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Impact of Airport Ownership Forms on Passenger Terminal Construction Projects: Developing a Robust Assessment Model

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ABSTRACT
The purpose of this research paper is to develop a comprehensive assessment model to examine how different forms of airport ownership affect the design and construction of airport passenger terminals. The study emphasises the development and justification of the research framework through an extensive literature review and theoretical foundation. The significance of this research lies in the need for a thorough understanding of the relationship between airport ownership forms and the execution of passenger terminal projects. The literature review identifies gaps in existing research and underscores the necessity of a new research framework. The chosen research approach, which includes interviews and case studies, is carefully justified. The paper systematically outlines the key elements of the research framework, linking them to relevant literature and theoretical concepts. By providing a step-by-step development of the research framework, this paper lays the groundwork for future investigations in this area. The conclusion summarises the key points presented in the article and emphasises the importance of the developed research framework in guiding further research efforts.

KEYWORDS
airport; ownership; passenger terminal; construction; project management.

1. INTRODUCTION

The airport industry is becoming increasingly more complex with a diverse range of different ownership and regulatory environments and varying expectations of stakeholders [1]. Despite various crises, the long-term prospect for air travel demand remains strong. According to the ICAO (International Civil Aviation Organisation) [2], the annual growth of passenger traffic over the last 20 years has been around 4%, which means a doubling of traffic every 20 years, leading to increased demand for capacity expansion and capital investments [3]. The deregulation and liberalisation of the aviation sector in the 1990s, together with the rise of low-cost carriers, had a major impact on the dynamics and growth of air transport [4], resulting in airspace congestion that, without optimisation, will no longer be able to meet the required traffic throughput [5]. Many governments are faced with assessing whether private ownership is the solution to capacity constraints and the rising need for investment.

Investment in airport infrastructure is essential if the air transport industry is to meet future growth, particularly in passenger terminals, which airports find very challenging. Unlike airlines, which can easily and quickly manage their physical assets (e.g. aircrafts), airports require “permission for growth” and a specific timeframe for the development of adequate infrastructure [6]. Airport expansion is a systematic and often long-term process, limited by spatial and environmental factors due to different requirements such as air traffic, security, noise etc. Pressures to cut costs have also increased due to various economic, political and health crises. Just obtaining a building permit in an airport environment involves many special considerations. Given the complexities involved in planning, getting approvals and constructing new airport infrastructure, by the

time the new infrastructure is ready for use, its traffic could easily be twice what it was when the project was conceived [7].

The financing of large capital projects, such as the construction of an airport passenger terminal, has traditionally been the responsibility of state and public funds. Since this area is very capital-intensive, state stakeholders encourage private investors. The motives for ownership and institutional restructuring via privatisation are diverse, but normally include easier access to private sector financing and investment, and improved operational efficiency [8]. As a result, privatisation of airports has become a trend in the airline industry [1, 9] and many countries have developed various forms of involving the private sector in the ownership and management of airports [10].

1.1 Airport privatisation and ownership

Airports were originally built and developed as essential transportation infrastructure, owned and operated by governments, reflecting their role as vital strategic assets for national economic growth, prestige, with further implications for the local environment and economy. It was the traditional organisational model, where the main priority was to provide services in the public interest. Over time, this model began to change for several reasons and new models of ownership began to emerge [11–13]. Their business models are often complex, and the structure of their ownership is evolving [14].

The ownership paradigm shifted in the 1987, when the British government privatised their airports. The rationales for this move and early privatisations were reducing public sector inefficiencies and improving service quality [1]. This was caught up by Europe as well as many other countries, and privatisation of airports has become the worldwide trend [11]. After the 2008 financial crisis, the rationales for privatisation shifted towards emphasising financial gains for the public sector and accessing private capital for needed new investment [12]. Consequently, since then this sector has been under intense pressure to privatise and reorganise airports. As this trend is likely to continue, interest in best practices in airport design and construction projects grows. Airport privatisation gave rise to many important questions to be understood with regards to the airport ownership including: (1) Does privatisation really make airports better? (2) Is privatisation the secret recipe to airport success?

Airport privatisation of traditionally publicly-owned infrastructure is a controversial, yet increasingly important theme in government policies throughout the world [15]. There is the view that airports are a public good and should therefore be controlled by the government. There is also no guarantee that private companies will act in the public's interest and reinvest their profits back into the airport and community. Yet, many successful airports have been privatised around the world [14]. The term "privatisation" may have several meanings in different circumstances. According to the Airports Council International (ACI), privatisation is defined as participation of the private sector in the management, financing and/or ownership of airport infrastructure [16] or simply transfer of partial or full control and ownership of a state-owned organisation to private sector.

Airport privatisation is not different in its concept from privatisation of any other state-owned organisation. The different types of airport privatisation are based on the degree to which this transfer takes place [17]. Reasons for airport privatisation are diverse and include easier access to private sector financing and investment, improved operational efficiency, financial benefits and reducing the influence of the public sector [1]. Privatisation of airports involves the transfer of ownership to the private sector, usually through shares, strategic partnerships or private management contracts [18]. The terms airport ownership form and airport ownership model are also often used interchangeably, but they refer to different aspects of airport management. The ownership form refers to the legal structure of the airport, such as whether it is owned by the government or a private entity. The ownership model, on the other hand, refers to the way in which the airport is managed, such as whether it is operated by the government or a private company [14, 19–20].

There are various forms of ownership and management of airports, ranging from state to private ownership, allowing for different forms of public-private partnerships. The public-private partnership approach, the most common form of privatisation [16], with the state retaining ownership became a popular means of risk distribution between the private operator and the state. This included the need for fresh capital for investments through the sale of public-owned airports or by granting airport concessions where the private operator pays a concession fee to the contracting authority and collects various charges from users to recover its costs and obtain a reasonable return on investment [17]. According to Deloitte and the International Air Transport

Association (IATA), in order to preserve the public service element of airports, the government should incorporate some controls in the concession agreement to make sure that the private owner does not treat the airport as a money-making machine [19–20]. However, concession agreements are complex, and experiences over the years have shown that achieving favourable outcomes for the state, operator and users is an exceptionally challenging task [21, 22].

The ACI Europe report [23] shows that over 40% of Europe's airports have at least some private shareholders. If governments cannot afford to invest, other sources must be tapped to accommodate traffic growth. This has been a driving force behind airport privatisations. According to Sadler [24], the number of private investors interested in European airports is growing every year. This change is attributed to thoughtful political decisions, limited state budgets, and the need to support connectivity by investing in airport infrastructure development. The report also concludes that private shareholders have a stronger footing at larger airports which is reflected in the fact that smaller regional airports tend to be structurally unprofitable. While in Europe, many airports have been fully or partially privatised, in the USA, almost all of them are under governmental control [14, 17]. The USA has not privatised its airports because of strong federal government incentives to remain publicly owned and operated, which do not exist in most other countries [11].

As outlined in IATA's position paper on airport privatisation [25], the private sector can play an important role in bringing expertise and cost efficiencies at airports. However, the outcomes often have been disappointing and privatising should not be viewed simply as a short-term revenue raising option for governments. It must be seen as part of a long-term vision for economic development and potential financing gaps related to infrastructure projects. Among potential risks to be addressed during airport privatisation are also under-investment when there is a push from shareholders to extract profits from existing assets, while negatively impacting service quality at the expense of the airport customers [26]. To provide guidance to successfully balancing the interests of all stakeholders impacted by airport privatisation, IATA published a guidance booklet on developing balanced concessions [19]. Together with a guidance manual which highlights opportunities to better decision making when government address changes in airport ownership and financing airport infrastructure [20]. Namely, governments often fail to explore options besides privatisation to which the private sector can contribute and/or ignore best practices, despite huge investments in airport infrastructure [27].

Many airports have been privatised to some extent, from the use of contracted agents to service and maintain terminals, through to the whole of airport operations and administration with sale and long-term lease arrangements. According to Oum et al. [8], airport ownership forms can be classified into: (1) government agency or department operating an airport directly; (2) mixed private–government ownership with a private majority; (3) mixed government–private ownership with a government majority; (4) government ownership but contracted out to a management authority under a long-term lease; (5) multi-level governments form an authority to own/operate one or more airports in the region and (6) 100% government corporation ownership. Gillen similarly states [14] seven different variations of ownership forms, including independent not-for-profit corporations (present in Canada) while Koyucak et al. [28] categorises them into three primary ownership forms: (1) public ownership and management; (2) Public–private partnership and (3) Private ownership and management. This classification also matches the framework by ACI [23] with slightly different terminological expressions: (1) Fully public ownership; (2) Mixed public–private ownership and (3) Fully private ownership. Zaydi [17] also cites three levels of privatisation based on the degree to which this transfer of control takes place: the first (1) is contracting out of airport services through tendering and outsourcing in which this transfer is minimum; the second (2) is airport concession and lease agreements which has a greater degree of this transfer and the third (3) is the complete divestiture of ownership by the state to transfer full control and ownership to the private sector.

Although airport privatisation comes in many different forms, they can be considered variations of the three main types used for research purposes: fully public ownership, mixed–public–private ownership and fully private ownership. The different approaches to airport privatisation are shown in *Table 1*, as a compilation based on a literature review and synthesis by many authors [8, 10, 28–29].

Table 1 – Airport Ownership and Management Forms

Fully public ownership / Public ownership and management	**Mixed public-private ownership / Public–private partnership**	**Fully private ownership / Private ownership and management**
— Central public ownership and management — Public ownership and public corporatisation — Regional or local public ownership and management	— Share flotation / Trade sell — Concession agreements — Build-operate-transfer (BOT) model and variations thereof) — Management contract	— Complete divesture of airport ownership by: – Trade sale / lease – Initial Public Offering (IPO) — Private sale or lease

In connection with airport ownership, there is a prevailing belief that the state is less efficient than a private owner. However, there are no definitive empirical results confirming or refuting this claim [17]. Researchers are not unanimous regarding the impact of ownership on airport operations or how different factors differ and what the best privatisation practices are [10–12]. It is an interesting dilemma, as state-owned enterprises are not only expected to pursue profit maximisation but also have other objectives, such as promoting the public interest. Similarly, it can be expected that the private owner of the airport will be primarily focused on maximising profits [21–22, 24]. International main airports represent critical infrastructure that, regardless of the ownership form, must provide services to the state, the economy, civil society and the population. Understanding the advantages and disadvantages of different airport ownership models is crucial for stakeholders involved in airport development and management. The following *Table 2* presents an overview of the pros and cons associated with various airport ownership models.

Table 2 – Pros and cons associated with various airport ownership models

	PROS	**CONS**
Fully public ownership / Public ownership and management	— Emphasis on public service — Lower costs for customers — Greater transparency and accountability	— Limited access to capital — Slower decision-making due to bureaucracy — Risk of political interference
Mixed public-private ownership / Public–private partnership	— Combines efficiency of private sector with public supervision — Shared investment reduces financial burden on public sector — Potential for innovative solutions and management practices	— Complex contracts and negotiations — Risk of conflicting objectives among partners — Possible disputes over revenue and management
Fully private ownership / Private ownership and management	— Increased efficiency due to profit motives — Access to private capital for development — Faster decision-making processes	— Profit focus may neglect public interest — Increased charges for airlines and passengers — Risk of monopolistic practices

In a global review of airports, an interesting finding is uncovered, contrary to the general public assumption: the most successful and multi-awarded airports[1] are not exclusively privately owned, and not all publicly managed airports show deficiencies in terms of condition and operations [17, 23, 25, 28]. The debate between the merits and pitfalls of private airport ownership will probably continue as airport privatisation will always be a controversial and emotive issue [29]. In the theory, the ownership of a business in a capitalist economy is irrelevant, however, in practice, it is often controversial [30]. Therefore, an important element in understanding airport privatisation is to understand what sort of relationship there is, if any, between airport passenger terminal construction projects and the type of airport ownership forms.

1.2 Airport passenger terminal design and construction projects

According to Nasseri [31–32], challenges and difficulties of managing construction projects increase when the context is related to an airport environment. Among the different types of construction sectors and their numerous types of construction works, airport projects, in particular, are very complex and have unique

[1] ACI World's annual ASQ (Airport Service Quality) Awards honour global airport excellence, based on Airport Surveys, with over 400 participating airports across 109 countries (https://aci.aero/programs-and-services/asq/).

characteristics. The design and construction of airport passenger terminal are extremely complex and financially demanding projects, which, according to many authors, including Flyvbjerg, Rothengatter, Shenhar et al. and Gschosser et al. [33–36], fall into the category of so-called 'mega-projects.' In the execution of such projects, ownership, as argued by these authors, can be a previously unexplored and unexplained variable in the literature that may influence the success of such projects.

Deregulation and liberalisation of the aviation sector and the emergence of low-cost carriers have significantly impacted the design and construction of airport passenger terminals, as demonstrated by research by Sabar and Perez [38–38]. A similar design impact is likely to be seen due to the Covid-19 pandemic, as concluded by Štimac et al. [39]. According to IATA's Airport Development Reference Manual [40], airport passenger terminal needs to be functionally and operationally efficient and resilient, commercially viable, offer passengers as effortless a travel experience whilst minimising their impact on the environment.

In the airport passenger terminal design, as noted by many authors [40–47], it is necessary to thoroughly address many areas such as: traffic forecasts, terminal capacities and service quality, passenger flow planning, terminal management systems, access system, design of controlled airport areas, supporting infrastructure etc. For the airport passenger terminal construction projects, the following characteristics apply: large investment costs, long time frame (several years), difficulty/complexity of implementation, uncertainty and high risks, large amounts of resources, many stakeholders, technological and logistical complexity, an exposed security aspect, involvement of public entities, environmental aspect, impacts on the community, socio-political impacts, changing environment, many technological challenges and great public attention. Different approaches can be observed in the literature, however airport terminal capacity planning must above all meet the conditions of compatibility and flexibility as well as extensibility and modularity [41, 42]. In this context, simulation models can also be very useful for analysing passenger terminal capacity [43].

Today's Airport Passenger Terminals are significantly different from those planned and built a decade or more ago. The biggest difference is due to technological progress facilitated by modern information technology [44] and that flexibility is a key driver of any successful design, especially in highly unpredictable environments such as airport terminals [46]. The emergence of the Covid-19 pandemic has only accelerated this process. The development is moving towards smart airports, where passengers have more control over their journey. Airport infrastructure and passenger terminals are part of this evolution. It is also important to understand that the development does not end with the construction of the airport passenger terminal, which is a living thing. The airport management must change or upgrade the various airport facilities during the airport passenger terminal lifetime. It is believed that the form of airport ownership, whether public or private, can play an important role in this decision.

2. LITERATURE REVIEW AND FRAMEWORK JUSTIFICATION

A review of a number of journal articles on airports, ownership, airport planning and construction projects revealed that many authors dealt with airport ownership, but most focused on various topics such as business, operational, socio-social and human aspects. The way public ownership thinks and the way private ownership thinks are different. Certain expectations are held for state-owned organisations, while different expectations apply to privately-owned entities. Bruijne examined the impact of ownership on airport security and found only minor differences in the effectiveness of security measures based on airport ownership [48]. Research by Cahill et al., Oum et al. and Vogel [8, 49–50] confirmed positive effects of airport privatisation on financial and operational efficiency, suggesting that airports with private capital involvement tend to be more successful or competitive. Howell et al.'s [11] main finding is that the type of ownership matters and that the improvements are concentrated when there is a competing airport nearby and under longer-term leases. Airport ownership and financing of the airports in the UK were examined in the study of Budd and Isson. According to the results [51], the trend of full private airport ownership has changed as local authorities have started to invest more in airports in partnership with private consortia.

Many economists claim that private airport ownership would provide a better set of incentives for viable long-term efficiency in the industry. Regardless of all its potential benefits, privatisation also involves risks such as cutting costs too much and leading to inadequate investment [52]. Many airport privatisations were not that successful. While some authors, such as, Ballart and Guell, conclude that public ownership of airports has been assessed as obsolete [53], others, such as Aulich and Hughesm, dispute this [54]. They have focused on the performance of Australian airports after their privatisation. Based on the results, private airports were assessed as risky. A similar conclusion was presented by Donnet et al. [55], claiming that governments seek

private funding for airport development to achieve regional planning goals, but risk losing the ability to actively coordinate future airport development to fit regional economic development plans. According to the Vasigh et al. study [56], involvement of the private sector in airport ownership structure does not always bring positive economic results and the transfer of ownership from public to private may not guarantee higher airport productivity and efficiency.

Privatisation is not a panacea for airports that are currently operating at a loss. Private ownership may find it difficult to run airports in crisis situations as can be seen from the case studies of Cardiff Airport in Wales and Glasgow Airport in Scotland, where private owner could not manage the airport in the face of economic crisis [17]. The airport in Bratislava, the largest international airport in the Slovak Republic, has also experienced unsuccessful privatisation due to political influences and the absence of strategies [13, 22]. Some authors expressed concerns about public–private partnerships, citing increased prices and additional fees in pursuit of greater profit [21], the others [57], challenges in meeting concession commitments concerning the project scope.

When privatising their airports, governments often made decisions based on the needs of the regional economy; some have been positive in delivering improved business relations and airport efficiency [9], while others have noted a range of unrealistic expectations and failures [51, 58]. Gerber concludes in his research that the privatisation of airports is only successful if the state provides an adequate regulatory framework before privatisation [9]. In accordance with this, IATA and Deloitte published a booklet as a support and guidance for the decision-making in delivering win-win outcomes for successful airport concessions [19]. Furthermore, some authors, such as de Neufville and Odoni [3] argue that complete airport privatisation is unacceptable, as public interest needs protection. However, the same authors emphasise that planning an airport as a 'national monument' often conflicts with cost-effectiveness and that a balance is needed. Manataki and Zografos concluded in their research [59] that there is no single model capturing all the complexity of terminal process planning.

Despite the numerous journal articles on airports, there is a lack of literature examining airport design and construction projects from an airport ownership perspective. Alnasseri [31–32] was one of the few who researched airport construction projects, however he focused more on HR strategies of airport construction project management and not on the design and construction of airport passenger terminals. The influence of ownership on the design and construction of airport passenger terminal projects, the subject of our research, has not been explored yet and could be crucial for future operations and the development of main airports, which, in Europe, fall under European critical infrastructure of national importance. That is why many developed EU countries have not privatised their critical infrastructure, such as main country airports, which mostly remain in state ownership. For instance, in Germany, France and Turkey [1; 23; 60], focusing just on airport operators present at airports in Central, Eastern and South Eastern Europe countries (CESEE[2]) where increased privatisation activity in recent years happened and where our future research and case studies will be focused. For example, former Yugoslavia commercial airports are handling over 30 million passengers annually.

In main airports of the CESEE countries, also as a result of privatisation, significant infrastructure development has occurred during the last 15 years, in various ownership forms, with infrastructure investments exceeding 1.5 billion euros, which requires in-depth research. According to Maharramov [14], the main driver and cause of privatisation is the need for investment, more than the need for efficiency. It may also be questioned why and how developed Western EU countries and some others successfully manage publicly-owned airports, whereas this is not the case elsewhere. The research aims to expand and upgrade the previous work of the mentioned authors with a study that could contribute to a better understanding of this field. The focus will be on CESEE countries, examining how changes in airport ownership relate to airport infrastructure development.

[2] CESEE – Central, Eastern and South Eastern Europe countries according to IMF (International Monetary Fund) refers to Albania, Belarus, Bosnia and Herzegovina, Bulgaria, Croatia, Czech Republic, Estonia, Hungary, Kosovo, Latvia, Lithuania, Macedonia, Moldova, Montenegro, Poland, Romania, Russia, Serbia, Slovak Republic, Slovenia, Turkey, and Ukraine.

3. RESEARCH FRAMEWORK

Many studies have shown that the structure of the airport industry is increasingly complex and very diverse and that every ownership structure has its cons and pros [17, 32, 35]. Factors contributing to project success will be identified and examined, exploring how these differ among various ownership forms. To achieve this, the focus will be on the conceptual and decision-making process, project planning, stakeholder involvement, project organisation, investment-procurement process, change management, risk management, operational readiness and project closure. Based on the literature review, it can be concluded that most of the published scientific papers have focused on airport ownership related to different topics and no study has focused especially on the regional airports in CESEE countries, which have similar political histories and social and economic backgrounds [61-62].

Thus, the research will focus on ownership forms and infrastructure development at comparable international regional airports in the CESEE countries with annual passenger traffic up to 5 million passengers, which are, according to the ACI [63] classified into the 4th group of comparable airports. The approaches on the selected (main) airports in the CESEE region will be compared, interesting due to their infrastructure development in recent years, under different ownership forms. Given that Europe has almost 70% of international airports with less than 3 million passenger traffic [64], this means that the representatives of the most represented airports in Europe will be researched. Over the past 30 years the economies of the CESEE countries have undergone a significant transformation. In most cases, this process has been accompanied by profound political changes in the early 90s. Before the political transition, the air transport markets of these countries had a lot in common, Janić noted [65]. Their airport infrastructure consisted mainly of one central airport located near or in very close proximity of the state capital. Other airports, if there were any, provided services of the armed forces or combined commercial and military traffic. The war and disintegration of former Yugoslavia in early 90s broke down also the air transport system at that time [66]. However, according to the Augustyinak research, in the years since, all these countries relatively quickly adopted liberalised air transport policies [52]. After the liberalisation of air transport, the emergence of low-cost airlines was the main driver of changes that broke the monopoly of national carriers of those countries. Consequently, many airports in the CESEE region have experienced operational bottlenecks which have been addressed in various ways, including optimisation airlines share models from an airport capacity perspective, researched by Štimac [67]. Namely, according to Hamilton [68], the population size, economic development and economic performance of a country in the period of economic transition are internal factors that affect the size of air traffic volume. The external factors are, inter alia, the openness of the economy and its ability to attract investment and tourism. Over time, the growth of passenger traffic, as well as various specific reasons in each country, led to both, privatisation and investments in infrastructure in many airports in the CESEE countries.

The main aim of the present work is to develop a research model to compare the airport terminal construction projects in selected CESEE countries. Interest lies in identifying best practices for the design and construction of airport passenger terminal projects across various airport ownership forms. This would provide a better understanding for decision-makers of how ownership forms can impact the development of main country airports, which are defined as critical infrastructure objects of national importance. Based on the findings, the following research questions were formulated:

- How does ownership affect the design and construction of airport passenger terminal projects, and what are the key challenges associated with different airport ownership forms?
- What are the key factors influencing passenger terminal design and technology scope planning and how do these factors differ between different airport ownership forms?
- How do different airport ownership forms influence stakeholder involvement in the design and construction of airport passenger terminal projects?
- How the ownership of the airport affects the project organisation and the investment procurement process and how these aspects affect the project results?
- What is the effect of airport ownership on change management and project completion and are there any differences in risk management and operational readiness between different forms of airport ownership?

Answers to these questions, obtained through a combination of empirical research methods, will reveal very interesting details and would provide a better understanding of the impact of various ownership forms on the design and construction of airport passenger terminals. In previous research by many authors [1, 9, 15, 18, 21–22, 32], it has been found that different airport ownership forms prioritise various factors. For instance, in the case of a private ownership form, this may be business performance or operational efficiency, while in the case

of a state-public ownership form, it could be the enforcement of public interest. Based on this, the main research thesis was formulated, which is intended to be verified: Airport Passenger Terminal Design and Construction Projects very much depend on the airport's ownership form. With certain expectations from state-owned organisations and others from privately-owned entities, there is a general assumption that in the design and construction of such projects, private sector participation models are more successful than fully private ownership and that state-public ownership is considered the least successful in these projects. Therefore, the research will focus on areas where significant differences between different ownership forms may exist, namely:

1) Airport Terminal Design:
   - Project pre-design (concept design, decision (approval) process).
   - Project design (detailed design, stakeholders involvement).
2) Airport Terminal Construction:
   - Project construction (Project organisation and coordination, investment process).
   - Project supervision and controlling (Change management, risk management).
   - Project completion (Project closure, Operational Readiness and Airport Transfer (ORAT[3]).

In this process, analysis will be conducted on as many documentary sources, data, available project documentation and online sources as possible. In the second, empirical part, the hypothesis will be tested using a combination of qualitative research methods, such as semi-structured interviews with key stakeholders, and quantitative research methods, like a questionnaire with individual invitations for a closed population. This will be supported by case studies, visits to individual airports and on-site observations, with the aim of obtaining as much relevant data as possible.

The independent variable is the airport's ownership. The dependent variables are the various aspects of airport terminal design. The construction can be influenced by airport ownership and include the conceptual and decision-making process, stakeholder involvement and collaboration in the planning and design process, the ambition of architectural and technological design, project construction management strategies and techniques, project financing sources, procurement process, techniques used for change control, project risk management, strategies for operational readiness and airport transfer and the economic and timely completion of the project. Through qualitative analysis, the relationship between airport ownership and these dependent variables will be explored to understand how ownership impacts various aspects of airport terminal design and construction potentially revealing patterns of project design and construction influences such as prioritising financial sustainability, stakeholder interests or political goals. Concerning airport terminal design, factors such as project scope, budget and timeline will be carefully examined. Regarding stakeholder involvement, patterns such as the level of community consultation and how these relationships impact project outcomes could be identified. Regarding the ambition of the design, factors in decision-making about architectural design, prioritising functionality, aesthetic appeal and technological innovations will be analysed. Exploration will also encompass whether certain construction features are prioritised, including decisions regarding public procurement and collaboration with stakeholders. Finally, through qualitative analysis, examination into how ownership affects activation techniques and airport operational readiness and transfer, including testing and activities for project completion, could be undertaken.

The previously stated assumptions are based on literature research, supported by many case study examples. According to literature [3, 41, 45], airport passenger terminal design involves unique challenges that require consideration of operational, security and environmental factors. Well-planned airport passenger terminal enhances the passenger experience, improves operational efficiency and enhances safety, while poorly planned airport passenger terminal can result in operational bottlenecks, delays, safety risks and high operational costs. The quality of the decision-making process can significantly influence the implementation of the decision and the ambition of the design, which is also confirmed by the author's personal experience [69]. Construction of an airport passenger terminal is a complex process that requires a high level of coordination and collaboration, and a successful opening of a new airport passenger terminal very much depends on Operational Readiness and Airport Transfer (ORAT) planned activities, as confirmed in the literature [70–72]. There are many challenges such as issues with the Baggage Handling Systems (e.g. at Denver and London Heathrow airports), software errors (e.g. at Milan Malpensa and Hong Kong airports) resulting in project delivery delays, as well as other factors. For example, Berlin Airport opened more than 10 years behind schedule due to political

[3] ORAT (Operational Readiness and Airport Transfer) is a complex process that ensures a new or upgraded airport facility is fully prepared for safe and efficient operations.

influences and inadequate project planning [73–74]. OECD cites: inadequate preparation and implementation of public tenders, inadequate change management and poor internal communication [75].

4. RESEARCH METHODOLOGY

4.1 Data collection

Given the complexity of this research area, various data sources will be utilised to gain a more comprehensive insight. In this endeavour, consideration will be given to literature recommendations from multiple authors regarding the planning and execution of qualitative and quantitative research, based on interviews which are a method of data collection that involves direct, face-to-face or virtual interaction between the interviewer and the participant [76–80]. The aim is to explore the participants' perspectives, experiences and insights in depth. Interviews are particularly useful for gaining a detailed understanding of complex issues, behaviours and motivations that are not easily captured through quantitative methods. Semi-structured interviews will be conducted based on a carefully prepared list of questions. Semi-structured interviews are a qualitative data collection method that blend elements of structured and unstructured interviews, allowing for a flexible, yet guided exploration of research topics. They can be more or less structured, depending on the interviewee and the topic to be explored. The researcher will have some overarching ideas about what they would like to find out and they will use an interview schedule to guide the direction of the discussion. However, they also have the freedom to rephrase or skip a question, formulate a new questions, follow up on emerging leads and probe for more detail from a respondent [76]. For example "Can you tell me about a time when you had to overcome a significant project challenge" or " Can you explain what do you mean by…" etc.

Interviews will be carried out with airport project managers end airport executives involved in the design and construction of airport passenger terminals or key stakeholders. Primary open-ended questions will be prepared in advance, and additional questions will be formulated on the spot during the interview based on a predefined reminder list of questions. Before conducting the qualitative research, the questionnaire was professionally evaluated and tested in content and form according to recommendations from the literature [76-80]. For this purpose, a pilot interview was conducted with a selected airport project manager involved in the design and construction of an airport passenger terminal at an airport which will not be included in the final research. The findings were considered in shaping the final version of the questionnaire to be used in the study.

When possible, interviews will be conducted face to face. Before the interview, participants will receive a research information letter with a description of the interview process and informed consent form. This ensures they understand the research, their rights and the confidentiality measures protecting their identities and data, as a key tool in ensuring the ethical suitability of the research. All interviews will be recorded. Responses to open-ended questions will be reviewed, transcribed and processed using qualitative text analysis based on coding. To analyse qualitative data, the qualitative data analysis software tool (QDA[4]) will be employed. This tool enables statistical text analysis through coding, the creation of text patterns and the discovery of connections between related concepts. Selected statements will be utilised in the discussion section to better illustrate the research.

A questionnaire will also be used to collect data. The purpose of collecting data through a questionnaire, with individual invitations for a closed population, is to gather as much relevant information and data about the design and construction of airport passenger terminal projects. These will be systematically analysed by cross-verifying multiple sources and closely examining all information to identify recurring and distinctive features of our research themes such as trends, patterns and relationships within the data. Combined-type questions, including open-ended ones, to encourage detailed responses and gather rich qualitative data, particularly on the characteristics of each airport's ownership form and airport passenger terminal design, will be used. Closed questions, designed to anticipate answers in the form of numerical data, will pertain to basic airport data and technical characteristics of airport passenger terminals.

A combination of qualitative and quantitative research approaches, known as triangulation, will be employed. This method enhances the validity of the research by enabling qualitative and quantitative data to either confirm or challenge each other [81]. By utilising various sources of evidence, we aim to examine and explain contemporary phenomena within their real-life context. Practically speaking, almost every qualitative study is a case study, which in its most basic sense involves observing events in their natural course and

[4] QDA – Qualitative Data Analysis Software which enables statistical text analysis.

systematically reporting on them [82]. By integrating these different approaches, cross-verification of findings can be achieved, biases can be minimised and a more comprehensive understanding of the research problem can be provided. The key features of the planned research methods are presented in *Table 3*.

Table 3 – Key features of the intended research methods

RESEARCH METHODS	
Methodological approach	Qualitative and quantitative research approach.
DATA COLLECTION	
Primary data	Semi-structured interview with key stakeholders, selected project managers of projects. Individual invitation questionnaire for a closed population using combined type questions. Observation and comparative case studies.
Secondary data	Academic textbooks, documentary materials, e-books, professional articles, annual reports…
INTERVIEW	
A selected sampling of	10 comparable regional airports in Central Eastern and South-eastern Europe (CESEE). With passenger traffic between 1 and 5 million passengers, with different ownership forms.
The length of the interview	60–90 minutes.
Interview method	Semi-structured interview.
Location of the interview	Fieldwork at the location of the selected airports. Video conference tools will only be used in exceptional cases.
Method of interviewing	1–3 Project Managers (PMs) and Airport Executives at the selected airport / airport operator.
QUESTIONNAIRE	
	Questionnaire in electronic form with individual invitations for the closed population. Questions of the combined type (open and closed questions).
CONTENT	
Target information	(1) Airport Passenger Terminal Design Project & Management. (2) Airport Passenger Terminal Construction Project & Management.

4.2 Proposed research model

The proposed research model is shown in *Figure 1*. The interconnections between different categories are grounded in an extensive review of literature and numerous case studies [17–18, 28–32, 50–57]. Additionally, these interconnections are based on personal insights gained from implementing similar projects, providing a robust foundation for the model. The proposed research model is built on the following assumptions:

— PROJECT PRE-DESIGN. Airports in private ownership tend to focus more on the business aspect when deciding on the implementation of passenger terminal projects, while those in state-public ownership may prioritise public interest. State-owned airports often have a more bureaucratic decision-making process, while privately-owned airports may be more focused on financial goals.

— PROJECT DESIGN. State owned airports usually have less ambitious plans due to budget constraints and political considerations, with more structured and formal collaboration with all stakeholders. On the other hand, they also have access to various sources of funding in the form of grants. Private-owned airports, although having more financial resources, are more focused on business results and may be less interested in collaborating with all stakeholders. Private sector participation forms (such as concession or lease agreements) can bring private sector expertise and more stable financing.

— PROJECT CONSTRUCTION. The (public) procurement process at state airports is complex and lengthy due to strict regulations and guidelines. Selection based on the lowest bid can impact the quality of execution. Private sector participation forms have less regulated and monitored processes, allowing for greater flexibility and efficiency. The private ownership form has more freedom in choosing contractors and qualified suppliers.

— PROJECT SUPERVISION AND CONTROLLING. The ownership form can influence how risks are recognised, assessed and managed. State-owned airports focus more on compliance with regulations and laws, while private airports emphasise the financial aspect. The decision-making process for changes in the project in a state-public ownership form may involve multiple government levels, leading to slower and more complex processes. Private sector participation forms have a more effective risk analysis and change control due to greater decision-making autonomy.

— PROJECT COMPLETION. During project closure and Operational Readiness and Airport Transfer (ORAT), state airports have greater public oversight, which can impact costs and delays. Private airports have less public oversight but may have more control to reduce risks affecting financial performance. Private sector participation forms and private ownership airports are more agile, potentially making the ORAT process more efficient.

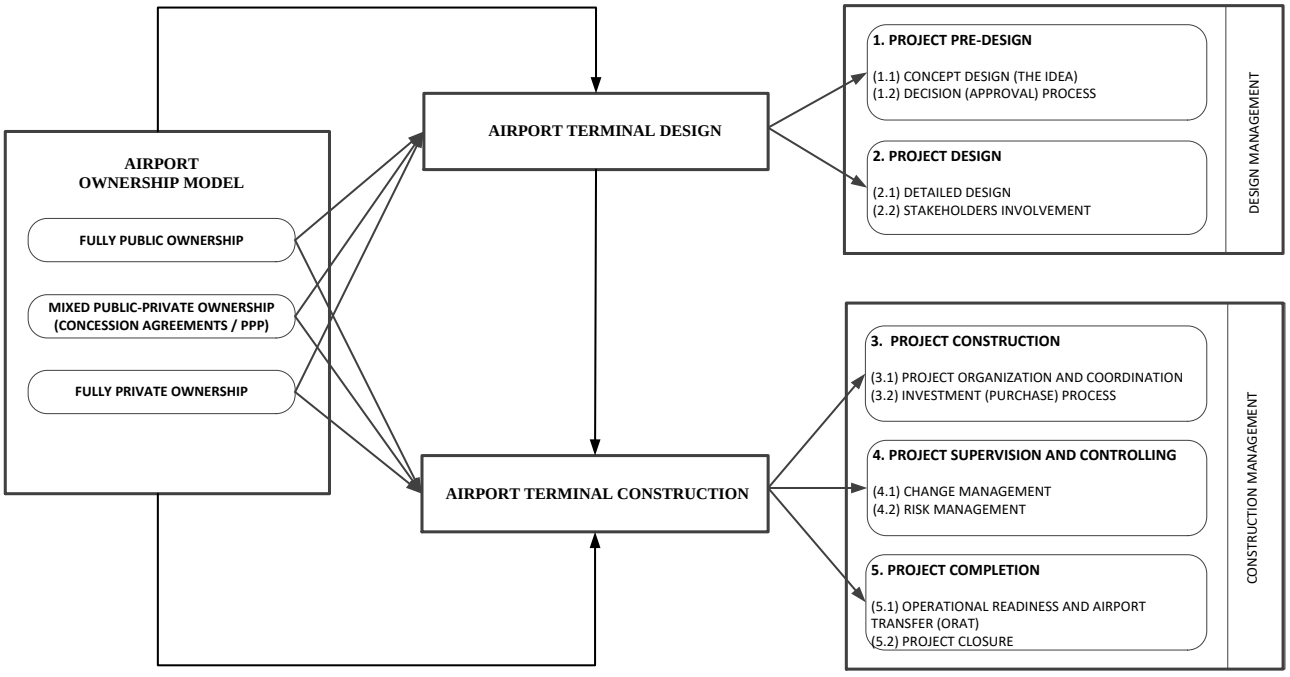

Figure 1 – Proposed research model

A thorough analysis and examination of responses will bring a complex and practical overview of the situation. The findings could serve as a basis for identifying the best possible practices for design and construction of airport passenger terminal projects in various airport ownership forms. The research process is shown in *Figure 2* while the research theoretical background for each individual scope is shown in *Table 4*.

Table 4 – Research theoretical background

	RESEARCH SCOPE	THEORETICAL BACKGROUND
PROJECT PRE-DESIGN	Concept Design Decision (Approval) process	The conceptual design process refers to conceptual solutions intended for the development of variants for the purpose of presenting ideas or solutions and serves as the basis for the development of a concept design [40, 45]. The decision-making and approval process are a systematic gathering and organising of knowledge during the conception of a project. A well-executed decision-making process can significantly influence the implementation of decisions and the ambition of the project's design [69].
PROJECT DESIGN	Detailed design Stakeholders involvement	Project planning, based on clearly defined goals, is crucial for its successful and efficient implementation. Where airports are owned and operated by the state, planning ambitions may be more limited by the availability of funds. Design and construction of an airport terminal as a "national monument" is often in conflict with economic efficiency [3]. On the other hand, when airports are privately owned, the planning can be more ambitious, as the private operator may have more financial resources to invest in the project [7, 16, 27]. It is essential to engage all stakeholders in the earliest phase of the project [84]. An agreement between the stakeholders is necessary regarding the implementation of individual project phases. It is an exceedingly demanding and complex process.
PROJECT CONSTRUCTION	Project organisation and coordination Investment (Purchase) process	The implementation of the project represents the most extensive phase of the project where the most people participate and the most resources are used. In the execution of airport construction project activities, there are different approaches to project organisation and coordination, depending on ownership [32]. In the investment process, the interest is in the procurement, which is used to identify the requirements of users or investors. These processes involve: conducting tenders, obtaining bids, selecting providers and monitoring contracts. In this case, the ownership of the airport can affect both the implementation timeline and the amount of investment [69].
PROJECT SUPERVISION AND CONTROLLING	Change management Risk management	Project implementation must be continuously monitored. With control processes, preventive measures for possible expected issues are identified. Controlling the project includes monitoring the implementation, comparing the situation with the plan, identifying deviations and planning and implementing corrective measures to ensure that the project will be carried out within the framework of the set goals. This involves coordinating participants, leading group members and overseeing the execution. Change management refers to the ongoing identification of possible deviations from the plan and involves managing changes throughout the duration of the project [83–84]. Risks need to be identified and thoroughly analysed already in the airport passenger terminal design phase. The project risk management process is divided into [83]: risk identification, risk evaluation, risk mitigation measures planning and risk control. Based on the risks identified in the airport terminal design phase, it is necessary to continuously monitor and manage them during airport passenger construction project.
PROJECT COMPLETION	Operational Readiness and Airport Transfer (ORAT) Project closure	Operational Readiness and Airport Transfer refers to the smooth operation of critical systems that could jeopardise the seamless start-up of the terminal and trained operational personnel [70]. Good and early preparation is crucial, involving all stakeholders from the very beginning [85, 86]. Project closure refers to the final confirmation of the project and the documentation process. In the closing processes, all contractual obligations are finalised. The project is completed when the client confirms the adequacy of the results with acceptance, and the project team prepares the final project report.

4.3 Research process

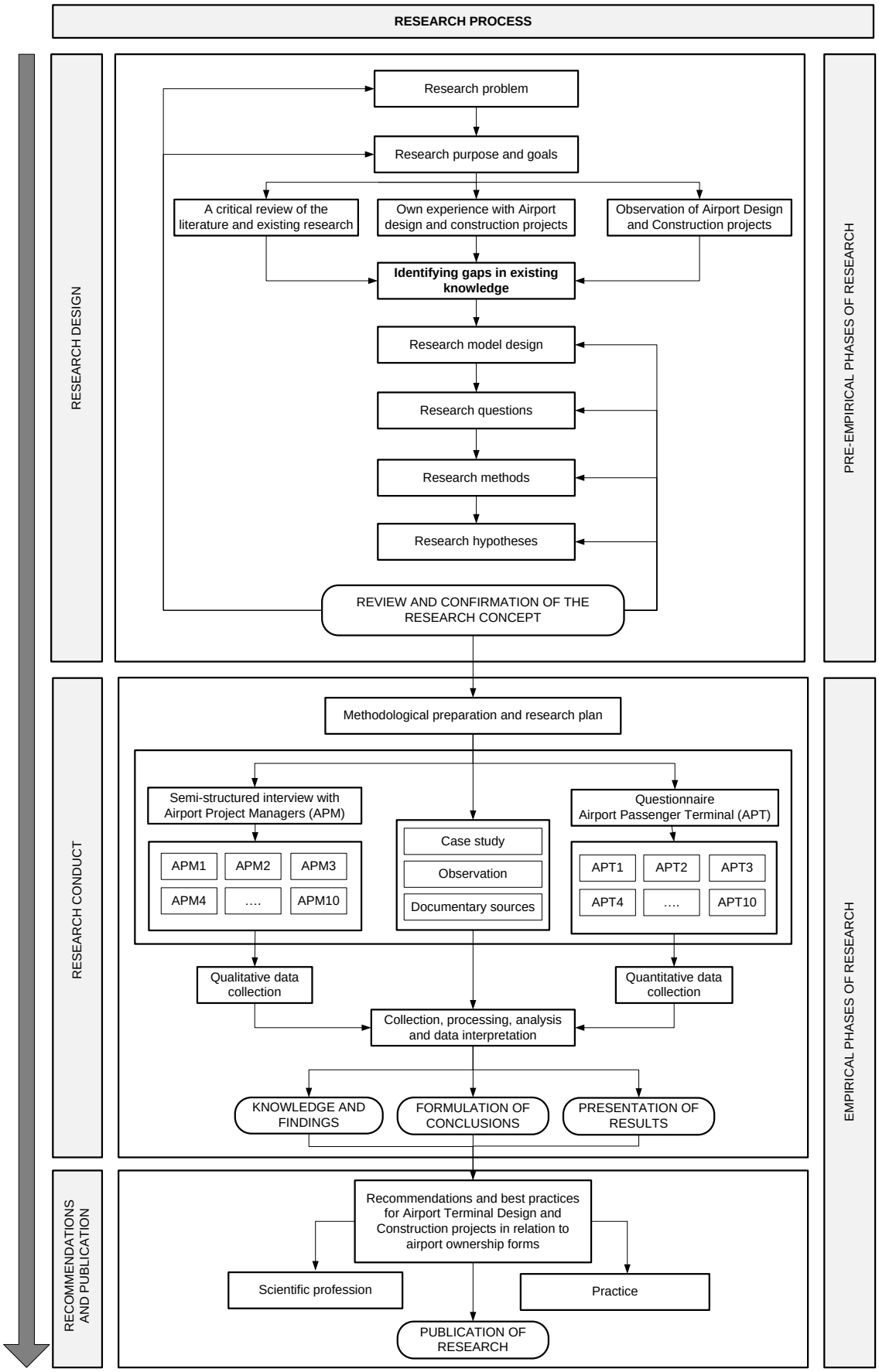

Figure 2 – Research process

It is assumed that the described methodological approach is suitable for recognising the impacts of ownership forms on the airport passenger terminal design and construction projects. The use of the proposed research methods will aid in drawing conclusions, based on which the best practices proposals for the design and construction of airport passenger terminal projects in relation to the airport ownership form will be formulated.

5. RESULTS ANTICIPATION AND DISCUSSION

This framework outlines a future research process aimed at fostering original scientific contributions in both theoretical and empirical dimensions. It is designed to anticipate new, evidence-based insights and advance scientific knowledge forward in theoretical understanding and empirical evidence in the research field. Moreover, it seeks to enrich the existing literature and stimulate further research in the domain.

The first contribution will be in the in-depth review and synthesis of existing literature, scientific articles and research related to airport ownership and infrastructure development. A critical assessment of previous scientific contributions will be provided, identifying gaps in existing literature, contributing to clarification and better understanding of the field.

The second contribution involves examining the effects of ownership on airport infrastructure development, specifically on the design and construction of airport passenger terminal projects. Knowledge in the area of airport privatisation and its impact has been growing in recent years, but it is still limited to specific areas and with restricted empirical verification. The scientific challenge is to acquire new knowledge, insights and findings regarding the impact of different ownership forms on the development of airport infrastructure and passenger terminals, adding value to existing knowledge. In the review of literature on such research to date, no similar findings were encountered, marking a significant advancement in the field of science.

The third part refers to the findings of connections between ownership forms and airport infrastructure development. The research findings can be valuable in terms of recommendations and best practices and practical solutions for design and construction of airport passenger terminal projects in connection with the airport ownership form in airport industry practice. Within the framework of the research embedded in a broader regional (CESEE) context, the aim is to integrate basic, already researched elements into a new whole that has not been explored as such. A potential contribution to the development of science is a better understanding of the impact of ownership forms on airport critical infrastructure of national importance for decision-makers. In this context, it also applies to other areas of critical infrastructure.

6. CONCLUSION

A review of research on airport infrastructure development, specifically the design and construction of airport passenger terminals, has shown its current importance. However, this area is severely underexplored concerning the impact of different airport ownership forms. Previous research on the effects of ownership on airports has mostly focused on different thematic areas. Researchers are also not unanimous regarding the influence of ownership forms or how various factors differ, and what constitutes the best privatisation practices. The impact of the field of different ownership forms on the design and the construction of airport passenger terminal projects, which will be the subject of our research, has not been investigated yet. The ownership form is considered an original and unexplained variable that may influence the success of the design and construction of airport passenger terminals.

The originality of the proposed research lies in understanding the complexity of the infrastructure development of main state airports through the analysis of various factors influencing such development in connection with different ownership forms. In the context of research embedded in the broader regional context, the goal is to integrate basic, already researched elements into a new whole that has not been explored in scientific research literature.

The results and conclusions can provide information for the creation of new strategies for the future development or the revaluation of current strategies within the national policies of individual counties. The research can be crucial for the development of main state airports in smaller countries, which fall under critical infrastructure of national importance and will be valuable both in the CESEE countries and beyond. In the coming years, it will be of significant interest to observe emerging trends in airport ownership and their infrastructural development.

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Robert Rauch, Igor Vrečko, Damijan Mumel

Vpliv oblik lastništva letališč na projekte gradnje potniških terminalov: razvoj robustnega ocenjevalnega modela

Povzetek

Namen tega raziskovalnega članka je razviti celovit ocenjevalni model da bi preučili, kako različne oblike lastništva letališč vplivajo na načrtovanje in gradnjo potniških terminalov. Študija poudarja razvoj in utemeljitev raziskovalnega okvira skozi obsežen pregled literature in teoretično podlago. Pomen te raziskave je v potrebi po temeljitem razumevanju razmerja med oblikami lastništva letališč in izvedbo projektov potniških terminalov. Pregled literature ugotavlja vrzeli v obstoječih raziskavah in poudarja potrebo po novem raziskovalnem okviru. Izbrani raziskovalni pristop, ki vključuje intervjuje in študije primerov, je skrbno utemeljen. Članek sistematično oriše ključne elemente raziskovalnega okvira ter jih povezuje z relevantno literaturo in teoretičnimi koncepti. Z zagotavljanjem postopnega razvoja raziskovalnega okvira, ta članek postavlja temelje za prihodnje raziskave na tem področju. Zaključek povzema ključne točke, predstavljene v članku, in poudarja pomen razvitega raziskovalnega okvira pri usmerjanju nadaljnjih raziskovalnih prizadevanj.

Ključne besede

letališče; lastništvo; potniški terminal; gradnja; vodenje projektov.