

Financial Performance in Portuguese Outdoor Tourism Industry: A Quantitative Research

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Abstract

Tourism is a vital industry in south European countries, like Portugal, where outdoor tourism is growing. Understanding the macroeconomic importance of outdoor tourism in the Portuguese economy, it is also noticeable there are fewer studies regarding the profitability of outdoor companies. Therefore, this paper investigates the financial determinants influencing the profitability of Portuguese outdoor tourism companies for the period 2010 to 2020. The results from an OLS regression allow finding evidence that companies working capital and financial autonomy are positively related to company performance. Moreover, size is negatively associated with the companies' performance in this industry. Leverage and sales growth seem not relevant to ensuring outdoor companies' profitability. The results also show that companies' location is not important in explaining the performance of outdoor tourism companies.

Keywords: Outdoor Tourism, Companies' Performance, Portugal

Introduction

Different authors define outdoor tourism as nature-based tourism (e.g., Fennell, 2000; Nyaupane et al., 2004), ecotourism, outdoor recreation, nature tourism (Bell et al., 2007) or active outdoor tourism (Buckley, 2009). Silvennoinen and Tyrväinen (2001) state that outdoor recreation refers to individuals' activities outside their locations and access to natural or green areas as part of their everyday routines. In contrast, nature tourism refers to activities people enjoy when on vacation that focus on engaging with nature and usually require an overnight stay. Outdoor tourism has been defined as "a behaviour that: 1) involves voluntary participation in free time activity, 2) occurs in the outdoors, and 3) embraces interaction of people with the natural environment" (Kulczycki & Lück, 2009, p. 167). It is affected by the natural environment, societal trends, and political and economic factors (Job & Paesler, 2013). Therefore, outdoor tourism mainly includes nature-based tourism, adventure tourism, and sightseeing (Noome & Fitchett 2019).

For Humberstone (2000, p. 21), the outdoor industry "provides or makes available outdoor opportunities for leisure and recreational purposes, educational, youth and management training, and therapeutic purposes". Nagle and Vidon (2020) added that the outdoor sector involves various service providers and facilities. Past research studies have suggested that perceptions of service quality affect feelings of satisfaction, affecting loyalty and post-behaviours (Carneiro et al., 2016), directly affecting the demand and supply. Indeed, the tourism industry results from the combination of demand and supply characteristics at the national and international levels.

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Ecotourism and outdoor tourism are now generally recognised as the fastest-growing components of the tourism industry and a means of achieving the ideals of sustainability and environmental protection (Valizadeh & Khorani, 2019). Although the most significant influence on outdoor tourism is climate and weather, it depends on two fundamental elements, appropriate levels of environmental quality and suitable levels of consumer service (Eagles, 2002). Outdoor explorers are drawn to these activities by a strong desire to immerse themselves in a natural, scenic outdoor setting and a desire to enjoy life. In the last decades, there has been an increase in private turnout tourism companies and outdoor activities. So, it seems reasonable that there should be a causal correlation between the quality of a tourism supplier's performance, customer satisfaction, and the organisation's success (Baker & Crompton, 2000). The growth of the rural market, availability of special equipment and sporting equipment for use in outdoor recreational activities, the rise in the people's living standards, economic status, and overall level of life quality are some reasons behind the increase in outdoor recreational activities offering companies (Astrapellos et al. 2010).

In fact, the economic and tourism industries are mutually beneficial. Seasonal changes impact this industry due to the nature of the service and the type of clients. As a result, peak outdoor tourist service sales are directly linked to vacations and the weather's suitability. Furthermore, there are numerous hidden costs associated with outdoor tourism that can have a negative impact on profitability. There is no doubt that this tourism industry's profit and performance are sensitive to climate change, economic conditions, and other factors. So, it is important to understand the determinants of companies' profitability in this industry.

There is not much research on the factors that affect financial performance in turnout tourism companies. However, even though these businesses face specific issues, the financial aspects that impact them are like those that affect tourism businesses. In general, studies examining the factors that influence profitability have reported several factors in various countries. However, they do not explicitly indicate which factors are the most important in firm profitability, even though different factors have been established as determinants of profitability in different countries using various research methods. This thesis also hopes to investigate the relative value of profitability determinants and identify the main factors influencing outdoor tourism companies' performance in Portugal.

This paper aims to analyse the performance of outdoor tourism companies in Portugal from 2010 to 2019. Secondary data is taken from the SABI database to analyse turnout companies' performance. A sample of 2,274 firms related to outdoor tourism in Portugal. The quantitative research approach was applied to investigate the findings, considering EBIT/SALES as a dependent variable. The variables firm size, sales growth, leverage, working capital, and financial autonomy are taken as independent variables and location is taken as a dummy variable to measure the performance of the companies. From this research work, the companies can understand the drivers and their relation to the companies' performance in Portugal.

This paper is divided into five sections. Later, this introduction follows the literature review regarding outdoor tourism and factors affecting the companies' performance. Then, section 3 describes the data and the statistical methodology used. Section 5 presents the empirical results and its discussion. Finally, the last section concludes.

Brief Literature Review

The tourism industry grows in importance regarding contribution to GDP, jobs, and the balance of payments. It strongly connects with tourism and recreational activities that significantly impact the destination, travel time, and quality (Valizadeh & Khorani, 2019). Seasonality is one of the industry's challenges, leading to profitability instability. The outdoor tourism sub-industry inside tourism is growing with an important impact on the economy. Engaging in outdoor recreation activities is also important to develop rural and green areas, impacting the local economy and industry professionals.

In the case of Portugal, tourism is a strategic industry for the economy and a potential driving force for economic growth, but vulnerable to economic and financial crises. Indeed, tourism has developed as a significant industry in the Portuguese economy over the last 30 years (Moreira, 2018). However, the tourism industry is experiencing important challenges due to the global economic and Eurozone debt crises. Castro (2016) said that the impacts of the crises were more profound in 2009 than in 2012 and with different characteristics. Still, the Portuguese tourism industry rebounded fast and fully compensated for the losses caused by the crisis. However, in 2020, Portugal faced another crisis like the rest of the world. Coronavirus had a tremendous impact on the atmosphere of tourism globally (Sinulingga, 2021). Almeida & Silva (2020) explained that the COVID-19 pandemic significantly influenced tourism and, as a result, the country's economy. Unlike earlier crises that allow tourism operators in Portugal to diversify markets and tourist profiles, this pandemic has resulted in rapid and unexpected interruptions in all activities. Despite the obvious obstacles that tourism operators confront, Almeida e Silva (2020) found some opportunities: (i) the perception of Portugal as a safe, sanitary destination; (ii) the search for places with a less massive tourist offer that combines the components of social and environmental sustainability; (iii) the greater attractiveness of the Portuguese tourist sector to the elderly population; and (iv) the acceleration of the digitalisation of tourist operations.

The outdoor recreation studies have focused on three dimensions to conceptualise a recreational setting: physical, social, and managerial (Margaryan, 2016). Another dimension is relevant to making the outdoor activities financially sustainable: how activities are sold. Carneiro et al. (2016) state that the profile of participants and factors like ability requirements, group size, client-to-guide ratio, access and remoteness, duration, equipment, and lodging impact adventure product structuring attractiveness. Whence these factors affect the price per person. However, studies about the tourism industry are less focused on companies' profitability and mainly focus on their economic contribution to the community and the economy (Carneiro et al., 2016). These authors suggest that tourism economic sustainability is related to new jobs, implementing strategies to increase the number of tourists or their average spending, and reducing the seasonality of tourism businesses and thereby minimising revenue limitations. It is also vital to belong to tourism networks and clusters that can improve flexibility, marketing information exchange, creativity, joining other networks, resource creation, and knowledge transfer between stakeholders.

Indeed, it seems there are a lot of factors that can impact the profitability of companies. Several studies analyse factors that influence the companies' performance. This study intends to improve the knowledge about the profitability of companies operating in the outdoor tourism industry.

The size of companies can be an important point to analyse. Barbosa and Louri (2005) explain that larger firms can have economies of scale and scope and may have advantages. However, these firms also have higher monitoring costs and functional hierarchies. Also, smaller companies have higher flexibility. Although Israeli (2002), Cortés et al. (2007), and Travanca et al. (2022) show that hotel size has a positive on the tourism company's performance, based on the characteristics of the outdoor tourism industry, we expect that smaller companies have higher performance, like in Sami and Mohamed (2014). Also, the study by Dimitrić et al. (2019) shows that size is an essential factor in tourism hotel companies in Portugal, Spain, Greece and Croatia. The firm's age can also be an important factor. Agiomirgianakis et al. (2013) explain that older firms have more experience and relationships than younger firms but a heavy bureaucratic organisational structure with lower flexibility.

The firm's debt can determine its performance, and its effects can be opposed. Based on the Trade-Off theory, debt is positively associated with performance because companies want to benefit from the interest tax deduction. Jang et al. (2008) find this positive relation. However, because companies prefer to finance with internal resources with the Pecking Order theory, there is a negative relationship between performance and debt (Myers, 1984). Agiomirgianakis et al. (2013) analyse the Greek tourism market and evidence that firms' size and age have higher profitability and that debt bank cost is negatively related to profitability. Travanca et al. (2022) studied the Portuguese tourism industry and found that a firm's size and age are positively associated with profitability and that debt is negatively related to profitability. Sales growth also must be studied. Geroski et al. (1997) suggest that corporate growth reflects changes in the long-term profitability expectations. In this way, Jang and Park (2011) evidence that sales growth is negatively related to profitability in the restaurant industry, which means that growth delays profitability.

In addition, some authors analyse working capital as a factor important to understanding the firm's profitability. El-Ansary and Al-Gazzar (2021) state positive and negative arguments to justify the relation between working capital and performance. Based on that, they find a non-linear relationship between net working capital and profitability. Also, Baños-Caballero et al. (2016) and Altaf and Ahmad (2019) find an inverted U-shape relationship between working capital financing and firm performance. Dimitrić et al. (2019) studied the determinants of hotel profitability in some countries around the Mediterranean. They found that cash flow, total asset turnover ratio (except in Portugal), and solvency ratio (except in Greece) positively impact profitability. Sami and Mohamed (2014) show that the localisation of hotels is an important factor in profitability because each region can benefit from different amounts of investments, have different facilities and different pro-tourism activities, and supported activities and types of equipment. Also, the region's notoriety and destination promotion can be important. The authors find that hotels in scenic and coastal areas perform better. Also, Travanca et al. (2022) evidence that companies operating in the most well-known Portuguese tourism regions have higher performance. So, this study tries to find if the companies' location near the sea is relevant for profitability or if the countryside with more green areas for outdoor activities is more suitable for higher profitability.

Methodology

This empirical research aims to identify and quantify the factors that may affect the performance of the turnout tourism companies. Therefore, data from outdoor Portuguese tourism firms have been extracted from Bureau Van Dijke's SABI database. Among the database, 2,274 firms were related to outdoor tourism when considering their leading sector of activity. The population of 2,274 firms includes data covering ten years of activity from 2010 to 2019. However, not all variables were found during the ten years of analysis. In this way, a final sample of 5.339 observations was considered in the study.

The empirical study about Portuguese outdoor tourism companies' profitability follows the Ordinary Least Squares method (OLS) estimation. The study focuses on Portuguese companies with activity in the turnout tourism industry and mainly tries to understand the impact of companies' leverage, growth and location on companies' performance. To investigate the performance of turnout companies in Portugal, the model estimated has the following specification:

$$PERFORMANCE_{ij} = \beta_0 + \beta_1.GROWTH_{ij} + \beta_2.LEVERAGE_{ij} + \beta_3.AUTONOMY_{ij} + \beta_4.SIZE_{ij} + \beta_5.WC_{ij} + \beta_6.LOCATION_{ij} + \mu \quad (1)$$

This model studies the performance as a dependent variable, and SIZE, SALES, LEVERAGE, WC, LOCATION and AUTONOMY are the independent variables. μ is the stochastic error term, and β_i are the coefficients of independent variables. The variables are described below.

- **PERFORMANCE_{ij}**: This variable measures the financial performance (profitability) of each company *i* in period *j* measured by EBIT (earnings before interest and taxes) divided by sales, like in Roffia et al. (2021).
- **GROWTH_{ij}**: The variable is measured by the sales increase of company *i* from year *j*-1 to the following year *j* in percentage.
- **LEVERAGE_{ij}**: This variable measures the financial leverage and is calculated using total company debt divided by shareholder's equity of company *i* in year *y*.
- **AUTONOMY_{ij}**: This variable measures financial autonomy and is calculated by using shareholder's equity divided by total assets of the company *i* in year *y*.
- **WC_{ij}**: The variable represents the working capital of the company *i* in year *y*.
- **SIZE_{ij}**: The firm size is measured by the total assets of the company *i* in year *y*.
- **LOCATION_{ij}**: This is a dummy variable equal to one to identify the companies located near the sea. Based on Portuguese geography, the population distribution and the green areas for outdoor activities, we categorise the location between "near sea" and "interior – countryside".

Results

Table 1 shows the results of the OLS regression estimation for two different models. The first model uses all the variables except the control variable that defines the company location as explanatory variables. The second model uses location as a control variable, trying to explain if the location can impact outdoor companies' performance. This table displays the estimated coefficients, their standard errors (in parenthesis), and each variable's statistical significance. The sample size, the adjusted R-squared and the joint significance test (the F-test) are also registered in the table. As mentioned, the data collected have 5.339 observations for the period between 2010 and 2019. The adjusted R-squared results allow understanding that the variables used only explain between 7% and 8% (model 1 and model 2, respectively) of the changes in the profitability of Portuguese outdoor companies. Indeed, other factors may also explain the performance of that companies. The F-test indicates that the explanatory variables can form a good model – the test statistics are statistically significant for both models. The results in both panels are corrected from potential heteroscedasticity problems. The White test was used to determine if the variance of errors in a regression model is constant, indicating homoscedasticity indicated no such problem.

Table 1: Results of the OLS estimation for the factors affecting a firm's performance

Variables	Panel 1	Panel 2
	Estimated coefficients	Estimated coefficients
Constant	0.267 (0.246)	0.225 (0.286)
GROWTH	-0.082 (0.137)	-0.069 (0.152)
LEVERAGE	0.003 (0.004)	0.004 (0.004)
WC	0.011 *** (0.001)	0.012 *** (0.002)
SIZE	-0.161 ** (0.063)	-0.167 *** (0.064)
AUTONOMY	0.473 *** (0.025)	0.482 *** (0.025)
LOCATION	-----	-0.086

		(0.163)
Number of observations	5.339	5.339
Adjusted R-Square	0.072	0.076
F (t, n)	84.099 ***	72.930 ***

Notes: In parenthesis are presented the standard errors; ** statistically significant at 5%; *** statistically significant at 1%.
Source: Author's elaboration.

Regarding the multivariate results of the explanatory financial factors on the performance of turnout tourism companies, both panels provide evidence that working capital and financial autonomy have a positive impact on the outdoor company performance and that company size has a negative impact on the performance of these companies. Companies with more working capital have a higher financial capacity for daily work (as explained by El-Ansary and Al-Gazzar, 2021) and manage the seasonality of outdoor tourism. In the same way, companies with higher financial autonomy seem to have enough own capital to deal with the financial requirements of the activity. In outdoor tourism, smaller companies have higher performance, as mentioned in the Sami and Mohamed's (2014) study, which means that is more important the flexibility and the lower functional hierarchies of these companies than the advantages of economies of scale and scope of larger firms, as explained Barbosa and Louri (2005). The sales growth and leverage seem not statistically significant to explain performance.

Additionally, this study investigates the impact of the company's localisation on performance. The results show that it seems not to be relevant to explaining outdoor tourism companies' performance. Although the countries' geography, the distribution of population and the green areas could induce better performance in companies from the countryside.

Conclusion

This study analyses the financial factors that can impact the companies' performance in the outdoor tourism industry. This empirical research deals with the issue of outdoor tourism and the elements to achieve companies' performance by studying a sample of 2274 Portuguese companies' performance from 2010 to 2019. The estimation results provide evidence that several factors can influence EBIT/Sales (performance measure used). This study shows that working capital and financial autonomy positively impact outdoor company performance. Companies with more working capital are more prepared for the challenges of outdoor activities, which positively impact performance.

Similarly, companies' financial autonomy seems to be important to increase the financial trust of the main stakeholders. The company size is also important and is negatively related to performance, which signifies the importance of flexibility and lower functional hierarchies. About the company localisation near the sea or in the countryside, the results evidence that it hasn't any relevant impact on performance. These findings provide information to management to make decisions to ensure the profitability of outdoor tourism companies. The implementation of this approach of analysis can assist policymakers in distinguishing between relatively well-performing factors of outdoor tourist enterprises and those exhibiting signs of financial trouble to identify those factors in financial difficulty early.

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References

- Agiomirgianakis, G., Magoutas, A. & Sfakianakis, G. (2013). Determinants of Profitability in the Greek Tourism Sector Revisited: The Impact of the Economic Crisis. *Journal of Tourism and Hospitality Management*, 1(1), 12-17.
- Almeida, F., & Silva, O. (2020). The impact of covid-19 on tourism sustainability: Evidence from Portugal. *Advances in Hospitality and Tourism Research*, 8(2), 440-446.
- Altaf, N. & Ahmad, F. (2019). Working capital financing, firm performance and financial constraints: Empirical evidence from India. *International Journal of Managerial Finance*, <https://doi.org/10.1108/IJMF-02-2018-0036>

- Asimakopoulou, I., Samitas, A., & Papadogonas, T. (2009). Firm-specific and economy wide determinants of firm profitability: Greek evidence using panel data. *Managerial Finance*, 35(11), 930–939. <https://doi.org/10.1108/03074350910993818>
- Avci, U., Madanoğlu, M., & Okumus, F. (2011). Strategic orientation and performance of tourism firms: Evidence from a developing country. *Tourism Management*, 32(1), 147–157. <https://doi.org/10.1016/j.tourman.2010.01.017>
- Baker, D. A., & Crompton, J. L. (2000). Quality, satisfaction and behavioral intentions. *Annals of Tourism Research*, 27(3), 785–804. [https://doi.org/10.1016/S0160-7383\(99\)00108-5](https://doi.org/10.1016/S0160-7383(99)00108-5)
- Baños-Caballero, S., García-Teruel, P. & Martínez-Solano (2016). Financing of working capital requirement, financial flexibility and SME performance. *Journal of Business Economics and Management*. 17(6), 1189–1204. <https://doi.org/10.3846/16111699.2015.1081272>
- Barbosa, N. & Louri, H. (2005). Corporate Performance: Does Ownership Matter? A Comparison of Foreign- and Domestic-Owned Firms in Greece and Portugal. *Review of Industrial Organization*. 27, 73-102. <https://doi.org/10.1007/s11151-005-4920-y>
- Carneiro, M. J., Breda, Z., & Cordeiro, C. (2016). Sports tourism development and destination sustainability: the case of the coastal area of the Aveiro region, Portugal. *Journal of Sport & Tourism*, 20(3-4), 305-334. <https://doi.org/10.1080/14775085.2016.1220863>
- Castro, C. (2016). The Impact of the Great Recession and Eurozone debt crises on Portuguese Tourism. *European Journal of Applied Business and Management*, 2(1), 97-116.
- Cortés, E. C., Guerrero, R. A., Ramón, D. Q. (2017). Las ventajas de la diversificación estratégica para las empresas turísticas españolas. Una visión desde la teoría de recursos. *Cuadernos de Turismo*, 19, 27-45.
- Dimitrić, M., Žiković, I. & Blecich, A. (2019). Profitability determinants of hotel companies in selected Mediterranean countries, *Economic Research-Ekonomska Istraživanja*, 32(1), 1977-1993, <https://doi.org/10.1080/1331677X.2019.1642785>
- El-Ansary, O. & Al-Gazzar, H. (2021). Working capital and financial performance in MENA region. *Journal of Humanities and Applied Social Sciences*. 3 (4), 257-280. <https://doi.org/10.1108/JHASS-02-2020-0036>
- Humberstone, B. (2000). The 'outdoor industry' as social and educational phenomena: Gender and outdoor adventure/education. *Journal of Adventure Education & Outdoor Learning*, 1(1), 21–35. <https://doi.org/10.1080/14729670085200041>
- Israeli, A. A. (2002). Star rating and corporate affiliation: their influence on room price and performance of hotels in Israel. *International Journal of Hospitality Management*, 21(4), 405-424. [https://doi.org/10.1016/S0278-4319\(02\)00037-3](https://doi.org/10.1016/S0278-4319(02)00037-3)
- Job, H., & Paesler, F. (2013). Links between nature-based tourism, protected areas, poverty alleviation and crises-The example of Wasini Island (Kenya). *Journal of Outdoor Recreation and Tourism*, 1–2, 18–28. <https://doi.org/10.1016/j.jort.2013.04.004>
- Kulczycki, C., & Lück, M. (2009). *Outdoor adventure tourism, wellness, and place attachment*. In Bushell, R., Sheldon, P. (Eds). *Wellness and Tourism: Mind, Body, Spirit, Place* (pp. 165-176).
- Margaryan, L. (2018). Nature as a commercial setting: the case of nature-based tourism providers in Sweden. *Current Issues in Tourism*, 21(16), 1893–1911. <https://doi.org/10.1080/13683500.2016.1232378>
- Moreira, C. O. (2018). Portugal as a tourism destination: paths and trends. *Mediterranee*, 130. <https://doi.org/10.4000/MEDITERRANEE.10402>
- Nagle, D. S., & Vidon, E. S. (2021). Purchasing protection: outdoor companies and the authentication of technology use in nature-based tourism. *Journal of Sustainable Tourism*, 29(8), 1253–1269. <https://doi.org/10.1080/09669582.2020.1828432>
- Nguyen, T. & Nguyen, C. (2020). The determinants of profitability in listed enterprises: A study from Vietnamese stock exchange. *Journal of Asian Finance, Economics and Business*, 7(1), 47–58. <https://doi.org/10.13106/jafeb.2020.vol7.no1.47>
- Nunes, P. M., Serrasqueiro, Z. M. & Sequeira, T. N. (2009). Profitability in Portuguese service industries: a panel data approach, *The Service Industries Journal*, 29(5), 693-707. <https://doi.org/10.1080/02642060902720188>
- Sami, B. & Mohamed, G. (2014). Determinants of tourism hotel profitability in Tunisia. *Tourism and Hospitality Research*. 14(4), 163–175. <https://doi.org/10.1177/1467358414543970>
- Sinulingga, S. (2021). Tourism & Covid-19 (Coronavirus Impact Inventory to Tourism Stakeholders in North Sumatera). *Budapest International Research and Critics Institute Journal: Humanities and Social Sciences*, 4(1), 170–179. <https://doi.org/10.33258/birci.v4i1.1562>
- Travanca, C., Vieira, C. & Félix, E. (2022). Determinants of Profitability in the Tourism Sector in Portugal. *Tourism, Hospitality & Event Management*, J. Leitão et al. (eds.), *Tourism Entrepreneurship in Portugal and Spain*. https://doi.org/10.1007/978-3-030-89232-6_10
- Valizadeh, M., & Khorani, A. (2020). An evaluation of climatic conditions pertaining to outdoor tourism in Bandar Abbas, Iran. *International Journal of Biometeorology*, 64(1), 29–37. <https://doi.org/10.1007/s00484-019-01790-2>