



# ECO-INNOVATION AND MANAGEMENT IN TIME OF CRISIS: A COMPARATIVE ANALYSIS OF ENVIRONMENTAL GOOD PRACTICES AND LABOUR PRODUCTIVITY IN THE SPANISH HOTEL INDUSTRY (2008-2012)

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## 1. PURPOSE

The economic crisis in recent years has significantly affected the Spanish hospitality industry. Some factors that affect labor productivity and therefore business performance in this sector may have affected the productivity in a different way when the economic crisis in Spain became deeper. One such factor is the eco-innovation. In previous works, the authors of this paper have used a variable that holds a set of good environmental practices to analyze the impact of the introduction of eco-innovation measures on labor productivity. The variable "good environmental practice" is an indicator of environmental management and has been introduced in a widely used production function. The main objective of the present work is to compare the impact of that variable on labor productivity into two different times (2008 and 2012) to verify the changes that have occurred as a result of the economic crisis. This analysis was performed for a sample of 173 hotels in Andalusia in 2008 and 181 in 2012.

## 3. RESULTS & FINDINGS

Descriptive data show that between 2008 and 2012 labor productivity of the hotels in the sample grew on average by only 2.48%, but the number of full-time equivalent jobs decreased by 7.31%.

In reference to the variable used to analyze the introduction of eco-innovation measures in this sector the average value of environmental sustainability measures implemented by hotels in Andalusia decreased by 6.30%. It is noteworthy that there has been an increase in foreign capital participation in the capital share of the hotels analyzed (4.27%) and the development of strategic plans by facility managers (3.97%), presumably to try mitigating the effects of the crisis.

Our econometric results indicate that, compared to 2008, the impact of the introduction of good environmental practices on labor productivity has decreased by 8.33%. Moreover it can be seen that the hotels that have developed a strategic plan as a tool against the crisis have increased labor productivity by more than 27%.

Finally, the number of good environmental practice from which the increase in labor productivity is becoming negative has decreased in the period analyzed, from 3.67 in 2008 to 3.38 in 2012 (i.e., 7.88%).

## 2. DATA & METHODOLOGY

We extend the standard Cobb-Douglas production function for introducing as explicative variable an indicator of good environmental practices. Specifically, we start with the following production function:

$$Y = AK^\alpha L^\beta e^{\gamma env} \quad (1)$$

where Y represents the gross value added (GVA), L the total number of full-time equivalent filled jobs, K the stock of physical capital and env the variable environmental good practices. We created the variable environmental good practices (env) that represents the commitment of the hotel to introduce measures that encourage environmental sustainability. Using logs in (1) and subtracting L in both side of the equation, we obtain our proposed empirical equation to be estimated as follow:

$$\ln(Y/L)_i = \ln A + \alpha \ln K_i + (\beta - 1) \ln L_i + \gamma env_i \quad (2)$$

where  $\alpha$  is the elasticity of labor productivity with respect to physical capital,  $\beta$  the elasticity of labor productivity with respect to employment and  $\gamma$  the semi-elasticity of labor productivity for the indicator of good environmental practices (env). If it is further assumed that the model described present constant returns to scale L and K (that is,  $\alpha + \beta = 1$ ), expression (2) is reduced to:

$$\ln(Y/L)_i = \ln A + \alpha \ln(K/L)_i + \gamma env_i \quad (3)$$

Adding a vector of control variables to expressions (2) and (3), as well as random disturbance independently distributed, we obtain the equations to be estimated. The additional variables considered in this work are introduced in the empirical model to control the observed heterogeneity related to the specific characteristics of the hotels in the sample.

## 4. CONCLUSIONS

- I. Firstly, labor productivity in Andalusian hotels has grown sparsely considering reduction in the number of employees; this may be due to the decrease in the value added generated by the hotels in this period of crisis.
- II. Secondly, the above fact may have led to a lower involvement of hotels for introducing good environmental practices due to the cost involved.
- III. Finally, this study suggests that investment in good environmental practice increases labour productivity; however, investment beyond a certain level of environmental involvement entails decreases in hotel labour productivity and between 2008 and 2012 this level has been significantly reduced by Andalusian hotels.