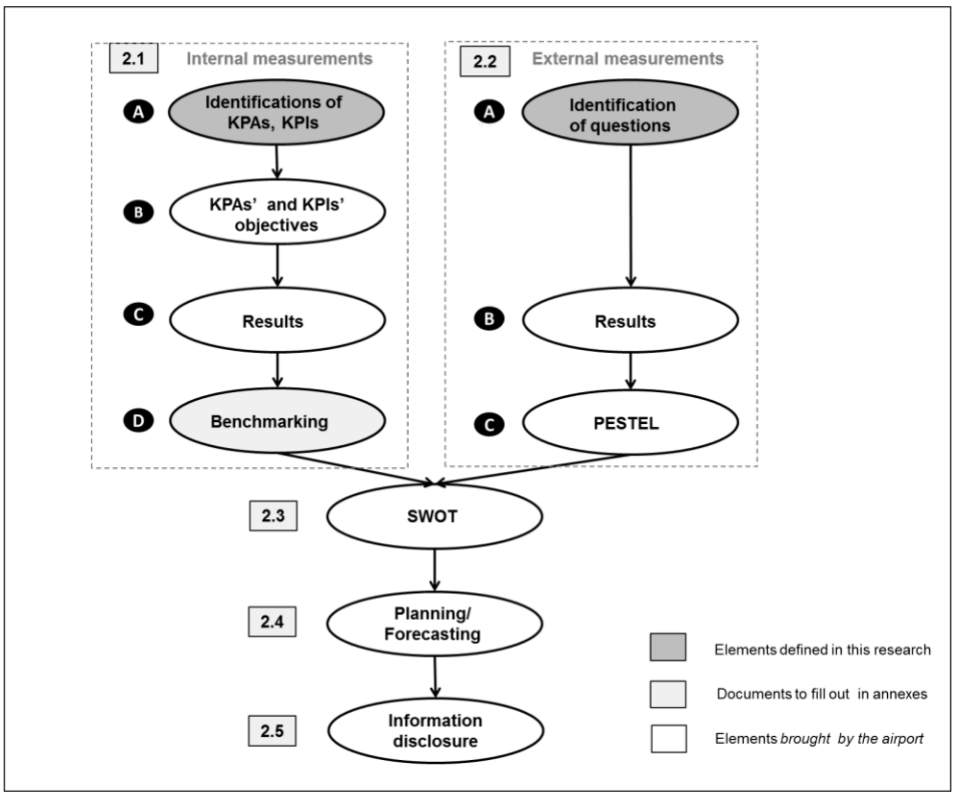

Figure 1: Methodology to evaluate and improve airport's performances

Airlines hub criteria

Before settingcriteria, it's important to select principles to obtain suitable numbers of key performance areas and indicators.ICAO's policies (ICAO, 2012. Doc 9082) recommended to emphases four KPAs, namely, safety, quality of service, productivity and cost-effectiveness. Nonetheless, managers may choose additional KPAs according to their objectives.Also, the numbers of KPIs has to be sufficient,but limited to acquire an overall vision and to be able to collect and process all statistical data.

For instance the"Guide to Airport Performance Measures" (ACI, Wyman O. 2012) provided a structure for effectiveness for economic and managerial performance of airports with six functional areas and forty two indicators. On the other hand, the"Resource Guide to Airport Performance Indicators" (Hazel. et al., 2001) proposes a system of indicators with a twenty-three functional categories, twenty-nine core performance indicators and one hundred thirty-one key performance indicators after interviewingforty industry experts and two industry workshops. The document provides more precisions and, in analysing this paper, it's possible to regroup some criteria.

Other indicators, not mentioned the "Guide to Airport Performance Measures" like "maintenance" or "information technology",are identified. Additionally, the two other papers "Passengers' expectations of airport service quality" (Fodness, et al. 2005) and"A competence-based strategic management model factoring in key success factors and benchmarking" (Chen, 2005) confirm indicators setbefore,and underline other judicious criteria or the "Total passenger per employee". Examiningthese different documents and research paradigms to develop a framework of airlines hub's performance indicators measures, the study delineates nine key performances areas and seventy key performance indicators defined in this section. Criteria are mostly measured annually and cost indicators have to require the same currency for benchmarking.

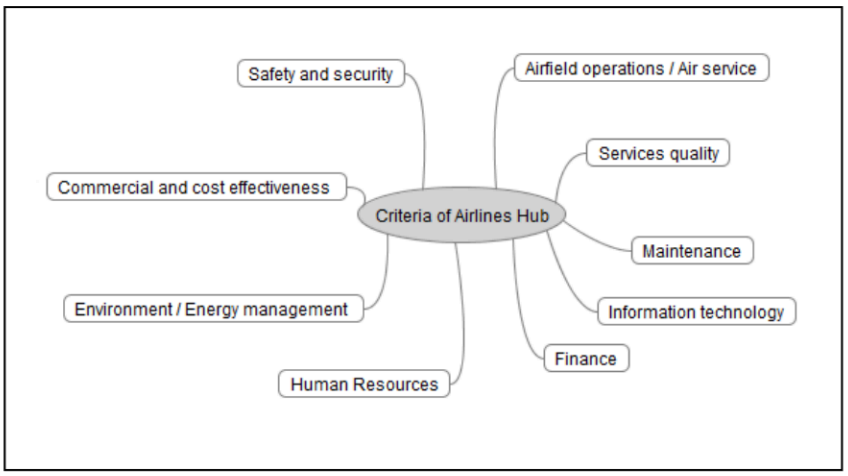

Figure 2: The Key Performance Areas

Airfield Operations/ Air services
These are the core measures used to characterize and categorize airports, such as the number of passengers and operations. Although airports may have little control over these core indicators, especially in the short term, they are important indicators of overall airport activity, and important drivers and components of other indicators.

Services quality
Airport performance measures for Service Quality focus on passenger perception of and objective measures of airport service delivery. This increasingly important area reflects the evolution of airport management from having a primary focus on facilities and operations to having a strong customer service focus in acompetitive environment.

For the first criteria in this area “customer satisfaction”, the survey could be based of on these following examples of indicatorsmentioned in the paper “Passengers’ expectations of airport service quality” (Fodness D. et al. 2005):

- Ease of finding one’s way;
- Attitude of employee
- Accuracy of screen information;
- Cleanliness of washrooms;
- Overall passenger satisfaction;
- Attitude and efficiency of customs officers;
- Expectation about airport’s decor;
- Expectation about specific facilities and restaurants;
- andAtmosphere of the airport: convenient layout of terminal.

Human Resources
Human Resources performance measures are used primarily to give precision about employee’s numbers, diversity, job satisfaction, and training.

Cost effectiveness – Productivity
These measures are closely related measures of an airport’s performance. In this section, some technical expressions are used. There are defined here. Operating cost refer to labour, contracted services, maintenance, utilities and energy and non-operating cost to capital and financing costs, site constraints, local construction costs, cost of capital, and many other factors. The Total Cost combines operating costs and non-operating costs.Contrary to aeronautical revenue which stands for of airfield, terminal space, gate charges, non-aeronautical revenue is about management decisions, contractual terms, facilities constraints, natural resources on site, location in areas. Work Load unit is a global unit that is delineated by one passenger (departing or arriving) or by 100kg of freight (inbound or outbound). (ACI, Wyman O., 2012). At least, concession is the right to operate a certain commercial activity at the airport, commonly on an exclusive basis and usually at a specified location. (ICAO, 2013.)

Safety and security
Safety and security are the most important airport responsibilities.The airport performance measures for Safety/Risk Management are a diverse set of indicators measuring accidents, injuries, security violations, and police costs.

Environment and energy management
Environment and energy management has become a strong focus for airport managements. These performance measures are used primarily to expose energy consumption of various aspects of the airport witha variety of environmental indicators relating to emissions, discharges, noise, use of green building and other environmental sound practices, etc.

Maintenance
Maintenance performance measures are primarily used to measure the cost of maintaining areas of the airport, buildings, systems, and equipment, etc. A clean terminal area and escalatorsin service, for instance, are crucial point for customer satisfaction.

Information technology
When considering airports, most people think of the airfield, terminals, people movers, roadways, and rail used to flow passengers to baggage, cargo, large and small aircraft, etc. Often overlooked, however, is the hidden infrastructure of Information Technology and Systems (IT&S), which enables the airport and all of its intricate facets to efficiently and safely function minute-by-minute and day-to-day. Information Technology performance measures underline the availability and functioning of network and the meantime to repair system.

Finance
Financial performance measures are used to determine all aspects of an airport's financial performance, including revenues and costs for the airport in total.Contrary to aeronautical revenue which stands for of airfield, terminal space, gate charges, non-aeronautical revenue is about management decisions, contractual terms, facilities constraints, natural resources on site, location in areas. Other specific wording is debt service which concerns capital development phase as expansion, modernization programs, but also interest rates, debt structure, and insurance. Eventually, eBitdA is driven by multiple factors including aeronautical charge levels, the success of the airport's commercial program, and the passenger level and growth rate. Higher revenue and lower operating costs result in greater eBitdA(ICAO, 2013).

Benchmarking
Internal Benchmarking
This part is focusing on the internal benchmarking (or self-benchmarking) which refers to theairport's performances considered it over time. On the contrary, with the external benchmarking, the airport's performances arecompared against other airportseither at a single point of time or over a period of time. (Wyman O., ACI, 2012).Internal benchmarking is essential to understand trends of the airlines hub over time and to help managersto forecast and to plan.

External Benchmarking
External benchmarking involves comparing airport with others.When used carefully, benchmarking is a powerful analytical tool. However, it's very important to be aware that benchmarking between airports is difficult and can often be misleading. Definitions, content, data collection, and accounting practices may also differ between two airports. If airport managers attempt to make performance comparisons with other airports, differences in operational, structural, commercial and organisational situations can be adequately reflected in the analysis. To the extent that such comparisons are made, great caution should be exercised in interpreting the results, especially when the goals are to understand performance drivers and shortfalls, and thus establishing best practices. "To conclude this part,it's essential to find truly comparable "peer" airports in terms of the many factors that drive the indicator."(ACI, Wyman O., 2012) and (ICAO, 2013."Airport Economics Manual").

PESTLE Analysis
PESTLE is a mnemonic which in its extended form denotes P for Political, E for Economic, S for Social, T for Technological, L for Legal and E for Environmental.(Source: pestleanalysis.com).

PESTLE analysis is an audit of an organisation's environmental influences so as to guide strategic decision-making with the information collected. It's very useful to understand risks associated with market (the need for a product or service) growth or decline.The hypothesis is that the organisation will have favourable position on its competitors to respond to changes, if it is able to audit its present environment and evaluate possible changes."(CIPD, 2010).

To use this tool, the most suitable way is to ask questionsin conducting a scan of the economic environments.The results display the opportunities to maximise and the threats in order to increase the organisation's potential. This analysis helps managersto make decisions and to plan for future events. (CIPD, 2010).

Political
This force underlines issues or opportunities about political stability, monetary policy, fiscal policy, international policy and trade tariffs. (Matthieu, 2013)A government may impose a new tax to which entire revenue generating structures of organisations and it may affect the economic environment to a great extent.(Source: pestleanalysis.com)
Main questions: What is the political situation of the country and how can it affect the industry?Are there international or home market pressure groups whichaffect airport's economy?

Economic
In this point, economic growth patterns, interest rates, inflation rate, purchasing power, foreign exchange ratesare precise(Matthieu, 2013).There are determining for an economy's performance that impacts on the company. For example, anincrease in the inflation rate of any economy would affect the companies' price of their products and services. Additionally, the purchasing power of a consumer would be also impacted. (Source: pestleanalysis.com)
Main questions: What are the prevalent economic factors?What are seasonality issues?

Social
The social raise the question about social environment like population, demographics, education,cultural trend, lifestyle and health.(Matthieu, 2013).For Western countries, for instance, there is high demand during the holiday season. (Source: pestleanalysis.com)
Main questions: How much importance does culture has in the market and what are its determinants?What are particular demands about safety or facilities for babies, aging people, handicapped people and so?

Technological
Technological factor relate to research and development& D discover, automation, innovation support, and technology transfer(Matthieu, 2013). They can influence favourably or unfavourably the market favourable. (Source: pestleanalysis.com) For example, the improvement of high-speed connections to and from the airport (motorways, high-speed rail, regional bus lines) in Amsterdam Schiphol Airport in December 2012 (Source: Annual report 2012).
Main questions: What technological innovations are likely to pop up and affect the market structure? Does the airport provide competing technology?

Legal
Legal point refers to industrial property, safety standards, contract law, labour rights, consumer law (Matthieu, 2013).There are certain laws that affect the business environment in a certain country while there are certain policies that companies maintain for themselves. (Source: pestleanalysis.com)
Main questions: Are there any current legislations that regulate the industry or can there be any change in the legislations for the industry?Are there law about open-sky?

Environmental
The issues of surrounding environment include weather and climate, geographical location, global changes in climate clean energy, recycling and regulations (Matthieu, 2013). As instance, the number of snowing day is significant in certain countries and has to be taking into count for the airports logistic. Other example is the integration of sustainability aspects in all airport processes of Amsterdam Schiphol Airport in December 2012 (Source: Annual report 2012).
Main question: What are the environmental concerns for the industry?

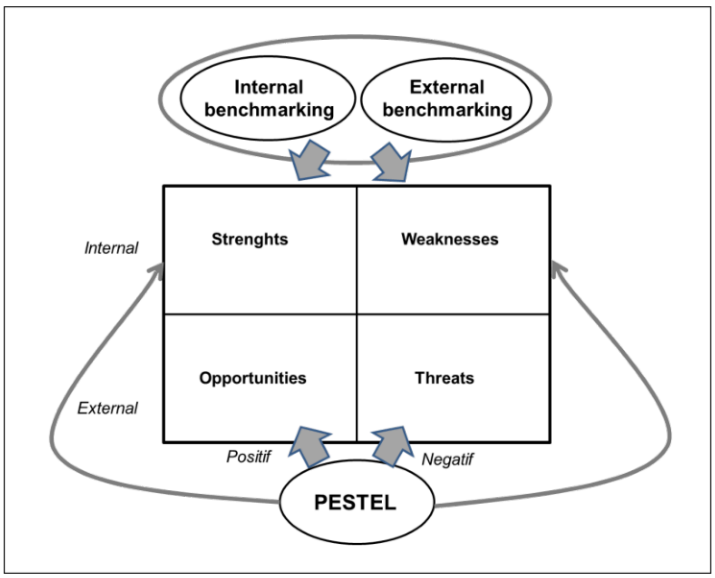

Figure 3: Methodology to get a basis of SWOT analysis

Evidently, this SWOT analysis can be completed by other components. The questions following are example to help to complete the SWOT analysis (MindTools, 2013):

Strengths which characterize the competitive advantages:

- What advantages does your organisation have?
- What do you do better than anyone else?

Example: Large network of connections and frequencies), Amsterdam Schiphol Airport in December 2012 (Source: Annual report 2012).

Weaknesses which represent organisational barriers or limitations:

- Whatcouldyouimprove?
- Whatshouldyouavoid?

Example: In Sydney Airport, a weakness is investment from European airports because of improper management of resources (Source :http://www.sydneyairport.com.au/)

Opportunities which highlight a favourable situation like new opportunities for profit or growth:

- What good opportunities can you spot?
- What interesting trends are you aware of?

Examples: Expansion of destinations network and frequencies, Amsterdam Schiphol Airport in December 2012 (Source: Annual report 2012).All Thai Airways domestic and international flights now operate from Suvarnabhumi airport. (Source: http://www.bangkokairportonline.com/, July 2013)

Threatswhich emphasise potentially damaging external forces:

- What obstacles do you face?
- What are your competitors doing?

Example: The rise of fuel price.
Bangkok at risk of sinking into the sea : Parts of Thailand's capital could be underwater by 2030 unless the government takes steps to prevent disaster, say experts . (Source : Guardian Weekly, Tuesday 13 September 2011).

Strategic factors which contribute to the success ofanairlines hub development.
The location is the base of a hub development. This is the first criterion for its success. An airline hub located in a heart of dense population area can offer multiple destinations with a short span of flying time. For example, Amsterdam Schiphol Airport is located at the centre of Europe and serves main European cities in fewer three hours. In the same way, Hong Kong International Airport is located at the heart of Asia and covers half of the world's population within five hours of flying time (ACI, Kwok M., 2010).

Having a good strategic location is not sufficient to success in hub. A political environment favourable to the development of airlines is necessary. Liberalization refers to a relaxation of previous government restrictions like the liberalization of air-service agreements. Deregulation is the process of removing or reducing state regulations. For example, relaxing domestics and regulatory constraints.Hubs existed before the deregulation, but the removal of restrictions on market entry and exit, along with policies permitting airline mergers, gave the possibility to surviving carriers to consolidate hub-and-spoke networks. In US, Canada and Europe, the deregulation and liberalization trended to the disappearance of weaker airlines through bankrupt and, in a same time, at the birth of upstart competitor.

Liberalization helped also low-cost carriers' development. The major motivation of deregulation in South East Asian countries in 2000s is to boost tourism, business travel after the financial crisis of the 1990s(Zhang A. et al., 2008).Prior to deregulation movements (end of 1970s-early 1980s), many airline services were taking place on a point-to-point basis. On the above figure, two airline companies are servicing a network of major cities. Many direct connections exist, but the frequency of services is low and fare tickets are expensive.With deregulation, a system of hub-and-spoke network emerges.

The hub and spoke mechanism allows a number of cities to be linked to a central hub with short-haul traffic or long-haul operations. For example, the airline Emirates links long-haul to long haul traffic between Europe and Asia, Africa and Australia via its hub at Dubai. A common consequence is that each airline assumes dominance over a hub and services are modified. The two hubs are connected to several spokes. With hub and spoke network, regional markets are dominated and passengers benefit from better connectivity (although delays for connections and changing planes more frequently) and lower costs(Rodrigue J.P., 1998).

Case of Thailand

Thailand is aneffective example of deregulations in ASEAN. In Thailand, deregulations had been set gradually in the 2000s. First: entry deregulation. The private airlines are allowed in domestic route. Second step: the fare regulation. Airlines are free to charge prices, but under an upper limit (Zhang A. et al., 2008).The growth of hub-and spoke operations has changed the competition among airlines and airports in a structural way. The competitive position of airlines and airports is usually compared in terms of aircraft movements, number of passengers or cargo volumes. The measurement of network performance in hub-and-spoke systems should take into account the quantity and quality of both direct and indirect connections. (Matsumoto H. et al., 2007).Having many airlines which serve multiple destinations is essential for airlines hub. For instance, Singapore Changi Airport serves more than 100 airlines flying to over 240 cities in about 60 countries (Facts and Statistics, accurate as of May 2013,http://www.changiairport.com*).*

Connectivity: Many people make transfer at hub airports even a good direct connection is available. Why? Because other available alternatives have better frequencies, better travel time or better price. Fare of direct routes is, in general, more expensive than fare of indirect routes. The ticket fare is function of the number of competitor on the route, the travel time, the number of transfers, carriers). In the research "Air network performance and hub competitive position: evaluation of primary airports in East and Southeast Asia", (Matsumoto H. et al., 2007.), the authors define the number of connectivity unit like the product of quality and number of operations (Matsumoto H. et al., 2007). The hub connectivity performance is the average of hub connectivity. Hub connectivity increases drastically, once the number of direct connections exceeds a certain threshold.

A strong local and regional economy is decisive for the growth of hub to provide the huge demand for passenger travelling and cargo shipping (ACI, Kwok M., 2010). This condition is essential to enable an efficient process for the transit passenger and for their baggage with the minimum connecting time even at peak traffic time (ACI, Kwok M., 2010).Moreover, the hub airports should have sufficient capacity in the airport, a safe, secure and environmentally sustainable operations and good customer service to provide the best airport quality services.

Conclusion and limitations

As a conclusion, this research is a qualitative exploration of the performance criteria of airlines hub and intends to bring a model of evaluation.After delineating the procedure, criteria which refer to the airport have been identified to help managers to underline strengths and weaknesses of the airport.

Strategic factors contributing to the success of an airlines hub development have also been presented. Furthermore, the research has brought one approachusing tools (Internal and External Benchmarking, PESTEL Analysis and SWOT analysis)to get a global vision of the entire airport at the present. However, benchmarking is difficult and complex, especially for external benchmarking, and the risk of misleading is significant. For this reason, in order to gain a deeper understanding of the drivers of efficiency, it will be interesting to apply process level benchmarking of particular activities to get more precise data and improvement solution.

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