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**Consortium:**

# Del. 1.3 - Final set of indicators for impact assessment on R&D&I programmes

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| Dissemination level | | |
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# Table of Contents

# 1 The GPrix indicator set linked to model and SME questionnaire

## 1.1 Introduction

The GPrix Description of Work includes an indicative set of indicators: i.e., variables that tell us something we want to know about innovation processes and outcomes as well as the effect of publicly funded innovation support programmes[1]. However, this list was ad hoc, culled from the literature in an eclectic manner. In this note, we not only set out our definitive list of indicators but also explain the full context and rationale for each indicator and, hence, for the indicator set as a whole.

Accordingly, our definitive indicator set is not an ad hoc list. Instead, each indicator is both:

- derived from our empirical strategy and, in turn,
- informs one or more questions in our survey questionnaire.

Figure 1 sets out in a schematic manner the GPrix approach to developing the indicator set.

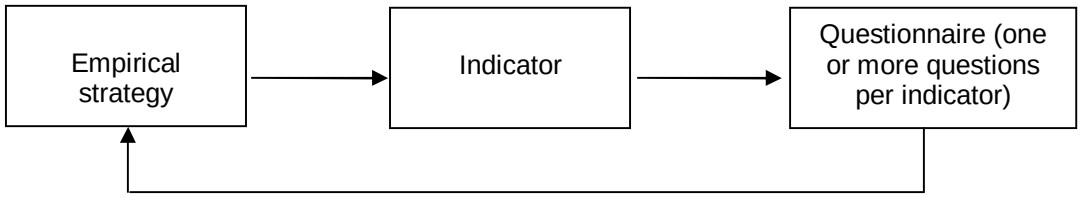


Figure 1: Developing the GPrix indicator set

We show a feedback loop between the questionnaire and the empirical strategy. This reflects the trade-off between what is desirable in an empirical strategy (e.g., numerous variables to reflect the full complexity of different competing and complementary theories) and what is feasible in survey research (first and foremost, a questionnaire of reasonable length and simplicity). Accordingly, the practice of developing an indicator set is iterative, involving several trips around the entire process.

The empirical strategy consists of two work packages. SME's are the unit of analysis in work package 1. In this document we focus on the indicators at firm level and the link to the SME questionnaire. Based on the results of questionnaire and the quantitative analysis the subsequent qualitative questions for interview and analysis at firm level will be re-fined. One

[1] GPrix 245459 under SME-2009-1 FINAL version of the Description of Work (DoW), Sept.2009 Section B1.2.3 "Performance indicators for evaluation of innovation support programmes", in particular Table 3 on pp.26-27. The DoW notes (p.26) that: "we anticipate that the final list will be shorter but not necessarily a subset of Table 3 … The final list of performance indicators will be developed through discussion between all the partners, drawing on their varied experience of evaluation (especially of R&D&I support programmes) and will proceed jointly with the development of the survey questionnaire and interview schedule … Questions guided by these PIs should yield information and insights to explain not only "what" the effects of innovation support programmes were but also "how" these effects were achieved."

implication of this empirical strategy for the SME questionnaire is that the number of 'open' questions is very limited, since these can be raised during interviews.

The empirical strategy also consists of work package 2 where support programmes are the unit of analysis and data will amongst others be gathered by interviewing programme managers. A set of programme indicators and questions will be defined at a later stage, but an implication for the SME survey is that there is no need to ask respondents to provide programme characteristics.

Section 2 sets out and explains our quantitative indicators, which inform the design of our survey questionnaire. Section 3 sets out our qualitative indicators, which inform the design of our interview schedules and case-studies. Because the qualitative indicators will be informed by results from the questionnaire survey, they are at this stage still provisional. Section 4 presents the complete indicator set

# 2 Quantitative Indicators

To explain the context and rationale for our quantitative indicators, we set out:

1. our modelling framework for investigating innovation and evaluating innovation support programmes from which we derive our indicators; and

2. the survey questions designed to generate data on each of our indicators and so enable empirical analysis of innovation and innovation support programmes.

Section 2.1 sets out our two-stage modelling framework together with the corresponding indicator set and survey questions; Section 2.1.1 further explains Stage 1 and section 2.1.2 sets out in detail Stage 2 of our modelling approach.

## 2.1 The 2-Stage Modelling Framework

The GPrix quantitative indicators are dictated by a modelling framework that allows for two stages of analysis: Stage 1 on the processes of innovation; and Stage 2 on the economic outcomes of innovation. Both stages are of interest to policy makers: Stage 1 concerning the determinants of the flow of innovation; and Stage 2 concerning the economic impact of innovation.

The GPrix empirical strategy is to relate inputs at the SME level to two types of SME output: innovation outputs; and economic outputs.

- **Innovation inputs** include: support measures, including factors that hamper innovation and thus programme effectiveness; programme design and implementation features; variables to capture the firm's commitment of resources to innovation, including dedicated finance and personnel; and other "control" variables that according to theory are likely to influences a firm's commitment of resources to innovation, including firm size and market power.

- **Innovation outputs** including product and process innovation, which may entail other activities – most likely in combination - such as: R&D (although this may not be relevant for SMEs in traditional manufacturing industries); investment in machinery and equipment (consistent with theories of "embodied" technical progress); organisational changes; marketing initiatives; design innovations; networking; internationalisation; and so on.[2]

- **Economic outputs** include the effects of innovation on final outcomes such as the firms' output, employment and growth.

These three types of variables or indicators enable modelling in two stages, which correspond respectively to the processes and outcomes of innovation.

[2] The conventional distinction between "product" and "process" innovation is present but not dominant in our indicator set, because if we gather data on a wide range of innovation activities we have the option to aggregate at a later stage.

- **Stage 1** relates innovation inputs to innovation outputs. This will enable us, for example, to discover similarities and differences in how traditional industries innovate.

- **Stage 2** relates innovation inputs, including participation is publicly funded support programmes, to final outputs (i.e., economic outcomes). This is accomplished by econometric estimation of a small selection bias model.

From these variables or indicators we derive corresponding survey questions.

The Table 1 bellow is organised according to the framework of our two-stage model. It shows how our modelling approach shapes our quantitative indicator set together with the corresponding survey questions.

**Table 1: Quantitative indicators and corresponding survey questions according to the two-stage modelling procedure**

| Innovation Inputs | Question(s) | Innovation Output | Question(s) | Economic Output | Question(s) |
|---|---|---|---|---|---|
| Location of SME<br>• National<br>• Regional | Introduction question (on p.1) | Product innovation<br>• Goods<br>• Services | Qu.6 | Impact of recession<br>• New products<br>• Established products | Qu.12 |
| Enterprise turnover<br>• 2005<br>• 2009 | Qu.1 | Process innovation<br>• Manufacturing<br>• Logistics<br>• Support | Qu.7 | Jobs created, sustained or lost as a result of innovation | Qu.13 |
| Enterprise employment<br>• 2005<br>• 2009 | Qu.2 | Organisational innovation<br>• New business practices<br>• New management practices<br>• External relationships | Qu.8 | Importance of innovation for survival and performance<br>• Product<br>• Process<br>• Marketing<br>• Organisational | Qu.14 |
| Sector (industry) | Qu.3 | Marketing innovation<br>• Design<br>• Promotion<br>• Sales channels<br>• Pricing | Qu.9 | Proportion of sales from new or improved products or processes | Qu.16 |
| Market power | Qu.4 | Expenditure on innovation<br>• 2009<br>• 2005 | Qu.10<br>Qu.11 | | |
| Main market(s)<br>(Regional, National, EU, Rest of World) | Qu.5 | | | | |

| Innovation Inputs | Question(s) | Innovation Output | Question(s) | Economic Output | Question(s) |
|---|---|---|---|---|---|
| | | Firm's innovation capability relative to industry<br>• 2005<br>• 2009 | Qu.15 | | |
| Public support received by the firm for innovation activities<br>• Local/Regional<br>• National<br>• EU | Qu.19 | Cooperation with other enterprises or institutions in innovation; and the type of cooperation partner | Qu.17<br>Qu.18 | | |
| Number of public support measures (PSM) | Qu.20 | | | | |
| Two most important public support measures (and agency) | Qu.21 | | | | |
| Nature of the innovation supported (product/ process/ marketing/ organisational) | PSM1:<br>• Qu.22<br>PSM2:<br>• Qu.26 | | | | |
| | | Nature of the impact or public innovation support measures on:<br>• Internal organisation<br>• Business or innovation strategy<br>• Quality certification<br>• Safety or environmental certification<br>• Research competencies<br>• Marketing competencies<br>• Design competencies<br>• Skills | PSM1:<br>• Qu.23<br>PSM2:<br>Qu.27 | Nature of the impact or public innovation support measures on:<br>• Turnover<br>• Profitability<br>• Productivity | PSM1:<br>• Qu.23<br>PSM2:<br>Qu.27 |

| Innovation Inputs | Question(s) | Innovation Output | Question(s) | Economic Output | Question(s) |
|---|---|---|---|---|---|
| | | • Partnerships and networks<br>• R&D linkages with universities, research institutes, etc<br>• R&D linkages with business organisations<br>• Commercial linkages with other organisations<br>• Reputation and image<br>• Participation in other R&D or innovation programmes<br>• Access to markets<br>• Internationalisation of activities<br>• Faster 'completion' of innovation project | | | |
| Value of support received (£s/€s) | PSM1:<br>• Q.24<br>PSM2:<br>• Qu.28 | Additionality (would the firm have taken the same steps without public support) | PSM1:<br>• Q.25<br>PSM2:<br>• Qu.29 | | |
| Drivers of and barriers to participation in innovation support programmes<br>• Administrative<br>• Financial<br>• SME – internal needs<br>• External needs | Qu.30 | | | | |
| Open question: how to improve public innovation support measure | Qu.31 | | | | |

### 2.1.1 Stage 1 Of The Two-Stage Model

The two stages of the model correspond to the two main types of analysis reported by Mairesse and Mohnen (2010) in their review of the use of innovation surveys in the literature. First they have listed econometric studies using CIS (Community Innovation Survey) data to identify the determinants of innovation or certain of its modalities. Secondly they refer to studies on the economic outcomes of innovation.

The analysis of stage 1 relates innovation inputs to innovation outputs. The analysis will mostly consist of descriptive statistics, since most indicators are qualitative (with yes/no answers or indications on a five-point Likert scale). Most evaluations of innovation policy instruments focus on this first stage, by questioning ex-ante if participation has lead to an increase in innovation, as formulated in the objectives of the concerning innovation policy instrument.

The results of the questionnaire will allow us to show which firms of our sample are more likely to have introduced a product, process, organisational or marketing innovation. We can think of the relevance of certain firm characteristics, such as size, sector, region and export. It is interesting to show the difference in innovation output for firms that have participated in different categories of policy instruments. One type of programmes may be especially effective in promoting product innovation, while another type of programmes may affect a broader range of innovation outputs.

Because many survey questions regarding innovation are similar to those used in the CIS, the results of the questionnaires can also be compared with existing CIS data, which allows us to show in what respect SME's in traditional industries differ from other firms in the way they innovate. In studies on high-tech sectors the focus is on R&D as the main innovation input and product innovation as the common mode of innovation. Based on the literature we expect that for SME's in traditional sectors a broader range of innovation inputs and outputs will be relevant.

Innovation surveys and the Oslo Manual (since its 2005 revision, distinguishes four types of innovations: product innovations (new goods or services or significant improvements of existing ones), process innovations (changes in production or delivery methods), organizational innovations (changes in business practices, in workplace organizations or in the firm's external relations) and marketing innovations (changes in product design, packaging, placement, promotion or pricing). In econometric studies using innovation survey data the most commonly used quantitative indicator for innovation output is the share of new product in turnover. In this respect the model as explained in stage 2 could also be applied regarding the determinants of innovation output as far as product innovation is concerned. However, several studies show that process innovation may be even more relevant to explain economic output in terms of productivity and especially for SMEs in traditional sectors the literature tells us not to focus merely on product innovation, but also to study process-, marketing-, and organisational innovation.

**Recalling the main GPrix research question:**
Which innovation support programmes are most effective in generating regional economic impact from SME's in traditional sectors in Europe?

The analysis in stage 1 will allow answering some sub-questions regarding the impact on innovation as a first step towards explaining the economic impact, e.g.:

- Which innovation support programmes are most effective in promoting innovation?
- What is most relevant and effective in terms of innovation programme objectives, design features, support activities and modes of implementation?
- What is specific to SME's in traditional sectors regarding innovation (inputs and outputs) and which innovation support fits best to this specificity?
- Do the differences between among traditional sectors (ceramics, leather, textile, food, automotive and mechanical/metallurgy) call for sector specific innovation policy approaches?
- Do the differences between regions call for regional specific approaches?
- Are national support programmes less effective than regional ones?

### 2.1.2 Stage 2 Of The Two-Stage Model

Stage 2 relates innovation inputs to economic (final) outputs. This section details the corresponding sub-set of indicators and survey questions. The second stage of our modelling strategy begins by specifying a parsimonious model for econometric estimation of the innovation effects of programme participation. From this model we derive a set of questions designed to generate the data needed to estimate the effect on firms - i.e., the additionality - of participating in an innovation support programme.

As noted in the Introduction, the practicalities of survey research require compromise between what is desirable (the least constraints on modelling, hence the maximum amount of data) and what is feasible (the length of questionnaire that respondents will tolerate). Hence, we have designed a model to be sufficiently well specified to estimate the effects of programme participation yet also sufficiently parsimonious to inform a questionnaire not exceeding the tolerable maximum length.

To explain in detail the rationale for those indicators needed to implement Stage 2 and how they are translated into survey questions, we briefly review the foundations of our approach: namely, best practice in programme evaluation; the characteristics of best practice evaluation methodology; and the principles for specifying a "parsimonious" (i.e., minimal) model of innovation. We then set out our parsimonious model for estimating the innovation effects of programme participation. Finally, we translate the variables in the model into survey questions.

## Best practice in programme evaluation

The best-practice approach to innovation suggested by GPrix is not new. However, it is it still not usual. The *OECD Framework for the Evaluation of SME and Entrepreneurship Policies and Programmes* (2007) has this to say about the state of evaluation studies on innovation programmes:

> *… whilst there are examples of high quality evaluations, this is not the norm … there remain too few examples of top quality evaluations … about … the impact which policy changes have upon SMEs and the economy more widely (OECD, 2007, pp.11-12).*

The introduction to a recent collection of evaluation studies of business support programmes characterises good practice as follows (Lenihan et al., 2007, p.317):

> *Increasingly, good practice in evaluation research at the level of the firm is pointing towards the use of econometric treatment models, e.g. two-step Heckman models, which account for 'selection' and 'assistance' effects … but on their own they are not enough to inform policy makers as to which policy measures are working and at what cost.*

This is precisely the approach of OECD Framework to identifying best practice (2007; see Appendix B, pp.106-108). In turn, this is the approach adapted by GPrix to the evaluation of innovation support programmes: i.e., a mixed methods approach including methodologically sound econometric modelling. In the rest of the Section we focus on the econometric modelling and the corresponding survey questions needed to generate the data for quantitative estimation of programme participation effects.

## Evaluation methodology

The methodological challenges to be confronted when evaluating innovation support programmes are explained in the OECD *Framework* (2007, pp.11 and 27; also, pp.50 and 52):

> Broadly, lower quality evaluations seem to produce more "favourable" outcomes for the project because they attribute observed change to the policy when this may not be justified … In contrast, the more sophisticated approaches strip out the other influences, and so only attribute to the programme its "real" effects … policy makers need to be aware that there is a risk that low grade evaluations … lead to misleading pictures of programme effectiveness.

To address these challenges, best practice quantitative evaluation methodology must include the following.

1. A **comparison group of non-participants**, which provides an observable "counterfactual" to the programme participants. In turn, this is the key to quantitative estimation of *additionality*.

2. A **selection model**, which accounts for the non-random assignment of participants and non-participants. Even in the absence of innovation support programmes, firms that would participate if they had the opportunity and firms that would not participate if they had the opportunity may have different innovation outcomes: potential

participants may be the firms most inclined to innovate; conversely, these might be the least able to innovate and thus the most inclined to seek external support. Unless such effects are allowed for in the model, they are falsely attributed to programme participation. A selection model is the means to account for such potential biases in estimating programme participation effects.

A selection model includes the following types of indicators:

1. ***variables of interest***, i.e., indicators of
    a. innovation (the dependent variable - i.e., the variable to be explained) and
    b. participation (the independent variable of interest - i.e., a dummy variable representing the programme or type of programme whose effects on innovation we want to estimate);
2. ***control variables*** (i.e., all variables that may have an effect on innovation other than programme participation); and
3. ***participation variables***, which influence whether or not a firm participates in an innovation support programme but which do *not* have a causal effect on whether or not a firm innovates (such variables are known as identifying variables, because they differentiate a model of participation from a model of innovation).

With these three types of indicator, we can estimate the impact of programme participation on firms' innovation conditional on (i.e., controlling for) *both* other influences on innovation *and* the probability that the firm will participate in an innovation support programme.

The problem is that there are many potential control variables. Estimation of programme participation effects will not be impaired if we omit variables that have only a minor effect on innovation outcomes and that are not correlated with programme participation. However, this initial winnowing would still leave a list of potential variables too long to be translated into a feasible questionnaire. Consequently, the next section proposes an approach to reducing the long list of potential variables to a minimum, practical list.

## Specifying a model of innovation

Literature review reveals a huge number of variables: for example, in a recent survey paper Becheikh et al. (2006) identify over 60 determinants of innovation. By taking an even more comprehensive view of the innovation literature - by including, for example, innovation studies from the literature on entrepreneurial psychology - many more determinants could be added. Moreover, even within disciplines, let alone between them, there is no "canonical" model of the determinants of firms' innovation. In the absence of such a model, we propose a strategy for specifying a "parsimonious" model (i.e., satisfying the principle of explaining the most from the least).

In the presence of too many potential variables, we proceed as follows.

1. We are not interested in the control variables as such; their function is only to enable accurate estimation of programme participation effects. Hence, we use dummy variables (i.e., binary indicator variables) wherever possible to aggregate the effects of the many possible individual effects.

a. ***Country dummy variables*** (i.e., fixed effects) substitute for all country effects (i.e., all those variables associated with the "national innovation systems" approach as well as with other institutional effects and with macroeconomic effects such as variations in the business cycle).

b. ***Regional dummies*** substitute for all regional effects (i.e., all those variables associated with the "regional innovation systems" approach).

c. ***Industry dummies*** substitute for all industry effects (i.e., all those variables associated with the "technological regimes" approach - e.g., technological opportunities and appropriability conditions - and demand conditions, etc).

2. In addition, we suggest an approach to constructing ***a firm level 'quasi' fixed effect*** (or initial condition) to substitute for *most* firm and ownership effects. Here we adapt an approach suggested, albeit in a different context, by Blundell et al., 1995; namely, we propose aggregating most time invariant (or, at least, "slow moving") firm-level and ownership influences on innovation by *"including a variable in the regression that approximates the build-up of knowledge of the firm at its point of entry into the sample"* (p.338). According to Blundell et al. (1995, p.338), such a proxy for "(the 'permanent' capacities of companies successfully to commercialise new products and processes" may capture the aggregate effect of firm-level time invariant influences on innovation.

In this approach, there is a crucial assumption; namely, that the variables substituted by country, regional and industry fixed effects, or by firm 'quasi' fixed effects, are time invariant or, at least, (to use a phrase from Blundell et al., 1995, "slow moving"). Our intention to evaluate programmes recently undertaken by firms (in, say, 2007 and 2008) helps to make this may assumption more reasonable than if we were taking a very long period into consideration.

Applying these principles, we next specify a parsimonious model of innovation.

## A parsimonious model of innovation

Selection models have two equations: the second equation models the participation decision (i.e., the probability that a firm will participate in an innovation support programme); and the first equation is an innovation model, which estimates the innovation effect on firms of participating in an innovation support programme *conditional on* (i.e., controlling for) both other influences on innovation and the probability of participating in an innovation support programme.

$$\begin{aligned} Innovation_i &= \hat{C} + \hat{\gamma} Participation_i + \hat{\beta}_1 Size_i + \hat{\beta}_2 MPower_i \\ &\quad + Industry_I \hat{\phi}_1 + \mathrm{Re}\, gion_R \hat{\phi}_2 + Country_C \hat{\phi}_3 \\ &\quad + QFFE_i \hat{\alpha} + \lambda_i + u_i \qquad (1) \\ Participation_i &= \hat{I} + \hat{\beta}_1 Size_i + \hat{\beta}_2 MPower_i \\ &\quad + Industry_I \hat{\rho}_1 + \mathrm{Re}\, gion_R \hat{\rho}_2 + Country_C \hat{\rho}_3 + QFFE_i \hat{\alpha} \\ &\quad + Obstacle_i \hat{\theta} + \varepsilon_i \qquad (2) \end{aligned}$$

We identify the following as the minimum set of control variables to be included in a parsimonious model for evaluating the innovation effects of programme participation.[3] All the data used to estimate this model will be generated by a questionnaire survey. Accordingly, the precise definition of each variable is given by the corresponding question(s) specified in Table 2 below.

Equation (1) of the selection model includes the following variables (indicators):

1. the dependent variable in equation (1) is the effect of innovation on firm performance (e.g., turnover and/or employment) (*Innovation*)
2. our variable of interest in equation (1), the programme participation indicator (*Participation*);
3. firm's size (*Size*);
4. firm's market power (*MPower*);
5. industry fixed effects (dummy variables) (*Industry*);
6. regional fixed effects (dummy variables) (*Region*);
7. country fixed effects (dummy variables) (*Country*); and
8. a quasi firm fixed effect - or initial condition - which is a pre-sample variable to control for the 'permanent' capacity of the firm to innovate (*QFFE*).

In addition, to complete the specification of the selection model, we need at least one variable to identify equation (2). This variable must influence the programme participation decision but not the innovation decision. Hence,

9. possible identifying variables could be some obstacle(s) to participation (*Obstacle*).

While this is the minimum list of variables, we would recommend one further variable:

10. to measure the effect of innovation on the ability of firms to cope with the current recession (*Recession_Impact*).

This variable provides an alternative dependent variable, so the model could be used to estimate the participation effect on firms' resilience to the current recession.

Of these 10 indicators, three are variables of interest: *Innovation*, *Participation* and *Recession_Impact*; one is the participation variable, *Obstacle*; and the remaining variables are control variables required for valid estimation of the relationship(s) between the variables of interest, in particular the relationship between innovation (*Innovation*) and participation in innovation support programmes (*Participation*).

One objection to a modelling strategy relying heavily on fixed effects or, in the case of firm and ownership characteristics, quasi fixed effects, is that not all of the omitted variables are necessarily time invariant or even slow moving. Here, we have a two-fold approach to minimise that problem: by

1. evaluating the effects of programme participation within a two-year period (2007 and 2008) by mid-2010, a maximum period of 3½ years; and

[3] For reasons of space, we do not give a conventional description of the model; in brief: subscript *i* indexes the number of firms in the sample 1…n, where n is the number of firms; $C$ and $I$ represent the constant/intercept in equations 1 and 2 respectively, to be estimated; the various Greek letters represent parameters or vectors of parameters to be estimated; and $u$ and $\varepsilon$ are the usual regression error terms. In equation 1, $\lambda$ is the inverse Mills ratio that controls for the participation probability estimated in equation 2. We have explained in the longer document, from which this note is derived, how this model is to be estimated.

2. including the only two time varying independent variables that are routinely included in models of innovation; namely, firm size and firm's market power.

## Variables translated into survey questions

Where possible, questions are adopted or adapted from established sources (such as the *Community Innovation Survey*); where necessary, new ones have been devised.

In addition, these questions have been developed to be included in the questionnaires of two projects running alongside and complementary to GPrix. By coordinating a subset of their survey questions, GPrix, MaPEeR and RAPPORT will be able to combine part of their datasets to create a unique resource for quantitative evaluation of innovation support programmes throughout the European Union. Accordingly, Table 2 details the GPrix questions but also notes the corresponding MaPEeR survey questions. (The RAPPORT questionnaire will be designed later on.)

**Table 2: Stage 2 indicators – a sample selection model to evaluate the impact of programme participation and the corresponding survey questions**

| **Indicator** | | **Questions:**<br><br>**Number of the Question in the GPrix questionnaire: draft of 27-05-2010**<br>**& (Equivalent question in the MAPEER on-line questionnaire)** |
|---|---|---|
| • **Variables of interest** | | |
| 1. | The effect of innovation on firm performance (e.g., turnover and/or employment) (*Innovation*) | Qu.13. How many job positions have been created sustained or lost in your company as a result of introducing new or substantially improved products or processes since 2005? (cf. MAPEER #15)<br><br>Qu.16. What proportion of your current sales by value comes from new or substantially improved products or processes introduced since 2005? (cf. MAPEER #14) |

| | | |
|---|---|---|
| 2. | Programme participation indicator(s) (*Participation*) | Qu.19. Did your enterprise during the five years 2005 to 2009 receive any public financial support for your innovation activities from the following levels of government?<br><br>Qu.20. From how many different support measures did you receive support?<br><br>Qu.21. If possible, please name up to 2 public support measures which have been most important in supporting your innovation activities.<br><br>Qu.22. For which of the following innovation activities have you used the support received through [PSM1]? (cf. MAPEER #33, #34, #35, #36, #37)<br>• Q.26 repeats the same question for PSM2<br><br>Qu.23. For [PSM1] which were the impacts from your participation on …? (cf. MAPEER #33, #34, #35, #36, #37)<br>• Q.27 repeats the same question for PSM2<br><br>Qu.24. Please estimate in Euros/Pounds the amount your enterprise has received in support from [PSM1]<br>• Q.28 repeats the same question for PSM2<br><br>Qu.25. Would you have taken the same or similar steps without this public support?<br>• Q.29 repeats the same question for PSM2 |
| 3. | One variable to measure the effect of innovation on the ability of firms to cope with the current recession (*Recession_Impact*) | Qu.12. What has been the impact of the recession on your company in relation to: Orders for new and improved products; Orders for established products (cf. MAPEER #20) |

| | | |
|---|---|---|
| • **Participation variable(s)** | | |
| 4. | One or more identifying variables: could be some obstacle to participation in support programmes (*Obstacle*) | Qu.30. Which of the following would you say are the specific needs by all SMEs to enable them to participate in innovation support programmes? (cf. MAPEER #53, #54, #55, #56) |
| • **Control variables** | | |
| 5. | Firm's (*Size*) | Qu.1. What was your enterprise's total turnover for 2005 and 2009? (cf. MAPEER #6)<br><br>Qu.2. What was your enterprise's total number of employees in 2005 and 2009? (cf. MAPEER #7, #8) |
| 6. | Firm's market power (*MPower*) | Qu.4. How would you judge the competition in your main market(s)? (cf. MAPEER #10) |
| 7. | Industry fixed effects (dummy variables) (*Industry*) | Qu.3. In which of the following sectors is your main activity? (cf. MAPEER #9) |
| 8. | Regional fixed effect (*Region*) | Name of enterprise: _____<br><br>Address: _____<br><br>ZIP/Postal code: _____ |
| 9. | Country fixed effects (dummy variables) (*Country*) | |
| 10. | A quasi firm fixed effect - or initial condition; i.e., a pre-sample variable to control for the 'permanent' capacity of the firm to innovate (*QFFE*) | Qu.11. Five years ago did you devote: Fewer resources to innovation; About the same resources to innovation; More resources to innovation<br><br>Qu.15. How would you judge your firm's innovation capabilities within your industry in the past and now, regarding? (cf. MAPEER #18) |

# 3 Qualitative Indicators and Analysis

To explain the context and rationale for our quantitative indicators, we set out:

In the absence of the questionnaire results and analysis, this section is still provisional. Especially regarding the first stage of the above mentioned two-step model the variables often refer to decisions made by the SME concerning innovation. Especially regarding decisions about innovation uncertainties prevail. In order to interpret the results of the questionnaire and the statistical analysis, the subsequent qualitative analysis will mostly try to answer the following question: What made the SME's decide to make the strategic choices regarding innovation?

Interviews with SME's will collect the stories behind what is observed in the statistical analysis. Why did they participate in the support programmes, why do they invest in innovation? In essence (innovation) policy aims to change (innovation) behaviour and it is this behavioural additionality what makes a policy programme efficient. In interviews SME's can explain causalities (e.g. did internationalization and collaboration lead to innovation, or vice versa); the order of decisions (for instance the process is not likely to have started with the decision to hire or fire employees), the magnitude of certain considerations; and the influence from having participated in a support programme.

From all the relevant determinants of innovation and all the policy impacts mentioned in the survey it is relevant to ask for the most decisive ones. From past policy evaluation interviews we know that SME's can often point to certain experiences, impacts and lessons from participating in a programme that have been crucial in changing their mind and behaviour. Programme participation can change the way a firm thinks about the risks involved in certain innovation behaviour, or the possible benefits.

The programme indicators will be qualitative and will be developed in work package 1 and 2. Based on the collected data and the results of the SME survey and quantitative analysis programmes will be classified in different categories.

# 4 References

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