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# THE PERFORMANCE EVALUATION SYSTEM OF THE MINISTRY OF LABOUR AND SOCIAL POLICIES: AN ANALYSIS OF INSPECTION ACTIVITY

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## SUMMARY

*For several years it has become the practice of Public Administration quality assessment as part of the institutional activities carried out by offices to improve public services by monitoring the production process. The Ministry of Labour and Social Policies has adopted a system of “quality assessment” based on indicators selected as representative of the inspection carried out in decentralized offices.*

*This scoring system - called Project Quality - is defined by three “synthetic indicators” determined periodically by the 92 Provincial Labour Directorates (in Italian: Direzioni Provinciali del Lavoro – DPL) operating in the country. It does indeed have a rating system that defines a ranking between the offices.*

*This paper presents the results of the research in order to analytically describe the performance level with a different model and also suggesting the possible influence exerted by the “local context variables”, i.e., those relating to the geo-socio-economic differentials, in explaining the efficiency of inspection. The data are analyzed according to the variable inspection and local was formalized through a second-order structural equations model.*

**Keywords:** PLS Path-Modeling, second order latent variables, performance evaluation, context variables; performance-ranking

## 1. INTRODUCTION

For several years it has become the practice of Public Administration to have quality assessments as part of the institutional activities carried out by offices (Bank of Italy, 2002). This to attempt to improve services to the public, making monitoring of the activities in departments, and acting thus, the production process of public services. Each Public Administration has therefore prepared appropriate instruments to enable an effective measure of its products (Morvillo, 2008; Gazzei *et al.*, 1997; Amenta *et al.*, 2008).

The Ministry of Labour and Social Policies (MLPS) has adopted a system of “quality assessment” based on indicators selected as representative of the inspection

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carried out in branch offices (e.g., number of inspections carried out, undocumented and black workers, number of unprotected minors found in the company, requested administrative, injuries received in the offices, non-payment contributions found during inspection access, etc.).

This scoring system, called Project Quality, is defined by three "synthetic indicators" determined periodically by the 92 Provincial Labour Directorates (in Italian: Direzioni Provinciali del Lavoro – DPL) that are territorial and decentralized structures of the Ministry of Labour and Social Policies operating on a provincial territory in the country. It does indeed have a rating system that defines a ranking between the provincial offices. A pilot study carried out on the basis of this national ranking has suggested the possible influence exerted by the "local context variables", i.e., those relating to the geo-socio-economic differentials, in explaining the efficiency of inspection.

The purpose of this paper is to present the results of research work on the collaboration between the Regional Directorate of Labour of Puglia (it's also a peripheral branch of the Ministry of Labour and Social Policies to coordinate, at regional level, more DPL) with the University of Salento, in order to analytically describe the performance level of the Provincial Labour Departments of Puglia on the basis of variables related inspection and local variables

The data analyzed comes from the 5 Puglia DPL (Foggia, Bari, Taranto, Brindisi and Lecce). The measurement of performance according to the variable inspection and local was formalized through a second-order structural equations model.

The remaining parts of the paper are divided as follow:

The first part will discuss the normal control procedures implemented in the DPL to verify the work done by labor inspectors. Then you will be offered a model of data analysis that is based on a more balanced assessment of the data collected from the DPL, using for this purpose, a PCA and a second-order structural equation model (SEM). Below, we discuss the data analysis and provide a brief commentary on the results obtained.

## 2. PERFORMANCE EVALUATION SYSTEM FOR THE INSPECTION ACTIVITY

The evaluation system of inspection called "Project Quality" introduced in 2009, has been amended repeatedly, even during a single year. For the year 2010 were considered to be 3 "composite indicators" determined periodically by the 92 DPL. Analytically:

1) Indicator of Presence on Territory:

$$IPT = \left( \frac{N.Inspections + N.Re\ visit}{N.Planned \_ Inspection} \right)$$

2) Indicator of Quality Inspection:

$$IQ = \left( \frac{\text{Quality\_score}}{N.\text{Inspections} - N.\text{Re visits}} \right)$$

3) Total indicator:

$$IC = (IPT * p_1 + IQ * p_2)$$

The IPT is an indicator of "presence on the territory" and measures the "capability of the Office to achieve all of the goals of the planned inspections to be carried out for the year". The number of inspections is the amount of access actually made. The number of revisits is related to the amount of additional visits that are made at the company after the first inspection access. The number of planned inspections is determined on the number of inspectors available (labour force relative to the activity inspection).

The indicator named "Quality inspection" (IQ) quantifies the inspection activity, through the implementation of a range of services.

Following the definition of national rankings of the indicators IPT and IQ, it generates a "national ranking" IC (Total Indicator) obtained by the sum of the scores attributed to the "position in the ranking of IPT" ( $p_1$ ) and "position in the ranking of IQ" ( $p_2$ ).

This system, however, has led to a national ranking that doesn't take into account certain essential features of the DPL, mainly related to the territory inside which they operate. There are in fact to consider, on one side, factors related to the potential capacity and production of the territory, on the other, more simply, the breadth of the jurisdiction within which insists the DPL. In general the system implemented has led to an undervaluation of DPL and an overestimation of others.

### 3. THE PROPOSED MODEL

In the micro and macro economic analysis, the concept of efficiency is used to indicate the relationship between the quantity of product obtained and the volume of one or more inputs required for its production; the result is a measurement of the ability to transform resources into products by the organization or economic production unit studied.

A production process is not efficient if you can't get the same amount of output already produced using less input.

There is a strong link between the product, production factors and level of performance.

The performance evaluated for a production is not solely attributable to the percentage change in the product according to the variation of the factors produced. In fact, many circumstances affect it such as economies of scale, substitutability and relative degree of complementarity between the factors, culture and experience of the

labour force, capacity management, and environmental factors (Allini, 2005; Leoni, 2008).

Environmental factors are considered, in fact, input factors and, as such, included in the production function for a more comprehensive identification of all the independent variables. In cross-sectional analysis we assume that the national ranking of the production level of different organizational units is a function of input variables and external variables in the production process or that the latter are strongly correlated.

The administrative changes initiated in the Ministry of Labour and Social Policies have led to verify empirically, through the application of specific statistical techniques, the adequacy of the evaluation system in use. This is to suggest an alternative built on references to economic theory, which also takes into account the relevant variables that are both internal and external to the production process.

The aim of the statistical model developed in this paper is to measure the inspection activity performance and to assess the impact that local context variables on performance of the local 5 Puglia DPL (Bari, Brindisi, Foggia, Lecce e Taranto)

Therefore, two families of indicators have been identified: the *first one* is made up of variables that measure the DPL performance, while the *second one* consists of a set of parameters representing local context.

To define the theoretical model and to select the variables, reported in detail in the next paragraph, we followed some defined steps:

1. Firstly, we perform an explorative Principal Component Analysis (PCA; Joliffe, 2002) on the output variables produced by the DPL (table 1), to verify the presence of a latent structure in the performances measuring process, in way to define Latent Variables (LVs) which represent a synthesis of the output process.
2. In the second step, the PCA is performed on some local context variables, to evaluate the socio-economic differences among the five Puglia Provinces (Bari, Brindisi, Foggia, Lecce and Taranto), and to select variables which better represent the context effect, defining also in this step LVs.
3. The LVs defined in the two previous steps are combined to define a unique model, by using a second-order structural equation model (SEM), based on the Partial Least Squares (PLS) estimation method.

A graphical representation of the theoretical model is represented below by the path diagram in figure 1, where the LVs are drawn by circles and the manifest variables (MVs) are drawn by rectangles. The oriented arrows represent the causal relationships.

Because the LVs will be defined after the PCA, the graphical representation reports them by just calling them “*Output 1, ..., Output K*” and “*Context 1, ..., Context M*”, giving a generic number  $K$  and  $M$  to the possible latent output and context variables.

To measure the inspection activity performance we adopt a second-order SEM, where the second order of abstraction is represented by a LV called *inspection*

activity performance. The graphical representation of the second order LV is the double circle positioned between the output and the local context variables.

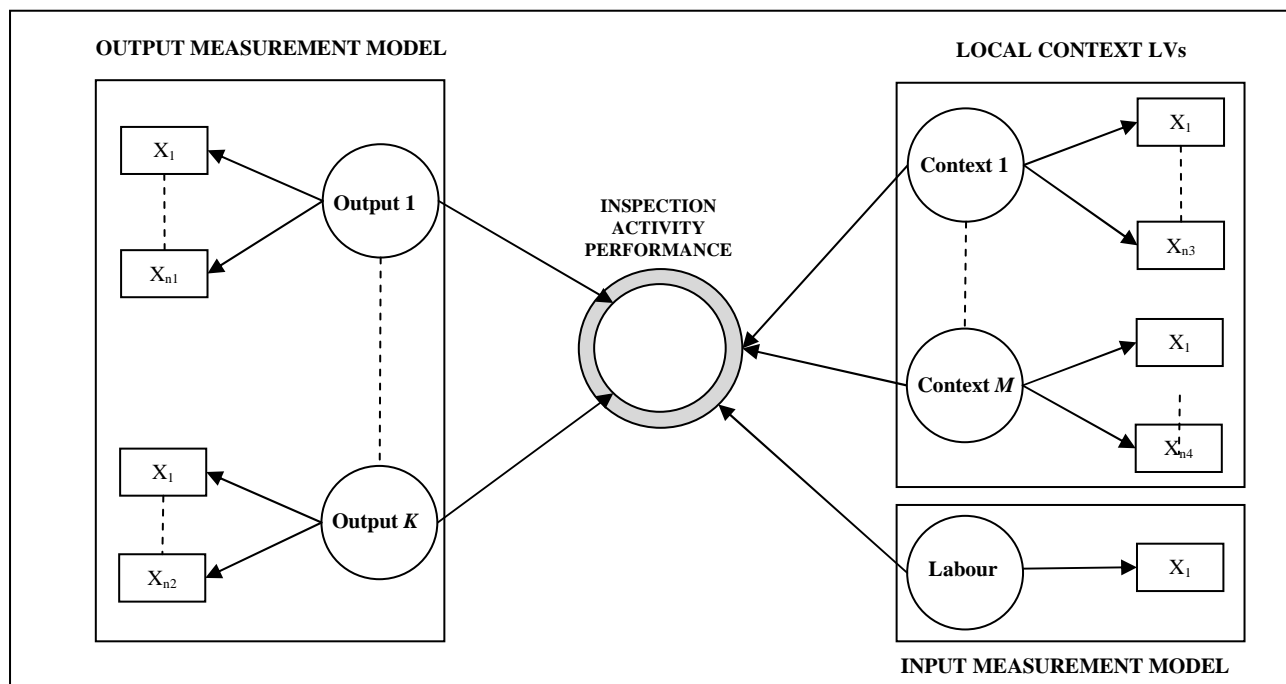


FIGURE 1 - . The Inspection activity performance model.

Moreover, the model shows on the left side the output' measurement model, which measures each single MVs' contribution to defining the *first-order Output LVs* and how these contribute to determining the *Inspection Activity Performance*; on the right side, local context variables define the causal effect of the *first-order Context LVs* have on the *Inspection Activity Performance*. In the end, the model considers as evaluation process input variable, the *Labour Force*.

### 3.1 The inspection activity variables and the local context variables

The data used for the description of the production process, kindly provided by the Regional Directorate of Labour are summarized in Table 1 and they refer to the year 2010. These are measures of input (only one) and output produced by 5 DPL of Puglia (Bari, Brindisi, Foggia, Lecce and Taranto).

TABLE 1. - Input/Output manifest variables.

Manifest Input/Output Variables	DPL				
	<i>Bari</i>	<i>Brindisi</i>	<i>Foggia</i>	<i>Lecce</i>	<i>Taranto</i>
<i>Labour Force</i>	79	32	45	38	37
<i>Black Workers</i>	1442	483	1311	985	622
<i>Inspections</i>	5122	2220	3413	2851	2459
<i>Sanctions</i>	3288	694	1165	1420	819
<i>Conciliation Request</i>	932	110	237	154	337
<i>Conciliation</i>	181	52	42	64	100
<i>Offenses</i>	2634	524	900	864	1929

<i>Irregular Firms</i>	2302	829	1210	1989	1446
<i>Audit</i>	664	445	150	1008	1066
<i>Verified Workers</i>	6010	5406	13584	11991	10297
<i>Illegal Workers</i>	1960	1335	2461	3276	2406
<i>Administrative Violations</i>	6124	4140	3550	6653	9682
<i>Suspended Firms</i>	184	30	135	451	80
<i>Monetary Recoveries</i>	1700	1500	800	2400	4400

A brief description of the variables can help making the discussion easier.

*Labor Force* means the number of labor inspectors who carry out inspections: the number refers not to individual units of staff, but shares of the labor force, applied in control activities. The *Black Workers* are workers who do not possess any form of job protection because, even if paid for the performed work, are not officially registered as employees of the company in which they were found in activity. With *Inspection* we mean the number of inspection of the work carried out by the DPL. The *Sanctions* are economic penalties imposed on firms for irregularities. The value is expressed in euro, the number should be multiplied by a thousand (€\* 1000). *Conciliation Request* is expressed by the number of required assistance for which ends up in the conciliation monocratic. The *Conciliation* monocratic is a form of job protection that allows the company and the employee to reach an agreement for compensation before the DPL proceeds with the inspection. Then there are the *Offenses* set out in the course of the inspection. *Irregular Firms* expresses the number of private firms that are not in compliance with the labour legislation. With *Audit* we mean the number of irregularities of an administrative nature that were identified during the inspection activities performed in the office based on communications from the firms. *Verified workers* expresses the number of workers subject to verification, while the *Illegal workers* are workers who are found to breach the protections in the workplace. *Administrative Violations* indicates the number of violations of an administrative nature such as, for example, failure sheet of recruitment, delay in payment of contributions, no weekly rest, etc. The *Suspended Firms* are companies for which it was ordered suspension of activity. *Monetary Recoveries* are, however, the monetary amounts for non-payment of social security and insurance contributions, obtained with the inspection activity. Again the value is expressed in euro, the number should be multiplied by a thousand (€\* 1000).

Table 2 is considered to be the set of variables external to the production process, selected by ISTAT publications of the year 2010 for resident population, Km<sup>2</sup> area, municipalities and population density; of the year 2010 for firms and employees (tavole Ateco).

They are considered relevant variables that could represent economies and / or production inefficiencies, and, therefore, affect the level of costliness of public service inspection.

TABLE 2. - Context manifest variables.

Local Context Manifest Variables	Provinces with DPL				
	<i>Bari</i>	<i>Brindisi</i>	<i>Foggia</i>	<i>Lecce</i>	<i>Taranto</i>
<i>Population</i>	1.645.967	403.096	640.891	813.556	580.525
<i>Surface</i>	5.364	1.839	6.966	2.759	2.437
<i>Density</i>	307	219	92	295	238
<i>Municipalities</i>	51	20	61	97	29
<i>Firms</i>	114.041	24.033	40.808	57.407	32.106
<i>Employees</i>	364.340	69.538	107.492	152.234	113.700

3.2 High-Order Partial Least Squares - Path Modelling

Partial Least Squares – Path Modelling (PLS-PM) combines a graphical representation with a very powerful estimation method, becoming a very flexible way to investigate models with a high level of abstraction.

The basic PLS design was completed for the first time in 1966 by Herman Wold to be used in multivariate analysis, and subsequently extended for its application in the structural equation modelling (SEM) in 1975 by Wold himself. An extensive review on PLS approach is given in Vinzi *et al.* 2010. The model-building procedure can be thought of as the analysis of two conceptually different models. A measurement (or outer) model specifies the relationship of the observed variables with their (hypothesised) underlying (latent) constructs; a structural (or inner) model then specifies the causal relationships among latent constructs, as posited by some theory. The two sub-models' equations are the following:

$$\xi_{(m,1)} = \mathbf{B}_{(m,m)} \cdot \xi_{(m,1)} + \zeta_{(m,1)}$$

$$\mathbf{x}_{(p,1)} = \mathbf{\Lambda}_{(p,m)} \cdot \xi_{(m,1)} + \delta_{(p,1)}$$

where the subscripts *m* and *p* are the number of the latent variables (LV) and the manifest variables (MV) respectively in the model, while the letters  $\xi$ ,  $\mathbf{x}$ ,  $\mathbf{B}$ ,  $\mathbf{\Lambda}$ ,  $\tau$  and  $\delta$  indicate LV and MV vectors, the path coefficients linking the LV, the factor loading linking the MV to the LV, and the error terms of the model.

The parameters estimation is based on a double approximation of the LVs. For an in deep discussion on the estimation method see Vinzi *et al.* (2010), Ciavolino *et al.*, (2009), Tenenhaus *et al.* (2005), Lohmöller (1989), Wold (1985), Fornell *et al.* (1982).

In our model, latent variables (LVs) are expressed by *Output Variables*, *Context Variables*, and *Labour*; they are measured by the corresponding manifest variables (MVs) reported in table 1 and table 2.

Instead, in order to measure the *Inspection Activity Performance* we define it as a second-order LV, by using the repeated indicators approach.

Wold's original design of PLS-PM does not consider higher-order LVs; each construct has to be necessarily related to a set of observed variables in order to be estimated. On this basis, Lohmöller proposed a procedure for the case of hierarchical



constructs, the so-called *hierarchical component model* or *repeated indicators approach*, which is the most popular approach when estimating higher-order constructs through PLS. The procedure is very simple: ‘a second-order factor is directly measured by observed variables for all the first-order factors. While this approach repeats the number of MVs used, the model can be estimated by the standard PLS algorithm’. The manifest indicators are repeated in order to represent the higher-order construct.

Even though it is the approach favoured by researchers, because of its simplicity, it can give some disadvantages for possible biasing of the estimates.

Another way of building a high-order model is the *two-step approach*: the LV scores are initially estimated in a model without second-order constructs (Rajala *et al.*, 2010); in the second step, the LVs are used as indicators, that means MVs, of the second-order LV. This method offers the advantages when estimating higher-order models with formative indicators (Diamantopoulos *et al.*, 2001; Reinartz *et al.*, 2004; Ciavolino *et al.*, 2011).

Based on the theoretical model and on the restriction given by the limited number of observations (just five Puglia DPL, table 1 and table 2), which may result a singular matrix, we adopt a reflective relationship between the LVs and MVs and the repeated indicator approach. This approach is the simplest to define, giving the results, for this case study hypotheses, essentially equal to the two-step approach.

## 4. ANALYSIS

The following subparagraphs report the two steps of analysis: at the first step we explore through the PCA the output variable to define how the LVs can be represented by the output process; the same procedure is applied to the context variables. In the next subparagraph, the second-order PLS Path-Modeling is used to define the measurement model for the inspection activity performance, to evaluate the contribution of each LVs defined in the previous step. Moreover the causal effect of the local context and the labour input is estimated by the definition of causal relationship between the inspection activity performance second-order LV, and the contexts and labour LVs.

### 4.1 *Principal Component Analysis for the output and the context variables*

The results of the PCA show that the first two axis explain the 72% of the total variance. The first dimension extracts a "latent structure" characterized by output variables that are referred to the first factor (F1). The second dimension is characterized by significant correlations between the remaining output variables, defining the second factor (F2).

- F1: "main output" produced by DPL. It is characterized by outputs directly related to the "protection of fundamental rights of workers", involving the presence on the

territory of labor inspectors who perform inspection by means of access to productive companies, construction sites, etc., (e.g., black workers - not resulting from scripture or other documentary required - non-EU immigrants, citable offense);

- F2: "output accessory" primarily related to activities typically carried out in Office, requiring only an administrative checkbook or documentary.

In this way we can define four quadrants, following the Cartesian plane, where are the five Provinces are projected. (fig. 2 and 3):

In the first quadrant we find the production units with an *ideal production strategy*, and high levels of main and accessory output, in the second quadrant we find observed production units with an *accessory production strategy* namely those where the activity is directed primarily to audits of the office, the third quadrant contains located production units with *non ideal production strategy* since there is no specificity of the activity and finally, in the fourth quadrant, production units with *main production strategy*, those where the inspection activity is directed towards the active protection of the work carried out on the territory.

We could compare then, through a performance-ranking uniform, Provincial Directorates more oriented towards the production of "primary output", ie those oriented toward the prosecution of most serious violations, such as working "under the table " and illegal, exploitation of workers, this since the territory in which they operate, presents situations of economic disadvantage, social and cultural. Or, instead, to compare those who develop mainly secondary output (inspection audits, administrative and accounting check, etc.) and that respond in this way to the specific requests made by the area of jurisdiction.

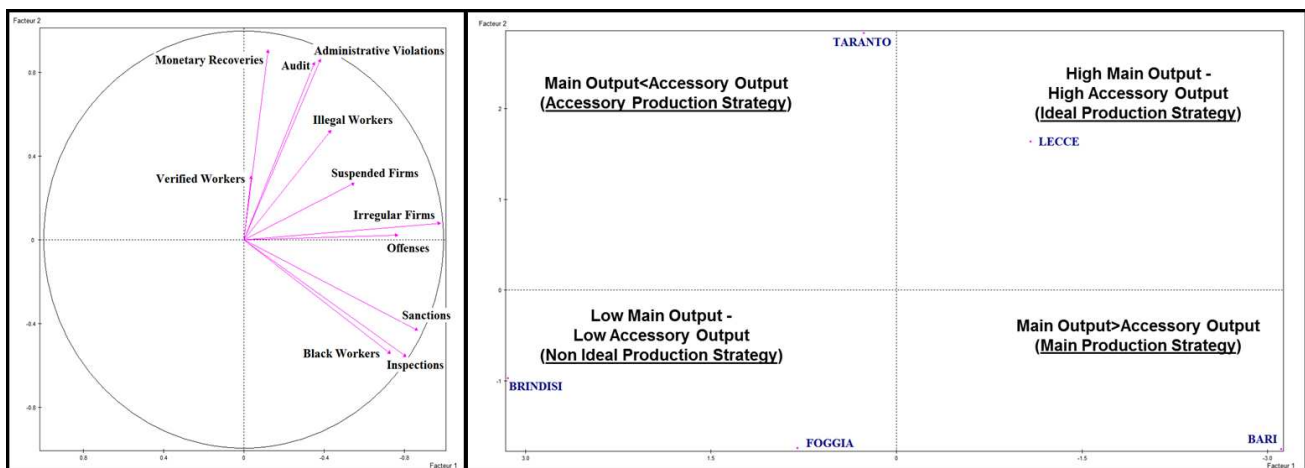


FIGURE 2. - PCA for the output variables: Variables and Units factorial planes.

The PCA results show that the territory is very diversified and characterized both in respect to the production capability and the size of population, on the first axis, compared to the dimensional characteristics of the area and surface density, on the second axis.

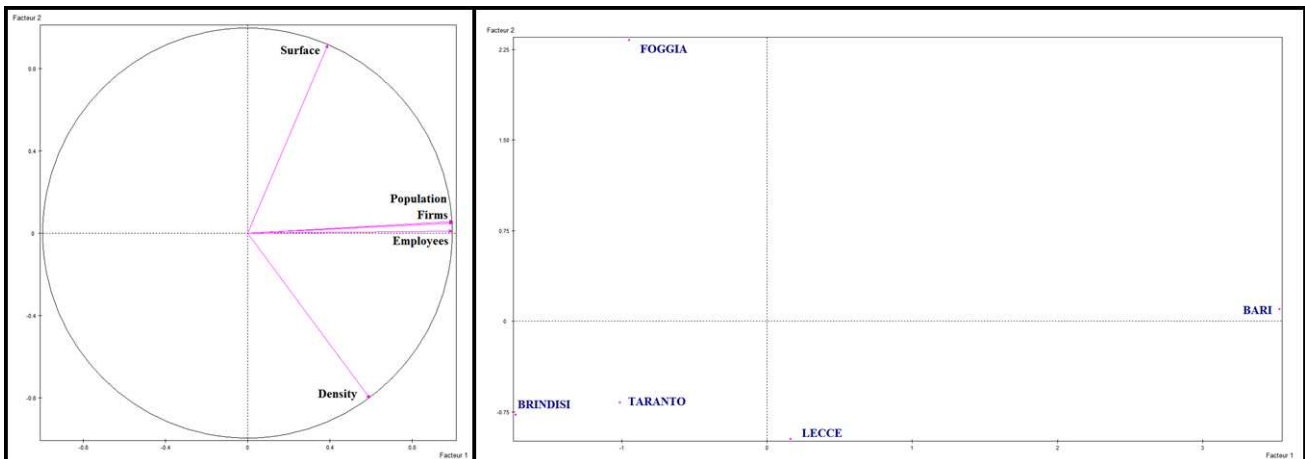


FIGURE 3. - PCA for the context variables: Variables and Units factorial planes.

The projection of the five Provinces on the two first axes show that Bari is the location where there are more enterprises, with a consequence of more employees than the other Provinces. It's also the biggest one in term of population. On the opposite side, there are Taranto and Brindisi, which are smaller in term of population with a lower level of socio-economic context. Moreover, taking into account the second axis, those Provinces are smaller also in term of surface and density.

Foggia is the biggest as extension of surface and on the opposite side there is Lecce that has highest density after Bari.

#### 4.2 Second order PLS Path-Modeling

Given the results of output variables and context variables, we define the below model (fig.4), where on the output measurement model, the LVs can be distinguished in "Main Output" and "Accessory Output".

The context LVS are instead defined by 2 variables: "Surface" and "Density" to coincide with the same manifest variables and a particularly interesting thing that we refer to as "context local productivity" that we will call "context" (latent variable of the remaining variables context observed). In the model suggested, the results are shown in the chart below. In the end, we only have one input variables, the Labour Force that together with the context LVS described above, explains the variability of *LVS output* identified (main and accessory).

With reference to the manifest variables "required for assistance" and "Conciliation Monocratic successfully" it is considered that they represent more adequately the level of "outcomes" of inspection public service.

As everyone knows, in the production processes of the Public Administration, the outcome is an indicator measuring the impact on citizens of the levels achieved by public services.

In this case, in fact, the two variables refer to "the will" of both the worker and the employer to reconcile. They are therefore related to the impact of legislation on

citizens (art. 11, Legislative Decree no. 124/2004<sup>1</sup> states that in cases of "required for assistance", the DPL can start the mediation attempt (Conciliation Monocratic), during which the parties – workers and employer" – can agree to the regularization of the accident insurance and contributions of the worker).

They define two variables that, although “result”, are more appropriately indicator of outcomes.

It was decided to introduce it in the model, this in order to assess the effect on performance’s level and therefore on the ranking of DDPPLL.

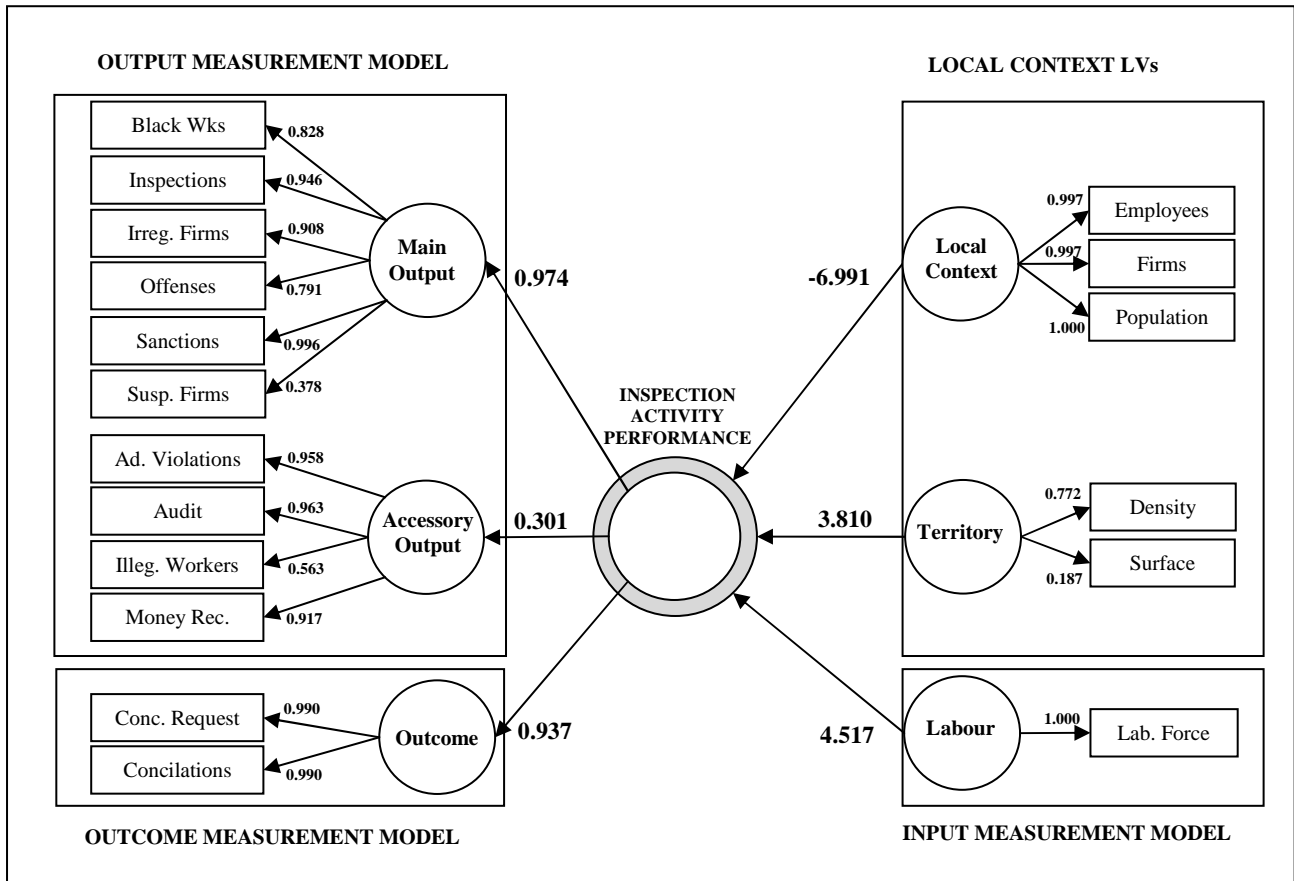


FIGURE 4. - *Second-order SEM results.*

Therefore, the model estimated by the technique of second-order SEM describes the production process of inspection measured by "three variables", main and accessory output (defined from the factor analysis), and the last one, defined by the outcome.

The estimated parameters show a significant representation of the model.

As expected, output and outcome variables positively influence the level of performance. Of interest is the latter variable, recorded with a "more flexible" on performance, compared at accessory output.

<sup>1</sup> The law 124/2004 entitled "Rationalization of the inspection tasks in the field of social security and work" concern the reform of security services in employment, with reference to the overall organization and coordination of inspection activities of all organization on social and labor legislation, and to combat shadow employment.

The inspection activity primarily aimed at "protecting the rights of workers" (F1) and the "realization of conciliation" (based on willingness to reconcile the citizens-applicants), are significantly more representative in order to explain the variability of the performance. Unremarkable, although significant, is the effect of the inspection conducted mainly in the office (through administrative and accounting checks: F2).

It also highlights a significant inverse relationship between the latent variable "context" and the inspection activity performance: while maintaining fixed the level of the input work (labour force of inspection), land area and density, the level of performance is reduced while increasing the variable "context" and vice versa. In other words, if the inspection staff structure remains unchanged, while the territory shows a growth in production (for example, increases in the number of employees), the inspection performance decreases.

The negative influence on the performance of the variable "context" is greater than the positive change of job. As if to say that the performance improvement is not crucial and unique feature of the "factor work", but it retrieves from the external environment, that one within which acts the organizational unit of MLPS.

## 5. DISCUSSION AND CONCLUSIONS

The system of performance assessment, empirically tested in this study allowed us to:

- identify two types of outputs: primary and secondary;
- establish a production strategy of DPL, on the basis of which identify the position in an "order of merit" (performance-rankiging);
- verify that the context variables behave as input variables
- measure the negative effect of context variables - significantly higher than the positive effect of the input work on performance

The relevance of the results is even more evident if the performance evaluation system is connected to a rewarding system that, as mentioned, in a phase of change of Public Administration, requires careful study, with the involvement of stakeholders.

A reward system as a device to the public management to take appropriate decisions, must take into account the variables of context, building, well, a system based on criteria of homogeneity.

The placement of a DPL in the national ranking with respect to "manufacturing strategy", modelled, first of all, on the basis of the mission of the Ministry of Labour and Social Policies, must necessarily also be "modulated" on the region's needs.

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