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Impact analysis of technological public services supplied to local firms: a methodology

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ABSTRACT: The aim of this work is to present a methodology useful to verify the impact of public interventions directed to support the technological innovation in local groups of SMEs. In the last decades, in several agglomerations of firms, some difficulties emerged, related to the small-medium enterprises gaps in innovation, to their low competitiveness and to the rising of distinct historical heritages in specific areas. To overcome them, some public interventions have been put into place, aimed at supporting the local units' development, and at sustaining the growth of the area.
The work examines two central points of this mechanism. Is it possible to evaluate the effects and the utility of the above mentioned public actions on the involved SMEs? Which is the methodology that is appropriate for such an evaluation?
In the economic literature these questions are linked to the "evaluation problem". This work suggests four methodologies (statistical - descriptive analysis and the application of regression, Probit and *difference in difference* models) to achieve these targets and, before that, it discusses the type of data that should be collected to apply them.

KEYWORDS: Firms' Technological Innovation, Public interventions evaluation, Impact analysis methodologies

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INTRODUCTION

The aim of this work is to present and investigate a methodology useful to verify the impact of public interventions directed to support the technological innovation in local groups of SMEs. In the last decades, in several agglomerations of firms, some difficulties rose, related to the small-medium enterprises gaps in innovation, to their low competitiveness and to the rising of distinct historical heritages in specific areas. To overcome them, some public interventions have been put into place: they are aimed at supporting the local units' development, at sustaining the growth of the area and then they are a possible solution for the above mentioned lags.

These public actions are usually realized through local Centres of Research, of Innovation or Technological Transfer, that supply different services to the involved firms or develop, with them, effective projects, in which collaborations among the technicians of the above subjects are realized.

The whole of these structures and laboratories are usually managed as public bodies and supply the services in a free way (they usually receive public financing).

The present work considers a central point of this mechanism: is it possible to evaluate the effects of the above mentioned public actions on the involved SMEs? Is it possible to give a clear answer about their real utility? And which is a methodology that is appropriate for such an evaluation?

The economic literature knows these questions as linked to the "evaluation problem" and gives different answers to them, as will be presented in section I. The following work suggests four methodologies which can be used to address the evaluation problem target and to investigate on the interventions effects:

- which are the effects of collaborations with public bodies, on the treated firms, going beyond a simple descriptive analysis of the interventions made?
- which are the answers of econometric regression models applied to the analyzed data and which are the information deriving from the estimated coefficients values analysis?
- which is the probability that some public interventions to innovate are successful and effective in inducing the growth of the involved firms?
- which is the measure of their effective impact on the local firms economy?

To answer to all these questions different techniques of analysis are presented in the following sections III, IV and V, while in the section II, the data base to which these methodologies can be applied is presented.

I. THE EVALUATION PROBLEM IN THE LITERATURE

The existence, in several economies, of different structural elements of crisis, due to the lack of an opportune firms competitiveness and of an adequate productive capacity, has led to several procedures of collaboration between private and public sectors, aimed at sustaining the first ones.

Nowadays the technological frontier is constantly progressing and the local small and medium units are required, to stay on the borderline, to have a central role in the national productive apparatus and to exceed the several problems that stop the development of their activity and reduce the efficiency of their productive processes. Often, in the actual economic contexts, these small units are not able to become, in an autonomous way, competitive, from social costs or technological points of view, in the national and international markets (Cappellin, 2007) and governments' interventions, oriented to the SMEs technological development sustain are generally required.

The whole of the above mentioned potential crisis factors is basically tied to the knowledge problem, where this last has the character of a public or semi-public good, with mostly tacit characteristics (Antonelli, Calderini, 1999) and discourages the local micro-size units in making strong quotes of investments in innovative products. This mechanism is explainable with the typical SMEs limit: the lack in them of an adequate risk and innovation propensity, due to the large infrastructures, to the economic capacity and to the financial autonomy required.

This phenomenon has led several SME to innovation investment rates lower than the optimum social level, to significant losses of competitiveness in the national and international markets and to deep innovation gaps.

The necessity of their overcoming and the systematic difference between the public and private yield rate of innovation investments are the principal argumentation justifying public interventions in the markets, aimed at supporting the SMEs competitiveness and technological innovation.

Further, several national and local governments, previously sustaining the interactive processes between the public and private spheres, have identified other new bases for public policies endorsing innovation (OECD, 1998). The new development theories focalize the justification of the public interventions in the growing returns of the knowledge accumulation: the evolutionary theories prove how this accumulation is path dependent and needs cognitive learning processes among the actors. Continuous feedbacks between the firms and the knowledge producers, that are, indeed, interdependent, in their diverse roles, but could also be in conflict (Rolfo, Calabrese, 2006b), are fundamental in the innovation process and the policies that arose from it could be identified as the result of the interaction among scientific, technological, economical and social factors.

Although this mechanism, in the last twenty years, the deep differences existing in the above mentioned fields and the consciousness of the centrality of the technological aspects, have become increasingly more important, indeed.

They have led to the definition of more concrete policies, specifically addressed to influence the firms decisions about the adoption, the development and the sale of new technologies (Mowery, 1994).

Finally, nowadays, it's possible to recognize a shifting process from the traditional firm-oriented perspective of the public innovation policies towards a more system-centred approach (Rolfo, Calabrese, 2006c). This last underlines the central role of the development of firms' relationships, the centrality of their technological aspects and of their regional contexts, and the increasing returns of investments in knowledge. The innovation policies born by this approach deal with the organizational, financial, educational and commercial dimensions of innovation (Cooke, 2005) and aim at enhancing the human and social capital. They are almost exclusively concentrated on the SMEs sustain (Rolfo, Vitali, 1997) and they are addressed to improve the existing network relationships among the local actors, the presence, in the public centres of research, of skilled and qualified staffs and to support the birth of new technology-based units (Rolfo, Calabrese, 2006).

Although, several experiences (among which Dosi *et al.*, 2005, Archibugi, Coco, 2005), that are a central base of quite all the public policy interventions, show, at a macro level, a clear tie existing among the innovative intervention made, the innovative level of the economic systems, the local firms development and their economical performances and growth, the same positive relationship (innovative level / economic growth) it's hardly confirmed at a micro-economic plane (Franzoni, Vitali, 2005), because of the difficulties in the valuation process too. These last increase the uncertainty of the observed relationship, that is already dimmed by difficulties in the data measurement (because of their low availability, the investments yield delay and several unobserved firms' life factors) and by the low uni-directionality of the public policy interventions, that are often characterized by different and sometimes opposite objectives, that increase their frailty.

Most of the time, the low impact of the public initiatives is due to their proliferation in too many operations and to the ambiguous way of their definition: they frequently are in competition among each others, are insufficiently financed, usually try to join different aims, replacing intermediary objects with the final ones and tend to generate confusion among the receiving subjects (Rolfo, Calabrese, 2006a). Moreover, the commercial times of the innovative products also weight on their uncertain results, because it's difficult to give, in a short time, a realistic measure of their effects on the firm sales or profits (Powell, Moris, 2004).

The increasing regional devolution of the

industrial policies, already affirmed in most of the European Countries, anticipated in the Italian context by the Autonomous Trento Province experience (Gabriele *et al*., 2007) and in several successive initiatives (as the one of the Canavese Technological District Consortium) has brought the necessity of a valuation of their effectiveness. A monitoring process of different public interventions is usually useful to improve their efficiency and the effectiveness of the incentives system, but it is often an extremely complex operation, due to the diverse problems that could rise in their realization.

The evaluation problem concerns the measure of the impact of a policy, or a reforming intervention, on a defined set of out-come variables, usually expressed as Yi_t.

In this ambit, the literature shows contradictory results.

Several analysis have tried to clear the relationship "public policies innovation sustaining / firms growth" training to gain new ambits of research (Griliches, 1979, 1998), paying attention to some Countries cases (USA and UK – Geroski, 1995; Germany – Engel *et al.*, 2004; Japan – Motohashi, 1998; Scandinavy – Nås, Leppälahti, 1997; Leiponen, 2000; France – Crepon *et al*., 1998) or to single regional innovation systems (as the West Midlands case, analyzed by Freel, 2000), but from all of them it's possible to gain only some general and univocal results, as the one about the different innovation intensity, that is usually higher in the big firms, thanks to their more complete innovation appropriation capacity.

Some researches (as Gabriele *et al*., 2007) show ambiguous conclusions. They stress, using a *Propensity Score Matching model*, the risk of a wrong use of public interventions, as capital substitution factors, instead of occasions of internal growth, if there is a low public interventions selectivity. Although David *et al.* (2000) show how the empiric evidence seems to favour the complementarity between public and private investments, Garcia-Quevedo (2004) concludes the results depend by the firms aggregation level and, finally, Santarelli and Vivarelli (2007) demonstrate, with a descriptive model, how often the interventions sustaining the entrepreneurship fall in the *replacement* or *earth burst* effects, because of the high probability they are supplied to firms that, in any case, would have been able to make the same investments, to be competitive in the market, or that are too weak to lead the investment made in an efficient way.

In this direction, the literature has also underlined as an incorrect use of the firm policies and incentives could produce negative effects, due to a too high young firms mortality, to entrepreneurship disillusion phenomena (Dosi, Lovallo, 1998) and to too superficial decisions if staying in the market or to get out (Lotti *et al.,* 2003; Santarelli, Vivarelli, 2007).

Other studies, aimed at measuring, with a counterfactual approach, the impact of the innovative interventions on the firms' production, technological performances and innovative output, have gained ambiguous and not very stimulating results: the causal relationship between the innovative processes input and output is dimmed by several risk and uncertainty factors (Crépon *et al.,* 1998) and, basically, by the existing trade-off between different objectives (Merito *et al*., 2007).

Next to these cases, in Europe, several programmes regarding specific technologies (nuclear, aerospace, electronic and ICT) have often led to the creation of big national enterprises operating in semi-monopolistic situations. Sometimes they have however failed to keep up the evolution of the markets (Rolfo, Calabrese, 2006b) and, in this contexts, the support at technological investments through business actions seems to have been the most useful: more advanced regions have benefited by a greater extent of available financial backing, although the appropriation of the results strongly depends by the presence of internal structures of knowledge and expertise (Rolfo, Calabrese, 2006b).

Observing the literary review, made by Chennels and Van Reenen (2002), of the microeconomic evidences of technological changes on the firms structure, it results again relatively scarce and with opposite results: Hujer and Radic (2005) don't recognize any effect on new products after the introduction of innovative activities; Irwin and Klenow (1996) noticed how the firms in network usually have, respect to the units out of them, better

performances in terms of profitability, after the introduction of an innovation, but it's not the same in terms of investments and labour productivity (in this last point, Merito *et al*. (2007) agree and underline the positive impact effect is only restricted to the firms' innovation activity).

Examining a panel of firms that have received a public sustain in the period 1983-1985, Lener (1999) observes how they grew more than the considered control group in terms of sales and employment, but, on the contrary, Wallsten (2000) demonstrate how the short time program effect is lower if the endogenous effects are considered. In opposite, Gabriele *et al*. (2007) underline how it's possible to see, in the short time, growth effects and size increases, that indeed not imply a better use of the existent productivity factors and remain limited to this period, because of the absence of structural change in the technological status of the involved firms.

Again, Harris and Trainor (2005) sustain the local incentives utility, defending the employment through the existing firms protection, but Bergström (2000) underlines how the stimulated firms productivity increase in the short time, to decrease later, in the long period, in a rate proportional to the received subsidies.

Concluding this brief review, Dodgson and Bessant (1996) point out that these policies may be useless if the gap that often prevent the smallest companies from an efficient use of external-know how is not filled.

Further, the innovations impact on the local or national employment is an old, uncertain question too (Beesley, Hamilton, 1984), because two effects have been noticed:

- of growth and increase of the work positions, because of the new productive processes, products, the births of new firms and the lower labour costs (Merito *et al*., 2007);
- of their decrease, because of the substitution effect "labour force/capital" and the possible firms structural changes, that imply the demand of different productive factors (more skilled, as Piva *et al.* (2005) said).

In this speech, it has been stressed the necessity of transformations of the markets and of the public bodies for the creation, respectively, of skilled labour forces and infrastructures useful to adapt the economic system to the new technologies (Vannoni, 2000). Furthermore, the consciousness that the innovation effects could change in different times, sectors or firms (Peters, 2004) and if the whole of the actors that gravitate around the firms (customers, suppliers, competing firms) are considered or not (Brouwer *et al.*, 1993), makes the observed relationship of difficult interpretation. In most of the estimation works, the growth dynamic generally has a positive sign on firms employment: it is usually stronger in the big firms, where the innovative activities seem to have a more direct effects, because they belong to specifically solid sectors (as the manufacture one), no strongly influenced by the economic trend; although, anyway, more refined distinctions, as, for example, the separation of process or product innovation impacts, have not been possible (Franzoni, Vitali, 2005).

Other works have been underlined, with descriptive approaches, how the *self-employment phenomenon* and the possible birth of new firms exist too. They could be sustained by the effective national or regional unemployment (Audretsch *et al.,* 2005), because the low opportunity costs of these actions, and they could be stimulated by the innovation. In these cases, the public interventions net employment impact could be positive, although it depends by other complex factors too, as the methods of measure considered (if they are relative to the total labour force - Armintong, Acs, 2002 - or to the net or gross entrance rate - Carree, Thurik, 1996). Particularly, the Piergiovanni, Carree, Santarelli, Verheul analysis (2007) shows, with a regression model, the innovative interventions impact is significant in the construction and transports sectors employment growth, because the high rate of autonomous amateurish firms, while, at aggregate level, in the manufacturer, commerce and financial services sectors the impact is negative. Anyway, more simply, most of the governments interpret the innovative interventions as creating new skilled employment places (Leiponen, 2000) and use in this sense these policy instruments.

A different notation is present in the literature regarding the public innovation policy effects on the firm size and vice versa, the size value on the innovation projects: the data and the regression models show the positive innovative interventions impact on the small firm dimension, that usually have, because of the few complementary assets owned, more difficulties in the appropriation of the innovation results (Cohen, Klepper, 1996; Franzoni, Vitali, 2005).

This is an important conclusion, although it's been recognized the existing imitative danger and the central role of the big units in the projects development and defence against the concurrent firms illegitimate appropriation (Merito *et al*., 2007).

Other analysis (Gabriele *et al*., 2007) underline how the public interventions usually have a first positive impact effect on the firms sizes, while there is no answer in labour productivity or capital intensity terms. On the contrary, other works (Merito *et al.*, 2007) conclude the firms involved in public interventions don't show, after 2 years from the collaboration, a particular growth in their size.

Paying attention to the firm activity sectors, the literature notices that, although the effect on them is lower than the size one, there is a better answer in the specialized suppliers fields and in the ones with high scale economies, where the processes of innovations are more frequent. Particularly, the considered innovations, usually, allow a production costs reduction, that permits the involved units to follow a competitive strategy based on lower prices; in this context, the big traditional firms usually have stronger results than the small and hi-tech ones (Nås, Leppälahti, 1997).

It's still important to underline as the above mentioned firms performances improvements usually appear in the 2-3 years just following the innovative intervention and they mostly regard the sales quotes. Anyway, they can't be necessarily considered as signs of a firm stronger competitive position in the middle and long time evolution, because it hardly depends by the specific market and economic sector.

Other inquiries (Merito *et al.*, 2007) suggest that generally the public interventions have few effects on firms growth or on their productivity in the long period, while are an incentive in the short time, stimulating the innovative activity output. In this context, the structural industrial differences, most of all in terms of presence of big multinational firms, have an important weight on the single firms replay to the innovative incentives (Cefis, Evangelista, 2007): the little units usually give higher answers to them, result more innovation oriented and the new processes techniques have in them an higher diffusion, but although this different reaction, their final performance tends to be lower then the big firms one.

From all the above mentioned concepts it's than possible concluding how a clear association "public intervention / innovative output / better firms' performances" exists particularly where more selective initiatives are allocated: in some studies it's demonstrated how the Italian initiatives are usually less useful, because of their too wide and generic finality. It's than clear the ambiguous and not unidirectional effect of the public interventions sustaining the firms' growth and development, because of the possible influence of too much factors, that could lead to diverse and opposite economic pictures. Often this relationship could be found, but it's overall due to a link between public subsidies and the technological improvement of the involved firms, to their sensibility to the incentives and to the greater investments concentration: the connection between the public actions and the better firms performances isn't than foreseen.

To gain a surer valuation of this last relationship, a more careful definition of the opportune valuation mechanism is due. The present work suggests a methodology, that can be applied to different cases and allows the achievement of objective results in the public interventions valuation activities.

II. THE DATA BASE CONSTRUCTION

First of all, it's important to give a summery of the kind of data that should be appropriately considered in these elaborations.

They are presented in a panel structure and are made by some generic firms' information

(name, location, age, juridical form, etc.), by their balance-sheet values (collected from the balance-sheet national data base) and by technical elements related to the interventions made.

For a realistic and more complete valuation of the actions supporting the innovation in the local firms, a cautious methodology implies their consideration in different times (for a period "long enough" to catch realistic results). The variables should be observed:

- Before the innovative intervention
- A short time after it
- A longer time after it

The principle that drives this triple control is that a long time analysis, that considers different steps in which the firms are checked, could give a more trustfully answer about the collaborations impacts in the short and longer time (usually the advantages of an innovative intervention appear only after a specific lapse of time, 2-3 years in average – Franzoni, Vitali, 2005).

The data that give a complete summery of the involved firms evolution include firstly their juridical form: it could be interesting to observe the initial panel composition and its changes, during the years of the collaborations.

Later, the oldness of each firm, since the year of its foundation, should be analyzed: a different age could imply different reactions to the services received and to the projects developed, in fact the effects of the collaborations with the Centres are usually stronger and better in the younger firms, but they aren't durable in the time, because their economical frailty.

Subsequently it's central the examination of the location area of each unit: usually, the services supplied by the Centres of innovation are directed to restricted panels of firms, characterized by common elements, as the sector of activity, the size or the location. This last element has an important role in the firm's economical performance, because of the narrow link between the space evolution and the local firms' technological growth (Antonelli, Calderini, 1999). The localization of the firms in zones defined in economic decline, with an high unemployment rate, increasing in the industrial sector, and with a percentage of vacant job positions, in the industrial division, greater than the national average, could represent a strong point of disadvantage in their economical performances and should be considered in the public collaborations evaluation. Similarly, the localization of the SMEs in areas sustained by European financial supports or inserted in development strategies could have a positive influence on their habit in the collaborations with public Centres and than in their absorptive capacity, that is a central characteristic in the reaction to the public actions.

An other central point in the public services valuation is the consideration of the firms' economic field of activity. Inside the usual distinction among more traditional or more innovative sectors, they could be differenced considering their internal technological level too. This last characteristic has a basic role in the SMEs absorptive capacity of the technical knowledge transmitted by the Centres technicians during the collaborations and on the firms ability to insert them, in the productive processes, and than on the public interventions effects.

Further, the SMEs' technical level is central for the projects valuation also because, if the greater part of involved firms belong to innovative and technological advanced fields, the Centres services typologies and innovativeness are justified; but if, on the contrary, the firms have only a low or medium technical level, it would be true the opposite principle: the innovativeness of the services supplied is the answer to the need, of the local SMEs, of technologically advanced collaborations. This last observation leads to a first important result, attesting the Centres central role in the local economic development.

Successively, the balance sheet data of each firm give a detailed picture of their economic / financial status. The first important variable that is important considering is the level of internal employment, that allows the observed units classification in small, medium or big firms, following the supranational (European or USA) definitions. Eventual changes in the firms' sizes are expressing their growth and show an important effect of the interventions realized and, in any case, the consideration of the panel

composition, through the count of each size category as a percentage on the total number of involved units, gives an important information on the specific utility of the analyzed services and on the units to which they are directed.

It might be also useful to analyse three groups of data:

- The number of professionals present
- The number of graduates
- The subjects with other forms of collaboration

It would be important consider the number of each group and their fluctuation in the observed period, to catch the real impact of the introduction of an innovation on the firm possible development. In fact, an increase of employments belonging to the second category is more important than the others, because it would permit a solid rise of the firm and of the national economy.

An other important factor that should be considered is the firm profitability, that can be observed from different points of view, which underline the diverse advantages of the involved enterprises. The productive system profitability could be measured, for example, by the indexes:

- ROS (Return on Sales), that is the ratio between the operative margin and the sales. It shows the degree of profitability that a firm is able to gain with the sales. It is important because it says how much the business contributes to the result of the balance and how much it could be improved.
- ROI (Return on Investment), that is the ratio between the net operative margin and the invested capital. It shows the profitability of the firm investments, that could, eventually, increase its technological and innovative level too.
- ROE (Return on Equity), that is the ratio between the net income and the net patrimony. It gives the best synthesis of the firm performance and it shows the degree of profitability of the capital of a firm: it measures the cost of it, that could be originate by the investments in technological innovation too.
- R.O.A., that explains the return on the investments and assets made by a firm.
- R.O.T. (Invested Capital Rotation rate), that shows the effectiveness of the invested capital respect to the sales.
- The Gross Operative Margin (GOM) or the Ebitda (Earning before interest, taxes, depreciation and amortization), that is the difference between the added value and the value of salaries. It explains the financial flux associated to the operative management.
- The ratio GOM / sales, that explains the trend of return of the firm.

The productivity of a firm should be evaluated through the sales and the profit values too: these quantities give information about their final products, about their sharing in the national and foreign markets and about the profits deriving by their management. They all could be influenced by innovative investments and it's interesting their comparison respect to the areas developments.

Further, the intention to keep in the time the relationships with a Centres is again indicative either of the more concrete realization of the collaborative activity, or of the presence of an "open mind" firm. As already explained, this last characteristic is a central point assuring the absorptive capacity needed for a complete reception of the knowledge transmitted. In this sense, the consideration of the involved SMEs technological status, before and after the collaborations, could lead to a better valuation of the concrete advantages and technical improvement reached with them. The technological status typologies should be defined considering the innovative technical level of each activity sector and the positioning of each firm could be made, in this ambit, in a range from 1 (obsolete technology) to 5 (top technology).

The central point, in this context, is the consideration of the correspondence between the technological level of each firm and the one needed for the realization of each project: only where there is accordance between them, the firms are able to catch in a complete way the advantages of the collaborative activity.

Beside all these data, to reach a more realistic final judgement of the interventions supplied, it's useful to add some technical information pertinent to the innovative needs of the involved firms and to the results reached with the collaborations. They could be identified and summarized through some interviews, questionnaires or *technological audit* realized by the Centres of Research technicians, that include a brief exposition of the problems individualized in the auditing and of the objectives researched with the collaborations. The audits represent the immediate impression of the firms components (managers, technicians and employees) about the interventions allocated. Alternatively, this information could be derived from the technical aspects of the different collaborations made and from the characteristics of their concrete realization. It's useful synthesize them in some different standardized typologies, explaining the different problems and technological needs of the involved firms. They can be classified in groups, that can be used to find the frequencies and correlation with the SMEs economical performances (which typologies of interventions correspond to firm's positive economical evolutions). It's also important to consider the different possible evolutions of each collaboration, that could progress, for example, in feasibility studies related to the possible solutions individualized by the Centres technicians: these studies could represent a concrete application of the knowledge transmitted and help the involved SMEs to catch better the advantages of the Centres services. It is interesting to observe the different impact of collaborations circumscribed to the first phases of intervention or realized in a longer time, with the execution of the above mentioned feasibility studies.

Similarly, the consideration of further successive developments in the production methodologies, or of products or processes modifications, or of patents made or in progress, deriving from the collaborative activity with the public laboratories, represents an important applications of the technological transfer activity and could influence the final results gained by the SMEs through the Centres support. On the contrary, the moderate firms' participation to these successive evolutions represents an element of reduction of the Centres collaborations effects. In an evaluation analysis, it's so central the consideration of each different step in the projects development and of their results, to ponder the technological improvement gained with them and give an objective description of their effects.

Still deepening the services supplied analysis it could be useful a notation of the interventions technological level, as already said, of their utility, their productive relapses, of the engagement made (or potential) with their realization and of the foresights of new orders (these data could be all expressed in three levels scale: high/medium/low). These results should be coherent with the preceding: the involved SMEs that aren't technologically advanced and have expressed their intention to realize some collaborations with the Centres in the future, should have realized satisfying results; on the contrary, the firms that are already technologically developed, should have judged the Centres interventions with a low utility and with only medium productive relapses.

Collected all these data, the methodology presented implies, firstly, a statistical-descriptive analysis of them and, secondly, the application of three econometric models, to analyze:

- the influences and correlations among the considered variables (regression models),
- the probability to gain positive results with the collaborations (Probit models),
- the effective impact of the services on the SME economical performances, through the comparison with a control group (Propensity Score matching models).

III. THE STATISTICAL – DESCRIPTIVE METHODOLOGY

The first methodology suggested, the more descriptive one, is based on the simple statistical consideration of the balance sheet and technical projects data of each involved firm.

These information describe the economical evolution of the observed units. Considering their variations in the analyzed period and their

statistical correlations, it permits to gain a first picture, of the services effects, on the single units performances and on the evolution of the sectors to which they belong. This analysis is particularly useful to identify the firms' balance-sheet advantages born with the collaborations supplied by the local Centres of Innovation and finalized to support the local units technological development. The innovative processes can usually be evaluated with:

- The frequency of the contacts with the Centres of research (1)
- The economical performances of the involved firms (2)
- The number of innovative products made in the period (3)

If the technological transfer actions, that have implied one or more collaborations with the local Centres (1), have been done in an efficient way (they have conducted to the insertion of specific innovations in the firms productive processes) and if the involved enterprises show a net increase in their economical values (or, if the whole area is decreasing, they have kept their economical position) (2), this better evolution could be justified by the new innovative products made in the period (3) or by their larger quantity produced and, finally, by the collaborations with the Centres. If the economical evolution of the greater part of the involved firms would be better than the one of the respective areas of localization, a first conclusion about the utility of the interventions made in the territories and their positive consequences on the firms evolution could be gained. It would be a first important policy result and, if it would be confirmed by the econometrics models too, a clear conclusion about the positive effects of the collaborations can be reached.

Having defined these simple points, the first necessary operation is a valuation of each firm performance, during the years considered in the analysis, and its comparison with the one of the location area. To reach this target it's important to identify the evolution of each location area in the analyzed period. Usually, some indicators, expressing the local economic trends and allowing the definition of a summery of the local economical developments are identified by the offices of the Chambers of Commerce. Comparing these trends with the economical performances of the involved firms, each unit could be defined as having had a positive or negative economical development in the observed years.

Because of the finality of these last performance judgements, it's important to consider the "success cases" as the ones that have had an evolution better than the location area one and the "failure cases" as the ones that have had economical performances worse or similar to it: the line that guides this valuation methodology refers to the utility, of the public interventions, to help the involved SMEs to have an economical evolution better than the one that would have had without them, in the specific location area and period.

Finally, it's useful to divide the cases of success by the failure ones and to find the statistical correlations with the services allocated (by mean of the frequency of the positive cases in the panels of firms that have used each specific service).

This first operation gives us the occasion to see a real risk of a valuation work and the necessity of using some specific expedients to go over it. Sometimes, the introduction of innovative technologies has positive effects on the involved enterprises, but it is difficult to see them in a short lapse of time, because they are not still producing advantages, and it's equally difficult to discover them in a longer period, because of the presence of changes in other different parts of the observed firms, that affect their general development. A double valuation activity, related to the firm economical evolution in the short period (2-3 years following the interventions) and in a longer time after them, is then crucial. The success and failure cases could differ in these two cases and this aspect could change the interventions final judgement.

Further, each valuation should be considered not only in the context of the local evolution, but also in the variables through which it's expressed: the changes of different balance sheet variables have diverse weight in the SME development judge. Generally:

- If an observed firm, located in a depressed area, keeps its economical stability showing positive variations in the sales and employment values in the last years of the public collaborations, the final judgement about its performance and the utility of the projects allocated could be positive, because the above mentioned variables have a weigh greater than the profit one on the firm evolutions, as they could be indicative of a solid future growth.
- Comparing the variations of other balance-sheet variables, it's probable that the Ebitda values have changes wider than the profit ones, because their bigger sensibility to the production costs. This point should be considered in a realistic evaluation of the firms' performances.
- If a firm shows lowing values, except for the Centres services years, then the judgement about its performance is negative, but the one about the utility of the projects is positive, although their good effects exist only for a short time.
- If a firm has positive effects through the collaborations and shows good balance sheet values in the first years after them, but it goes down in a sharp way in the last period, the judgement on the firm's performance is negative, because a decreasing period could start and the collaborations haven't been enough to avoid it. On the contrary, if a SME re-acquire good values, after a short fall, then the judgment is positive.
- Instead, if a firm shows an high increase in the production or employment variables in the years of the collaborations and a little fall, in the same balance sheet values, in the following years, then this typology of variation could be joined to the positive ones, because it's possible to think that very high increases could be followed by a little decrease later, not defining the firm as one with bad results in the period.

After the identification of the success cases for each typology of intervention, it's indeed useful considering the different quotes of units that agreed to successive projects developments; the results reached after these last collaborations; the evolutions of the firms technological status and the correlations between this last and the cases of success. An other central point is the clustering of different typologies of SME, characterized by common elements. For example:

- it's useful to group the units that agreed to a project only and the ones present in more interventions: the observation of their different economical performances and technical evolutions could explain, in a realistic way, the public services utility. Usually, the firms that use more than a collaboration, in the same period, don't show results better than the ones of the period preceding the interaction with the Centres; on the contrary, the units that agree to more than a project, but in different successive times, belong to the Success Cases and gain results clearly better than the previous.
- Similarly, it could be interesting to consider the units belonging to technological advanced sectors and observe their different answers to the collaboration supplied: usually these firms should have an higher absorptive capacity, gain stronger economical advantages and deeper changes in their productive processes.

Further, if the interventions are supplied in different tranches, the consideration of the results gained in each different share could be highly explanatory of the typologies of problems faced and of the productive tissue evolutionary trend.

Although from this first valuation work some important results are surely gained, to catch a more complete picture of the collaborations impact, some specific econometric models might be applied to the constructed database.

IV. THE REGRESSION MODELS

The first econometric application suggested in this work is the regressive one. Its objective is catching the mutual influences among the most important variables considered.

The constructed panel of data should contain

repeated observations per individual (each variable is analysed for a specific lapse of time): this could be a problem, but it's an advantage too. Indeed, these variables are not independent, so if we pooled the observations and we use OLS methodology we would have biased estimates, but if we fit them with a "cross-sectional time-series" model[1], as the fixed-effect or random-effect ones, which take into account the repetition, we can control for fixed or random individual differences and we can get better parameter estimates. The basic framework is:

$$Y_{it} = X'_{it}\,\beta + z'_i\delta + \varepsilon_{it}$$

Where $z'_i\delta$ is the individual effects term and where z_i contains a constant term and a set of individual specific variables, that are taken to be constant over the time t. If z_i is unobserved, but correlated with X_{it}, then the least squares estimator is inconsistent, as a consequence of an omitted variable, and the model become:

$$Y_{it} = X'_{it}\,\beta + \alpha_i + \varepsilon_{it}$$

Where $\alpha_i = z'_i\delta$, embodies all the observable and unobservable effects and specifies a conditional mean. This is a fixed-effect model, in which α_i is an individual specific term, constant in the time. This model is appropriate when we consider each individual has a fixed effect shifting the Y_{it} up or down (it would be appropriate for a firms study).

If z_i is unobserved and uncorrelated with X_{it}, then the model may be formulated as:

$$Y_{it} = X'_{it}\,\beta + \alpha + u_i + \varepsilon_{it}$$

This is a random-effect model, where u_i is an individual specific random element. So, the crucial distinction between the two models is whether the unobserved individual effects are correlated, or not, with the regressive variables in the model. The random-effects model considers the individual differences (u_i) as random disturbances drawn from some specified distribution, rather than fixed and estimable: this has the advantage of using fewer degrees of freedom, but it has the disadvantage of requiring no correlation between the regressive variables X_{it} and the u_i. Admitted the fixed effects approach virtues, going beyond the little justification for treating the individual effects as uncorrelated with the other regressive variables, as it's assumed in the random effects model, from a purely practical standpoint, this last method greatly reduces the number of parameters to be estimated and often appears more suitable (the fixed effects method may be inconsistent, due to the correlation between the included variables and the individual specific random element) (Chamberlain, 1978).

Helping in the choice between the two models, we find the Hausman Test (1978). It verifies the orthogonality between the random effect elements and the other regressive variables: the test is based on the idea that, under the hypothesis of no correlation, both the OLS and the GLS are consistent in the Least Squares Dummy Variable Model[2] (although OLS is inefficient) and they should not differ systematically. Under the other hypothesis, OLS is consistent, but GLS is not. The Hausman test is based on the valuation of the difference between OLS and GLS and on the analysis of the covariance matrix of the difference vector [b – β], in which b is the slope of the model. More exactly, the test verifies:

$$\mathrm{Var}\,[b - \beta] = \mathrm{Var}\,[b] + \mathrm{Var}\,[\beta] - 2\,\mathrm{Cov}[b,\beta]$$

If the no correlation hypothesis is verified, the result would be: $\mathrm{Cov}\,[(b - \beta), \beta] = 0$

Then: $\mathrm{Cov}\,[b - \beta] = \mathrm{Var}\,[\beta]$

and then: $\mathrm{Var}\,[b - \beta] = \mathrm{Var}\,[b] - \mathrm{Var}\,[\beta] = \psi$

[1] In the econometrics literature these models are called `cross-sectional time-series' because we have time-series of observations, at individual rather than aggregate level.

[2] Least squares dummy variable model: $Y = X\beta + D\,\alpha + \varepsilon$. Where D is the matrix of dummies d_i indicating the *i*th firm.

The test is based on the Wald criterion: under the null hypothesis, W has a Chi-squares distribution, with K-1 degree of freedom.

$$W = [b - \beta]' \, \psi^{-1} \, [b - \beta] = \chi^2 \, [K-1]$$

If the no correlation among the unobserved individual effects and regressive variables in the model is confirmed, a random-model should be applied; in opposite, if the hypothesis of no correlation can't be accepted, it's the case of a fixed models application.

Indentified the model, its application to the analysed data could be extremely interesting and shows the variables relationships, correlations and the mutual effects.

V. THE PROBIT MODEL

With the second econometric typology of inquiry, we verify an other central point of a valuation analysis: which is the probability that an innovative public o private intervention is successful, in term of economic growth of the involved enterprises? And which are the most important factors in this process, which have a stronger impact on this probability?

We answer applying a Probit model to the collected data (González *et al.*, 2005). These models, explaining a binary variable as dependent, typically arise when the interest is in a regression-like model and it is oriented to specify a relationship between the former binary variable and a set of covariates, in a binary choice model (Greene, 1993).

In the specific panels of data analyzed in these works it's useful to consider, as dependent dummy variables, the results of the first methodology applied, the more descriptive one. They are pertinent to the judgements given to each firm economical evolutions during the collaborations years and the whole considered period, in comparison with the location area one. These variables indicate if the public interventions have been successful or not (Y=1: success; Y=0: failure) and are dichotomous, qualitative, binary, dependent variables. The focus idea is to consider the realization of each $Y_{i,t}$ as explainable and linked to a set of factors, gathered in a vector X, at least in the spirit of regression (Greene, 1993).

The basic notion characterizing the model is the existence of a latent, unobserved, variable, $Y_{i,t}^*$, ranging from $-\infty$ to $+\infty$ and indicating, in this case, the probability of success of the intervention supplied. This *latent variable* derives from an *index function model* and it's related to the set of explanatory variables $X_{i,t}$ by the relationship:

$$Y_{i,t}^* = \alpha + X'_{i,t}\beta + \xi$$

Where the vector $X_{i,t}$ collects the qualitative and quantitative variables that explain the result of $Y_{i,t}$, α is a vector of unobserved and stochastic effects, independent from the vector $X_{i,t}$ and from the error ξ, β is a set of parameters that reflect the impact, on the probability $Y_{i,t}^*$, of a change in $X_{i,t}$ and is estimated with the maximum likelihood method, and ξ is a random error term, drawn from a standard Normal distribution.

The relation between the latent variable $Y_{i,t}^*$ and $Y_{i,t}$ is:

$$Y_{i,t} = 1 \quad \text{if} \quad Y_{i,t}^* > 0$$

$$Y_{i,t} = 0 \quad \text{if} \quad Y_{i,t}^* < 0$$

Then, the probability that $Y_{i,t} = 1$ is:

$$P\,(Y_{i,t} = 1 \mid X_{i,t}) = P\,(Y_{i,t}^* > 0 \mid X_{i,t}) = F\,(X_{i,t}, \beta) = \Phi\,(x'\beta)$$

Where $F(X_{i,t},\beta)$ is a continuous probability function, defined over the real line, and $\Phi\,(x'\beta)$ is the notation commonly used for the standard Normal distribution regression model, that is the distribution assumed for the error term ξ.

Obviously, the dependent variable results are varying with $X_{i,t}$ and, to interpret the estimated model, it's useful to calculate its values, named marginal effects, at its mean level. It's possible calculating the marginal effects at the sample mean of the data or to evaluate them for each observation, using the sample average of each individual marginal effect. For the Slutsky

theorem and assuming the data are well behaved in the large numbers law, in the large samples the two methods give the same answer, but they don't in small or moderate sized samples: the current favourable practice depends, then, on the single case and put:

$$\delta F (X_{i,t}\beta) / \delta (X_{i,t}\beta) = \Phi'(x'\beta)$$

the marginal effects are defined as:

$$\Phi'(x'\beta) * \beta$$

Calculated the marginal effects, we can gain the probability that the *latent variable* is major than zero and then the probability that the binary variable $Y_{i,t}$ is equal to 1: this last value shows the probability of success of the innovative interventions analyzed.

VI. THE PROPENSITY SCORE MATCHING MODEL

The evaluation problem concerns the measure of the impact of a policy, or a reforming intervention, on a defined set of out-come variables, usually expressed as Yi_t. This valuation is often an extremely complex operation, due to the diverse problems that could rise in its realization (Cefis, Evangelista, 2007), linked to the usual late of the results gained, to the low availability of data and to correlation problems among the variables. To overcome these difficulties, the literature frequently follows a counterfactual approach (Bondonio, 1998, 2006; Santarelli, Zaninotto, 2007; Merito *et al*., 2007; Gabriele *et al*., 2007). It is usually considered one of the most suitable method, giving a solid summery of the impact of the interventions realized.

It implies the analysis of a realty very similar to the observed one, but which hasn't received the studied interventions (Ashenfelter, 1978; Blundell, Costa Dias, 2000), and it allows the services evaluation by means of the comparison between the performances of the supplied firms and the ones of the control group.

Particularly, the counterfactual approach allows the consideration of the services aims and of the factors of their realization: it takes into account different aspects of the same intervention, as the involved technological input/output elements (Engel *et al*., 2004), the firm economic evolution, the employment changes and the ones relative to incremental or tacit innovations, inserted in the productive process. Finally, it permits a complete valuation.

This methodology is based on the theory that, usually, each subject involved in a public act is identified by some characteristics *ex-ante* and it's valued by some other points, *ex-post*, that show the intervention impact and allow a classification of all the individuals in respect to the results of the analysis (Blundell and Costa Dias, 2000).

The whole of these characteristics is useful to identify the counterfactual group (or control group) units, but, although this simple methodology, often, different problems rise in this identification. The construction of a fitting control group is not elementary, and even when its choice requests the close comparability of the peculiar characteristics considered in the selection of the treated group (and this is already quite hard to guarantee), we cannot be sure about the absence of other features that could distort the comparison and the impact valuation. A system for an efficient solution of this problem is proposed in the following part.

In the empirical economics, the evaluation methods are divided in 5 great categories (Blundell and Costa Dias, 2000), that lead to different way of construction of the counterfactual group. The use of the appropriate model depends on several criterions:

- The scale and the width of the programs: local or national, small or global;
- The nature of the questions;
- The available data: if are available the same information, relating to the period before and after the participation to the programme, either for the analyzed and the control group units.

In a study of LaLonde (1986) we can verify that valuation results obtained using different estimation techniques and different types of control groups, are deeply different, but Blundell and Costa Dias (2000) show the optimum evaluation situation and how to construct the better control group: if the services

are supplied to a "random sample from a group of eligible individuals, chosen to participate to a programme, the assignment of the treatment is completely independent from a possible outcome variable, that results independent from the treatment effect. If no side-effects exists, the selection problems are completely ruled out and the comparison group, composed by no-treated units, is statistically independent to the treated group in all the variables, except the treatment status" (Blundell and Costa Dias, 2000). After the proper control group individualization, the appropriate valuation methodology that should be used in this third analysis depends on three factors:

- The type of information available;
- The underlying model;
- The observed parameters.

If data are available in a longitudinal or repeated cross-section format, as in the case here hypothesized, it is possible to estimate the treatment effect on the treated units consistently, without having to impose any restrictive conditions, applying the *difference-in-difference* method, which can provide robust results. It verifies the effects of the treatment through the comparison of the involved units with the ones of the control group: the variables that could be analyzed depend on the specific aspect investigated, but usually are the profit, the added value and the sales ones.

To filter this result from the own trend of each unit and avoid errors of selection bias, a pre-post control group methodology should be adopted (Bondonio, 1998, 2006). It cancel the regional or national cycle effects and formally it measures the SATT (Sample Average Treatment Effect on the Treated: α), in the units (i), in the time (t_n), on the variable Y, as:

$$SATT = \alpha = E[(Y_{i,tn}^{T} - Y_{i,t0}^{NT}) - (Y_{i^*,tn}^{NT} - Y_{i^*,t0}^{NT})]$$

where:

T/NT = Treated / Not Treated units

i = Observed units

i* = Control Group units

t_n = time of the treatment endowment

$E(Y_{i,tn}^{T} - Y_{i,t0}^{NT})$, $E(Y_{i^\wedge,tn}^{NT} - Y_{i^\wedge,t0}^{NT})$ = deviation from the *spontaneous* dynamic of both the observed and control group units.

Considering each $Y_{i,t}$ as the result of the linear equations:

$$Y_{i,t} = X_{it}\,\beta_i + \varepsilon_{it} \qquad \text{if } t < tn$$

$$Y_{i,t} = X_{i,t}\,\beta_i + d_{it}\,\alpha + \varepsilon_{it} \qquad \text{if } t > tn$$

Where:

d = dummy variable, that is equal to 1 if the individual participates to the programme, equal to 0 otherwise,

α = homogeneous coefficient of impact for the treated individuals

$\alpha_T = \alpha + E(\varepsilon_i \mid d_i=1)$ = the mean impact of the treatment on the treated where:

$E(\varepsilon_i \mid d_i=1)$ represent the mean deviation from the mean impact among the participants, and $\alpha_i = \alpha + \varepsilon_i$, represents the coefficient of impact on the subject i

The estimator α measures the growth excess of the treated units, comparing the two deviations from the *spontaneous* dynamics: it's the more realistic measure of the impact of a treatment.

This method allows catching the average effect of the observed policy on the involved individuals. This evaluation methodology has two advantages:

- It removes unobservable individual effects and common macro effects, because it considers the observed outcome variables enhance, valuating their differences in the time;
- It requires only two sets of information, relative to the pre and post-programme periods.

Anyway, although these positive points, this method relies on some important assumptions that could make the construction of the control group extremely difficult (Blundell and Costa Dias, 2000).

First of all, both the treated and the comparison group are supposed to be *affected in the same way by macro shocks*; secondly *composition changes are not admitted within each group* and finally crucial assumptions are lying behind the *error composition*.

The value of the error term, ε_{it}, could be decomposed (Blundell and Costa Dias, 2000) as:

$$\varepsilon_{it} = \Phi_i + \theta_t + \mu_{it}$$

where Φ_i is an individual specific effect, hypothesized constant over the time, for each individual, is θ_t a common macroeconomic effect, the same for all the agents, and μ_{it} is a temporary individual-specific effect. If the expectation of ε_{it}, conditional on the treatment status, depends on the temporary individual-specific effect, μ_{it}, the difference-in-difference method is inconsistent, because it's unable to cancel the individual specific evolutions with their subtraction. The method is instead able to control for the other two error components, as they are cancel out on subtraction. Then a separability condition between individual and temporal effects has to be assumed, as:

$$E(\varepsilon_{it} \mid d) = E(\Phi_i \mid d) + \theta_t$$

If the only unobservable term is Φ_i, a simple difference method could be applied and the estimator $[\alpha = (\tilde{Y}_{tn}^{T} - \tilde{Y}_{t0}^{T})]$ would be sufficient to identify α consistently.

If the control group units are the ones that would have been selected for the allocation of the services but they have not still received them, then a joke of word defines α as measuring the mean impact of the *treatment on the treated.*

If the control group units come from the entirely population of the area, α measures the population impact, but to catch this quantity is not so simple, because of the rising of a selection problem (usually individuals have not a similar reaction to a policy interventions, they are heterogeneous).

It can be solved by the nearest neighbour matching valuation method: it implies the selection, both from the treated and the control groups, of a sufficient number of defining characteristics so that any couple of observed subjects, one from the former panel of firms and one from the latter, would not display systematic different reactions to the policy analyzed, due to strongly different structures. The aim of the method is to match individuals with similar values of the set of variables considered, to observe the differences in the outcome variables and to catch, with this latter value, the net measure of the mean impact of the policy. To solve the uncertainty problems that weigh on the right identification of the matching variables (see Heckman *et al*., 1997 study) a specific instrument summarizing the whole of them, the Propensity Score (PRSC) is used, in a *propensity score matching model* (Bondonio, 1998, 2006; Gabriele *et al*., 2007).

The PRSC allows the peculiar identification of a control group, that shows characteristics similar to the treated one.

Its value usually represents the probability of participation of each individual to the valued treatment and summarizes it in a number. It's expressed as (Rosenbaum and Rubin, 1983):

$$P(X) = P(d=1|X) = E(d|X)$$

Where d = {0, 1} is the dummy indicating the exposure to the treatment,

X = multidimensional vector of the pre-treatment characteristics

More exactly, given a population of units denoted by different X, if the propensity score P(X) values are known, the Average effect of the Treatmen on the Treated (ATT) can be estimated as follow (Becker, Ichino, 2002):

$$\begin{aligned} ATT &= E\{Y_{1,i} - Y_{0,i} \mid d_i = 1\} = \\ &= E\{E[Y_{1,i} - Y_{0,i} \mid d_i = 1, P(X_i)]\} \\ &= E\{E[Y_{1,i} \mid d_i = 1, P(X_i)] - E[Y_{0,i} \mid d_i = 0, P(X_i)] \mid d=1\} \end{aligned}$$

Where the expectation is over the distribution of P(X) | d= 1: any standard probability model can be used to estimate the PRSC: usually the probit or logit models are used, then:

$$P(X_i) = P(d=1 \mid X_i) = \Phi(h(X_i))$$

where $\Phi(h(X_i))$ denotes the normal function and $h(X_i)$ is a starting specification, which includes all the covariates as linear terms, without any interactions or higher order terms (Becker, Ichino, 2002).

In the present work, on the contrary, a different use of the PRSC is considered. The propensity index is constructed using the data relating to the former financial situation of the observed firms and it means the probability of each unit to have a specific economical evolution (positive or negative respect to the area) in the observed period. The indexes have been constructed both for the analyzed and the control groups units and allow the identification of couples of firms with similar probabilities of growth. In a counterfactual optic, these couples of units should be matched with a *difference-in-difference econometric model* (Barnow, 1987; Rubin, 1973; Rosembaum and Rubin, 1984, 1985).

Anyway, it's important remembering that, usually, the assignation of the treatment is not random, as already explained, and if it's probable that a series of variables are considered when the firms are chosen, it's also probable that they affect, simultaneously, the outcome variable Y too, because they are related to the series of considered X. If it's not possible to separate these effects, a correlation between the dummy variable representing the services allocation, d_{it}, and the error term, ε_{it}, is expected and the standard econometric approach is not valid.

Moreover, considering the different impacts among the subjects involved, it's natural admit that these differentiated effects influence the decisions for successive allocations of the services to the same or to other units, and then d_{it}. A correlation between Y and d_{it} is then likely to be and the econometric approach isn't suitable again. It's then important to verify if the services allocation depends on elements different by the ones used in the valuation (for example, the technical necessities and the overcome of innovation gaps could be useful for the services distribution decision, while the economical firms performances could be considered for the interventions effects valuation). In these cases, the standard econometric approach can be applied and the counterfactual problems are eliminated: there are no significant differences, before the treatment, between the hypothetical group of selected units and the counterfactual ones (Blundell and Costa Dias, 2000), so there are no reason for which hypothesize neither some particular selection or self-selection processes made, respectively, by the government bodies or by the units themselves, involved in the public intervention.

However, if the process is not completely random, the self-selection problems could compare for the firms that attended to more than one project. In these cases, evidently, only the impact results deriving from the first methodology application should be considered, because the simple *difference-in-difference* equation is not able to catch the trustfully the impact effects.

CONCLUSIONS

In the work just presented, four methodologies have been suggested to realize an objective analysis of the effects of different treatments supplied to local SMEs that are, usually characterized by common elements, as the activity sector, the location, the size, etc...

The methodologies presented lead to a general consideration of the impact of the collaborations realized and to more specific valuations. Firstly, a discreetly exhaustive impression of the effects of the services supplied is gained with a straightforward descriptive methodology; secondly, confirming this conclusion and adding new interesting elements, the use of three econometric models allows the identification of the variables relationships and correlations, of the probability of success of each intervention and of the net effect, on specific firm figures, of the collaborations realized.

Considering the four different results gained, it's possible to obtain a clear summery of the treatment impact effects, that allows a realistic

valuation of them and of the public interventions usefulness.

This articulated conclusion isn't trite and could help the policy makers to have a more concrete viewpoint of their actions and future decisions outcomes.

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