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Performance Measurement System (PSM) and Balanced Scorecard (BSC) Strategies Used in the Process Related with Ramp Handling Services of Ground Handling Management

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Abstract

In civil aviation sector, the design of airports is divided into two as air side and ground side. The latter part of second security gate in terminal building at the airports is defined as air side in the literature [which is defined as customs area]. The air side is also divided into; ground service and airspace. In this research, the concept of ramp services which constitutes basic content of ground service management process is examined. One of the two most important causes of delays in civil air traffic is that ramp services can not be planned effectively [the other reason is that airport capacity is extremely dense], so this concept needs to be well analyzed and evaluated. The performance measurement system (PMS) and balanced scorecard (BSC) methods in this review are examined in terms of the conceptual background within design, measurement and implementation phases for effective ramp services process in ground handling management.

Keywords: Performance Measurement System (PMS), Balanced Scorecard (BSC), Conceptual Background, Ground Handling Management, Ramp Handling Services.

1. Introduction

Today's civil aviation industry is highly dynamic and has a systematic job definition where flights are scheduled on regular basis [3, 4]. Civil aviation has a high growth potential on one hand [1, 9] and profit margins on the other as competition intensifies [7, 27]. Changes in the civil aviation sector affects all members in the value chain [6]. Competitive

pressures are not only affect air side of the value chain but also affect ground services [18]. In this context, logistics of ground services is one of the biggest difficulties and the main factor determining sustainable success [11, 20].

For this reason, efficient and privatized processes in passenger, baggage, mail and cargo forwarding areas mean great importance for airports

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and other logistics service providers [14]. There is a tendency towards liberalization in ground handling market exists at European level such as EU (European Union) Directive 96/67/EC which is developed through liberalization and increases competition and cost pressures especially in the area of ramp services [31, 8]. Ramp services which is an important part of ground handling management in general terms, seem to cover all transportation activities as one of the main functions of airports. Ramp services including loading and unloading of aircrafts and activities of passengers, crew, baggage, mail and cargo transportation between aircrafts and terminal buildings represent the interface of the airline on the one hand and the interface to the airport infrastructure on the other. Historically civil air transportation has become an increasingly regular sector. This order has also been used for public interest and is required for state regulation. The EU directive 96/67/EG forms the basis of today's market structure and was published in early 1990's to liberate air transport in Europe.

Main theme of this directive is to initiate step by step liberalization process and to provide an integrated system understanding of ground handling management which is referred to as ramp services especially affecting air side. Another aim is to reduce operating costs of air transportation and to increase quality of using aircrafts. The EU directive sets the number of ground handling services that must be activated to enter the market [13]. Exceptional cases are related with enforcing certain rules on ground handling operations. In addition changes to the EU directive have made the process of liberalization in ground handling operations even more difficult [22]. Because of this increasing competitive pressure, employees in the ramp area of ground handling services have had to rethink their strategies and structures as well as their working principles to achieve long term competitive advantage [37].

As seen other areas in civil aviation sector, ramp services system approach needs to be more competitive, market oriented and customer focused [23]. For this reason, it is very important for ground handling companies to develop their ability for evaluate their own performance according to their competitors [14]. To achieve this development,

appropriate approaches should be used to allow for a holistic analysis of performance measurement, productivity and efficiency measures [16, 4]. In these approaches measurement system for performance use (PMS) does not answer question of "what are our competitors doing?" which is one of the most basic questions [4]. Benchmarking is considered to be a suitable tool that must be combined with performance measurement to identify best practice solutions across the industry [26]. Performance gaps create a fundamental understanding of not only targeting radical changes but also aiming to provide both continuous improvement and long term competitive advantage.

Benchmarking is criticized for being limited but it helps to exchange information in parallel with other businesses [15]. Nonetheless, taking the first step in positioning businesses under strategic grounds is linked for setting a firm's competitive position and taking the foundations to achieve sustainable competitive advantage [17]. Within this context performance measurement system (PMS) is described as an integrative approach that serves as a source of information for benchmarking activities. Nevertheless, such a system has not yet been developed for the ramp services process. For this reason, the research objectives of this article are twofold: The first objective is to develop a PMS sufficient to analyze productivity and efficiency of ramp services operations. The second objective is to test applicability of PMS developed to perform a comparison.

2. Theoric Method - Performance Measurement System Required for Effective Use of Ramp Services

Although it is claimed that a PMS is required, how to adapt an undetermined strategy and implement such a system in order to increase the efficiency of ramp services. Scope of ramp services are classified; logistics services as passenger, crew, baggage, freight and postal transportation as well as loading and unloading of aircraft among terminal buildings of aircrafts. This service is provided by a third-party location operator, airline (self-processing) or an airport ramp services unit [32]. In this research, the role of integrated ramp service in airports is emphasized.

Today's airport performance measurement approaches deal with airports as a whole organization, not with ramp services in particular [26]. In the context of airports; numerous studies have been conducted focusing on financial, qualitative, political or ecological perspectives and most researches have focused on financial performance indicators [45, 58, 17, 35, 13, 19, 39] or quality based performance measures [53, 54, 30, 29, 16, 18]. Some researchers follow a combination of economic and qualitative perspectives [7, 21, 74]. However, analysis of ecological effects such as noise or exhaust emissions at airports is also important [12, 15], in direction of liberalization from current research subjects [8, 57]. Under current research, researchers have the opinion that there is no fully developed PMS that can be implemented in context of ramp services management. Therefore, the next section provides the necessary conceptual background of PMS's.

3. Findings and Discussions - Conceptual Background

Performance measurement is a process that often discussed but rarely defined [2]. While performance can be observed in variety of ways, a measurement method must be available to assess performance. Particularly the distinction must be made between concepts of logistics, productivity and efficiency [33, 2, 14]. Efficiency is a measure of how much the customer's needs are met and productivity is how much the company's resources are used economically by providing a certain level of customer satisfaction [36, 2]. That is why we support the decision making process of the company by assessing main objective effectiveness and efficiency of performance measurement [44] and providing reliable information about performance measurement [41]. For this reason, strategies called performance measures can be arranged with a PMS system to measure the efficiency and productivity of company's actions [2]. In this research in order to get an overview of the interpretation of holistic performance related with measurement table 1 shows; design, measurement and implementation of a three stage performance measurement process (developed by Bredrup in 1995) [28].

3.1. Targets and values which are related to the performance of the Ground Operation as Design Phase

Selected performance indicators must be added to a valid, robust and integrated system and only have different metrics [10, 14]. For example, financial performance reflects not only the development process but also the conclusion [43]. Focusing too much on financial or cost oriented systems can be seen as inadequate as it neglects the ongoing analysis to manage a logistics service provider. Therefore, it is very important to continue the process analysis of the logistics phase successfully [76]. Logistics performance is seen as a subset of company or organizational performance in the general past approach [24]. However, this is not sufficient to measure the logistical performance of logistics service providers (for example, ramp services operator). Because logistics services are seen as the main function of these organizations, there is a need for a stronger logistics and organizational efficiency relationship to be reflected in PMS for these organizations.

Ramp services is one of the most important activity definitions for the continuous execution of ground handling management. Because service demand requires to be realized instantaneously, customers (such as airline) or customer's products (such as luggage, mail and Cargo) must be integrated into service process. This configurable process is called airline and customer integration because production and consumption occur simultaneously in the literature [55, 77]. For this reason, these strategies need to be taken into account when designing a PMS for effective use of ramp services. Based on these strategies, more transaction and value chain oriented performance is absolutely needed. Linking to measurement approaches that take into account strategically well planned processes affects the company's development process positively [34, 2, 42]. As the development progresses positively, the PMS process for ramp services management includes performance parameters [input, process, output and result] structured with its own dimensions along the basic logistics value chain [48].

The loading and unloading of freights in ramp services is done according to service process system [55]. For this reason while PMS is designed for using of ramp services, the service process needs to be accounted for. More service and value chain oriented performances are needed with service process participation in account. Strategically the most important processes need to be applied to measurement approaches that add value to account and link with company activity [34, 5, 42]. For this reason, the PMS process for ramp services management includes performance [input, process, output and result] criterias that is structured with its own dimensions in basic logistics value chain process [48]. It seems that the start and finish process of ramp services [55, 13] is closely related to process of service [46, 6]. While the processes and outputs from dimensions that make up input process represent efficiency with result size more generally for describing efficiency of the ramp services organization. Several concepts have been used to achieve the goal of structuring PMS throughout previously established logistics value chain and there are many accepted definitions for PMS's available in the literature [40, 52].

One of the reasons for selecting Balanced Scorecard (BSC) practice associated with PMS process is to identify the single performance indicator used to reflect organization's internal value chain with cause and effect relationship [64]. BSC also offers a multi dimensional study of measured performance. BSC varies depending on the performance indicators of company's past and future critical success factors by taking into account processes under financial details [38]. BSC evaluate; customer, business process, learning and growth with financial perspective [64, 67]. The system used in this study to meet the demand for a PMS that reflects the logistics value chain examines the perspectives of the BSC according to cause and effect relationships under value chain benchmark.

Learning and growth perspectives focus on inputs and ensure that key operations represent staff and infrastructure of the company for continue. This perspective concerns with suppliers (individuals who perform certain pre determined actions). In the business process perspective, transformation process helps to define actions required to

determine desired outcome for customer and company related with concentrate on output. From a customer perspective, the financial or fiscal perspective concentrates on outputs that are then used to evaluate [41]. This combination of BSC perspectives and service value chain dimensions is shown table 1 [input to output] in the design phase. Designed for effective use of ramp services in PMS system, this structure also fulfills need to direct more processes in airport surveys [26, 25, 4]. This model which was designed for detailed development of PMS process during ramp services, has been devised by Kaplan and Norton [14, 67].

In this model, it is aimed that the mission, vision and strategies of corporate units are transparent and understandable for everyone [65, 63]. In BSC model, the processes such as indicators in cockpit of an aircraft is intended to precisely manage process under complex information by managers [64].

The following transactions explain steps in this process [64]:

- 1) Strategies in all units of corporate enterprises are clearly defined.
- 2) Strategic sub-targets have been identified for each BSC phase.
- 3) Sub targets are converted into performance metrics and included in the process of logistics value chain.

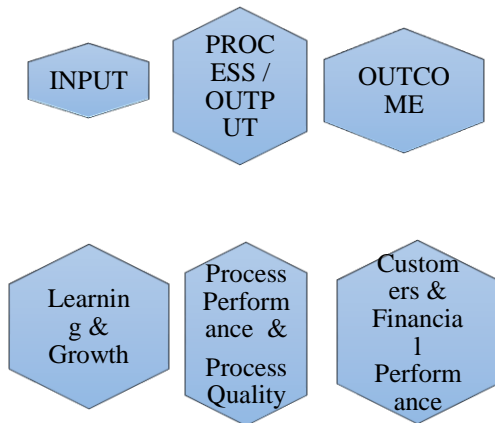
The first step is to plan negotiations that will be carried out in line with strategic priorities of companies so as to positively influence the working process [47, 62]. The second step is to divide corporate strategy into sub targets for each BSC perspective. In the third step, the aim is to make results operationally obtainable [15, 17, 67]. Thus, BSC can bring the system to a better analysis by integrating operational strategies into company's job description [62, 16] and assessing cause and effect relationship [61, 66]. In this article, processes in BSC system are evaluated in terms of input, process / output and result dimensions. This evaluation is aimed at obtaining process oriented PMS requirements.

3.2. Targets and values which are related to the performance of the Ground Operation as Measurement and Implementation Phases

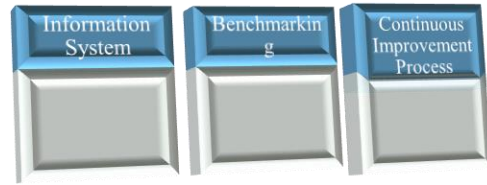
The measurement of overall performance period is carried out in order to make an advanced comparison for PMS. Thus, it will be easier to improve ground handling management process in central airports across European Continent where civil aviation is the most active outside the United States of America. The conversion of performance measurement into a benchmarking exercise to facilitate this improvement is due to the fact that using a single PMS alone does not provide enough information about company's ultimate competitive performance [3]. For this reason, comparisons can be seen as an indispensable part of performance measurement. As a result of the application of PMS process prepared in line with measurable performance that can be obtained by comparison made, ground handling process can be successfully managed in many airports especially in European Continent [56].

To Show the relevant PMS application:

Table 1. Performance measurement application [72]



DESIGN	MEASUREMENT	IMPLEMENTATION
<ul style="list-style-type: none"> • Identification of Strategic Goals • Development of the Performance Measurement System 	<ul style="list-style-type: none"> • Identification of Improvement Potentials 	<ul style="list-style-type: none"> • Development of Improvement Actions • Reporting • Incentivisation



4. Conclusion

In the airports ground handling management which constitute a major part of civil aviation sector is necessary to adopt performance measurement system (PMS) and balanced scorecard (BSC) method. To perform airport strategies in a planned way, these methods are significant in order to reduce delays in ramp services field and to plan the processes more effectively. BSC concept is shown in table 1 and PMS system is concerned with the most effective planning of design, measurement and application phases in the context of conceptual background concept in this table. With a well analyzed PMS application, ramp handling process in ground handling management can be managed in a more planned approach and costs will be reduced by this way. The equipment used in the process of ground handling management is quite expensive and depreciation is also decreasing over time. For this reason, a well planned PMS system can also adopt a control oriented approach for airport's ground handling management with cost and funding process.

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References

- [1] Air Transport Association, "ATA Economic Report 2006", Air Transport Association of America, Washington, DC., 2006.
- [2] A. Neely, J. Mills, K. Platts, M. Gregory, and H. Richards, "Performance measurement design: Should process based approaches be adopted?", International Journal of Production Economics, 46-47, 423-431, 1996.

- [3] A. Neely, J. Gregory, and K. Platts, "Performance measurement system design: A literature review and research agenda", *International Journal of Operations and Production Management*, 15(4), 80-116, 1995.
- [4] A. Neely, J. Mills, K. Platts, R. Huw, M. Gregory, M. Bourne, and M. Kennerley, "Performance measurement system design: Developing and testing a process-based approach", *International Journal of Operations and Production Management*, 20(10), 1119-1145, 2000.
- [5] A. Schwolgin, "Stand und Entwicklungsperspektiven des Controllings von Logistikdienstleistern. In: Schneider, C. (Ed.)", *Controlling für Logistikdienstleister: Konzepte, Instrumente, Anwendungsbeispiele, Trends*. Deutscher Verkehrsverlag, Hamburg, 17-50, 2004.
- [6] A. Stainer, "Logistics: A productivity and performance perspective", *Supply Chain Management*, 2(2), 53-62, 1997.
- [7] ATRS, "Airport Benchmarking Report. Air Transport Research Society", University of British Columbia, Vancouver, 2003.
- [8] B. Graham, and C. Guyer, "Environmental sustainability, airport capacity and European air transport liberalization: Irreconcilable goals?", *Journal of Transport Geography*, 7, 165-180, 1999.
- [9] C. Bernabai, "Airports: An integral part of the air traffic management system", *Air and Space Europe*. 3(1/2), 25-27, 2001.
- [10] C. Caplice, and Y. Sheffi, "A review and evaluation of logistics metrics", *The International Journal of Logistics Management*, 5(2), 11-28, 1994.
- [11] C. Gonnord, and F. Lawson, "Airports: A precious resource of the aviation network", *Air and Space Europe*, 2(5), 33-39, 2000.
- [12] Civil Aviation Authority, "The use of benchmarking in airport reviews", Civil Aviation Authority, London, 2000.
- [13] C. Murillo-Melchor, "An analysis of technical efficiency and productivity changes in Spanish airports using the malmquist index", *International Journal of Transport Economics*, 26(2), 271-292, 1999.
- [14] C. Rafele, "Logistic service measurement: a reference framework", *Journal of Manufacturing Technology Management*, 15(3), 280-290, 2004.
- [15] C. Templin, "Deregulation of ground handling on six European airports", Paper presented at the German Aviation Research Society Workshop, Bremen, 2005.
- [16] C. Tyler, "Pleasing the passenger", *Airport World*, 5(3), 19-22, 2000.
- [17] D. Gillen, and A. Lall, "Developing measures of airport productivity and performance: An application of data envelopment analysis", Paper presented at the Aviation Transport Research Group Conference, Vancouver, 1997.
- [18] C.-H. Yeh, and Y.-L. Kuo, "Evaluating passenger services of Asia-Pacific international airports", *Transportation Research E*, 39, 35-48, 2003.
- [19] D. Parker, "The performance of BAA before and after privatization. *Journal of Transport Economics and Policy*", 33, 133-145, 1999.
- [20] D. Wyld, M. Jones, and J. Totten, "Where is my suitcase?, RFID and airline customer service", *Marketing Intelligence and Planning*, 23(4), 382-394, 2005.
- [21] E. Pels, P. Nijkamp, and P. Rietveld, "Inefficiency and scale economics of European airport operations. *Transportation Research Part E*", 39, 341-361, 2003.
- [22] European Commission, "Ground handling market at community airports [revision on the directive 96/67/EC]", 2003, http://ec.europa.eu/transport/air_portal/consultation/2003_06_01_en.htmS., Date of Access 21.02.2018.
- [23] F. Chan, H. Chan, H. , Lau, and R. Ip, "An AHP approach in benchmarking logistics performance of postal industry", *Benchmarking: An International Journal*. 13(6), 636-661, 2006.
- [24] G. Chow, T. Heaver, and L. Henriksson, "Logistics performance: Definition and

- measurement systems”, *International Journal of Physical Distribution and Logistics Management*, 24(1), 17-28, 1994.
- [25] G. Francis, I. Humphreys, and J. Fry, “An international survey of the nature and prevalence of quality management systems in airports”, *TQM and Business Excellence*, 14(7), 819-829, 2003.
- [26] G. Francis, I. Humphreys, and J. Fry, “The benchmarking of airport performance”, *Journal of Air Transport Management*, 8(4), 239-247, 2002.
- [27] G. Francis, I. Humphreys, and J. Fry, “The nature and prevalence of the use of performance measurement techniques by airlines”, *Journal of Air Transport Management*, 11(4), 207-217, 2005.
- [28] H. Bredrup, “Background for performance management. In: Rolstadas, A. (Ed.), *Performance Management: A Business Process Benchmarking Approach*”, Chapman & Hall, London, 61-87, 1995.
- [29] H. Hegendorfer, and C. Tyler, “Who’s top in passenger satisfaction”, *Airport World*, 4(3), 39-41, 1999.
- [30] H. Hegendorfer, and P. Morris, “Competition hots up for top airport ratings”, *Airport World*, 5(3), 26-29, 2000.
- [31] J. Fuhr, “Deregulation of European ramp handling market: Lessons to be learned from an institutional perspective?”, Working Paper, Center for Network Industries and Infrastructure CNI, Berlin, 2006.
- [32] J. Fuhr, and T. Beckers, “Vertical governance between airlines and airports: A transaction cost analysis”, *Review of Network Economics*, 5(4), 386-412, 2006.
- [33] J. Glaeson, and D. Barnum, “Toward valid measures of public sector productivity: Performance measures in urban transit”, *Management Science*, 28(4), 379-386, 1986.
- [34] J. Leyk, and J. Kopp, “Unternehmensplanung bei Logistikdienstleistern mit Advanced Budgeting. In: Schneider, C. (Ed.)”, *Controlling für Logistikdienstleister: Konzepte, Instrumente, Anwendungsbeispiele*, Trends, Deutscher Verkehrsverlag, Hamburg, 361-377, 2004.
- [35] J. Martin, and C. Roman, “An application of DEA to measure the efficiency of Spanish airports prior to privatization”, *Journal of Air Transport Management*, 7(3), 149-157, 2001.
- [36] J. Mentzer, and B. Konrad, “An efficiency/effectiveness approach to logistics performance analysis”, *Journal of Business Logistics*, 12(1), 33-61, 1991.
- [37] J. Müller, V. Kamp, and H. Niemeier, “Can we learn from benchmarking studies of airports and where do we want to go from here?”, Paper presented at the German Aviation Research Society Workshop on Benchmarking, Wien, 2005.
- [38] J. Sandström, and J. Toivanen, “The problem of managing product development engineers: Can the balanced scorecard be an answer?”, *International Journal of Production Economics*, 78, 79-90, 2002.
- [39] J. Sarkis, “An analysis of the operational efficiency of major airports in the United States”, *Journal of Operations Management*, 18, 335-351, 2000.
- [40] J. Schmitz, and K. Platts, “Supplier performance measurement: Indications from a study in the automotive industry”, *International Journal of Production Economics*, 89, 231-243, 2004.
- [41] J. Ukko, J. Tenhunen, and H. Rantanen, “Performance measurement impacts on management and leadership: Perspectives of management and employees”, *International Journal of Production Economics*, 110, 39-51, 2007.
- [42] J. Wahler, and J. Cox, “Competitive factors and performance measurement: Applying the theory of constraints to meet customer needs”, *International Journal of Production Economics*, 37, 229-240, 1994.
- [43] K. Hafeez, Y. Zhang, and N. Malak, “Determining key capabilities of a firm using analytic hierarchy process”, *International Journal of Production Economics*, 76, 39-51, 2002.

- [44] K.-H. Lai, E. Ngai, and T. Cheng, "An empirical study of supply chain performance in transport logistics", *International Journal of Production Economics*, 87, 312-331, 2004.
- [45] M. Abbott and S. Wu, "Total factor productivity and efficiency of Australian airports", *The Australian Economic Review*, 35(3), 244-260, 2002.
- [46] M. Balle', "The Business Process Re-engineering Action Kit", Kogan Page, London, 1995.
- [47] M. Bourne, J. Mills, M. Wilcox, A. Neely, and K. Platts, "Designing, implementing and updating performance measurement systems", *International Journal of Operations and Production Management*, 20(7), 754-771, 2000.
- [48] M. Brown, "Keeping Score: Using the Right Metrics to Drive World Class Performance", Productivity Press, New York, 1996.
- [49] M. Garvens, "The airport of the future against backdrop of dramatic changes in the aviation sector. In: Delfmann, W., Baum, H., Auerbach, S., Albers, S. (Eds.)", *Strategic Management in the Aviation Industry*, Ashgate, Aldershot, 2005.
- [50] M.J. Gregory, "Integrated performance measurement: A review of current practice and emerging trends", *International Journal of Production Economics*, 30-31, 281-296, 1993.
- [51] M. Kennerley, and A. Neely, "A framework of the factors affecting the evolution of performance measurement systems", *International Journal of Operations and Production Management*, 22(11), 1222-1245, 2002.
- [52] M. Smith, and D. Smith, "Implementing strategically aligned performance measurement in small firms", *International Journal of Production Economics*, 106, 393-408, 2007.
- [53] N. Adler, and J. Berechman, "Measuring airport quality from the airlines viewpoint: An application of data envelopment analysis", *Transport Policy*, 8, 171-181, 2001.
- [54] N. Ashford, M. Stanton, and C. Moore, "Airport Operations", Wiley, New York, 1995.
- [55] P. Hill, "Tangibles, intangibles and services: A new taxonomy for the classification of output", *Canadian Journal of Economics*, 32(2), 426-446, 1999.
- [56] P. Lawson, "Performance management: An overview. In: Walters, M. (Ed.)", *The Performance Management Handbook*, Institute of Personnel & Development, London. 1-13, 1995.
- [57] P. Upham, and J. Mills, "Environmental and operational sustainability of airports: Core indicators and stakeholder communication", *Benchmarking: An International Journal*, 12(2), 166-179, 2005.
- [58] R. Doganis, A. Graham, and A. Lobbenberg, "The economic performance of European airports (No. 3). Department of Air Transport Research", Cranfield University, Bedford, UK., 1995.
- [59] R. Doganis, "Flying off Course: The Economics of International Airlines", Routledge, London, 2002.
- [60] R. Doganis, "The Airline Business in the Twenty-First Century", Routledge, London, 2001.
- [61] R. Kaplan, and D. Norton, "Linking the balanced scorecard to strategy", *California Management Review*, 39(1), 53-79, 1996b.
- [62] R. Kaplan, and D. Norton, "Putting the balanced scorecard to work", *Harvard Business Review*, 71(5), 134-147, 1993.
- [63] R. Kaplan, and D. Norton, "Strategic learning and balanced scorecard", *Strategy and Leadership*, 24(5), 18-24, 1996c.
- [64] R. Kaplan, and D. Norton, "The balanced scorecard: Measures that drive performance", *Harvard Business Review*, 70(1), 71-79, 1992.
- [65] R. Kaplan, and D. Norton, "The Balanced Scorecard: Translating Strategy into Action", Harvard Business School Press, Boston, MA, 1996a.
- [66] R. Kaplan, and D. Norton, "Transforming the balanced scorecard from performance

- measurement to strategic management: part I”, *Accounting Horizons*, 15(1), 87-104, 2001.
- [67] R. Kaplan, and D. Norton, “Using the balanced scorecard as a strategic management system”, *Harvard Business Review*, 74(1), 75-85, 1996d.
- [68] R. McIvor, “Outsourcing: Insights from the telecommunications Industry”, *Supply Chain Management: An International Journal*, 8(4), 380-394, 2003.
- [69] S. Albers, B. Koch, and C. Ruff, “Strategic alliances between airlines and airports”, *Journal of Air Transport Management*. 11(2), 49-58, 2005.
- [70] SAS, “The SAS Group’s Annual Report and Sustainability Report”, *Scandinavian Airlines*, Stockholm, 2005.
- [71] SH&E, “Study on the quality. London”: SH&E, 2002.
- [72] S. Schmidberger, L. Bals, E. Hartmann, and C. Jahns, “Ground handling services at European hub airports: Development of a performance measurement system for benchmarking”, *International Journal of Production Economics*, 117, 104-116, 2009.
- [73] T. Oum, C. Yu, and X. Fu, “A comparative analysis of productivity performance of the world’s major airports: Summary report of the ATRS global airport benchmarking research report-2002”, *Journal of Air Transport Management*, 9(5), 285-297, 2003.
- [74] TRL, “Airport performance indicators”, *Research Report, Transport Research Laboratory*, Wokingham, 2003.
- [75] T. Soames, “Ground handling liberalization”, *Journal of Air Transport Management*, 3(2), 83-94, 1997.
- [76] T. Wegelius-Lehtonen, “Performance measurement in construction logistics”, *International Journal of Production Economics*, 69, 107-116, 2001.