



THE INNOVATIVE PERFORMANCE OF SMEs A NEW MEASUREMENT APPROACH

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Samenvatting

Het belang van innovatie voor economische groei en het scheppen van werkgelegenheid in het MKB wordt erkend door zowel academici als politici. Er worden daarom programma's ontwikkeld om innovatie te stimuleren. Met deze maatregelen ontstaat de vraag te bepalen of deze initiatieven succesvol zijn en zo ja, in welke mate. In de literatuur hebben we geen indicator gevonden die ons in staat stelt de mate van innovativiteit van MKB bedrijven te bepalen voor een dergelijke interventie en daarna. De hoofdvraag van ons onderzoek was dan ook: hoe kunnen we het effect van een interventie voor het bevorderen van de innovatiekracht van MKB-bedrijven meten? Kijkend naar de definities van innovatie zoals die zijn verzameld door King & Anderson (2002) hebben we vastgesteld dat een bedrijf innovatief genoemd mag worden als het met opzet en succesvol nieuwe ideeën implementeert. Succesvol wil in dit verband zeggen: het draagt bij aan de winst en dus aan de continuïteit van het desbetreffende MKB-bedrijf. Door de verschillende (bewuste) innovaties te identificeren samen met de ondernemer en te berekenen wat de winstgevendheid is geweest van de innovaties, kunnen we de 'innovatiewinst' van de ondernemer berekenen. Dit bedrag delen door de omzet creëert een indicator waarmee de innovativiteit van de organisatie door de tijd gemeten kan worden. Wij stellen daarom de volgende definitie van innovatiekracht voor:

$$\text{KIKR} = \frac{\text{Winst Innovatie}_1 + \text{Winst Innovatie}_2 + \dots + \text{Winst Innovatie}_n}{\text{Omzet}} \rightarrow 100\%$$

De ratio kan alleen met voldoende betrouwbaarheid bepaald worden door een gestructureerd interview met de directeur/eigenaar van de het bedrijf door een gekwalificeerde gesprekspartner. De auteurs realiseren zich dat dit gesprek op zichzelf misschien een interventie is, omdat de ervaring leert dat het innovatiebewustzijn van de ondernemer er door toeneemt. Om te bepalen of dit daadwerkelijk zo is, en om te testen of de KIKR inderdaad als bruikbare maat voor innovatiekracht kan worden gebruikt is vervolgonderzoek noodzakelijk. Desalniettemin zijn de auteurs van mening dat met de KIKR de innovatiekracht van bedrijven door de tijd heen gemeten kan worden en daarmee een bruikbaar instrument is om het effect te bepalen van interventies die innovatiekracht moeten vergroten.

Without innovation, we would still be living in caves. This may not be a truly *scientific* statement, but it is nonetheless hard to dispute. Innovation is inextricably linked with progress.

Innovation is about creating something new – most authors agree on that (Harkema, 2004, pp. 38-39). Along this line of thought, the researchers in the Research Department for Entrepreneurship and Innovation at The Hague University of Applied Sciences hold the basic assumption that innovation is a necessary condition for companies to thrive and survive in the long term. This assumption underlies our activities and research.

We would like to propose a 'Thought Experiment' to validate the above-mentioned basic assumption. Imagine one could duplicate an economic region, such as the greater The Hague area, by waving a magic wand. Another wave stops all innovation in the original region and enhances it in the duplicate region. Both regions develop from that point. Which region will be better off economically in three, five, ten years from that point? Very few people would choose the former region or claim that it makes no difference.

In the Netherlands, as in the entire EU, SMEs are a very significant factor in local economies.² There are more than 700,000 SMEs in the Netherlands that account for more than 50% of GDP. Hence, it is our mission to increase the innovativeness of SMEs in our region. But how does one accomplish that? What actions can be undertaken, what instruments can be developed or what policies can be implemented to make a small or medium-sized company more innovative?

These questions are relevant for politicians looking for ways to increase economic performance in a region or country. Henceforth there have been and still are many public initiatives to stimulate entrepreneurs to innovate, often through the granting of subsidies. For most, if not for all of these initiatives, the actual result is hard to quantify.³

Our research therefore focuses on the question: Which interventions for improving the innovativeness within an SME have an effect? More generally, what actions succeed in improving the innovation performance of SMEs and what actions do not? And how do we measure their effect? This article shows the result of our proposal to answer the latter part of this question: How can we measure the effect of interventions aimed at stimulating innovation within SMEs?

To measure the effect of any intervention that stimulates innovativeness, it is obvious that one should be able to measure the degree of innovativeness of companies both before and some time after the intervention⁴.

This paper is structured as follows. The first step we took was to determine if such an innovation metric already exists. Led by a very useful study of Neely and Hii (1998), we recognized that the ways in which innovation is measured depends on:

- the model of innovation being used (e.g. a technology-push model, a market-pull model, a networking model);
- the definition of innovation, especially if innovation is seen as a process (activities) or as a result (an implemented idea);
- the purpose of the measurement.

This made us realise that we need a sharp definition of innovativeness and of innovation. From these definitions, we have come up with a new metric, one that has some advantages over existing metrics.

After having defined the metric, we developed a measurement instrument in the form of a structured survey. With this measurement instrument we approached a large number of SMEs to establish whether the instrument measured what we expected. The results of this process are described in the consecutive sections of this paper. We conclude with suggestions for further research.

Research focus: the call for new metrics

In May 2010, the High Level Panel on the Measurement of Innovation established by Ms Máire Geoghegan-Quinn, European Commissioner for Research and Innovation, called for new headline indicators for innovation in support of the Europe 2020 strategy.

The report states that “sound policy-making, including benchmarking and the setting of targets, requires that the state of innovation be adequately measured. (...) As requested the now used R&D investment target (input) indicator needs to be complemented by some additional output-oriented indicators. A complete picture should indeed have both” (Mas-Collell, 2010, p. 1).

Section II Desirable Properties of Indicators of the report states that “[a]n indicator, or a set of indicators, intended to measure progress and possibly to serve as the basis for the establishment of challenging European targets for 2020 has to satisfy, ideally, a number of desirable properties.” These properties are:

1. Simple and understandable
2. Sizable and direct
3. Objective
4. Presently computable
5. Stable
6. Internationally comparable
7. Decomposable

8. Low susceptibility to manipulation
9. Easy to handle technically
10. Sensitive to stakeholders’ views

Against this background and through the confrontation with owners of SMEs, we found out that a new metric is needed to measure innovativeness.

Background of research project

Our research is framed within a larger project, Kite120⁵ that is part of the Dutch Program ‘Chances for West’. This program is aimed at improving the innovative capacity among SMEs in a large number of sectors. In our case, we focus on four sectors: Food & Flowers, ICT & Media, Services and Law Firms. It is a four-year program in which we work with a large number of SMEs (at least 30 per sector).

Research objective and research question

The objective of our research is to establish whether a new metric is needed to measure the innovative performance of SMEs and if the metric developed by us can be used as an indicator to measure the innovative performance of SMEs. Hence our research question is:

How can we measure the effect of interventions aimed at innovation stimulation within SMEs?

Methodology

Our methodology consists of a number of steps:

1. First, we held eighteen interviews with the owners or general managers of SMEs to speak openly with these entrepreneurs about innovation, innovative performance and the relation between innovation and profitability.
2. Second, we carried out an extensive literature review on measurement indicators for innovation, which resulted in conceptual definitions of the most important terms.
3. Third, we operationalized our conceptual definitions by developing a ratio,
4. Fourth, we tested the validity of this ratio through interviews with entrepreneurs.
5. Lastly, we drew conclusions based on the interviews with entrepreneurs.

Innovation and innovativeness

The aim of the project we developed within the framework of a European Program for Regional development is to make companies more innovative. Our research is embedded within that program, which seeks to improve the innovative performance of SMEs in a number of sectors. That immediately raises the question: what do we mean by ‘being innovative’? Using an extensive study on definitions of innovation (King & Anderson, 2002), our definition is that a company is innovative if the company deliberately and successfully implements new ideas.

This definition already partially expresses our view on innovation. It shows that we consider

innovation to be a result of activities. The management of a company must have freely chosen to implement the idea, so we rule out improvements and cost savings that companies sometimes are forced to carry out or that get thrown into their laps⁶. But the key phrase in the definition we have formulated is that the implementation has to be successful. So merely carrying out activities that are innovative does not suffice. The activities should be successful. So what do we mean by that? In our opinion, in this context ‘success’ means that it ‘contributes to the goal of the company’. Without going into a debate about what that goal of the company is or should be (after all, it is the owner who decides this), we feel safe to say that, in general terms, a company is a for-profit organization. Whatever the goal, as formulated by the owner, might be, it is also safe to say that a company needs profit to survive in the long run. So we argue that the implementation of an idea is successful and hence an innovation only if it *demonstrably brings profit to the company*. Innovation in this sense is inextricably linked to the extent to which an SME is able to innovate and, in so doing, be profitable.

One might think that this limitation is too narrow. In our view, the limitation makes sense, as the whole idea behind stimulating innovation is to make companies more profitable in the long run. The limitation does not mean that we consider implemented ideas that do not demonstrably bring profit to the company -or worse, a demonstrable loss- to be worthless. On the contrary, there is no better teacher than failure. But if these lessons do not ultimately help the company in any way to perform better, in our view it is not justifiable to call the effort an innovation.

An example may help clarify why we think it is important to use profit as the divisor between trying out ideas and being innovative. Suppose a company implements new ideas once a month. However, year after a year, they must conclude that none of the implementations have made them any profit. We admire their persistence, we praise them for having the right mindset, but we have great difficulty labelling them ‘innovative’.

There is one last choice to be made in order to create a sharp definition. How ‘new’ must the idea be to fit in our definition? We address this question first by making the distinction between the in-house invention and the adoption of an idea that originated elsewhere. Again, if the focus is on ‘does the innovation bring profit to the company?’, an adopted idea is as good as a new one. So the idea does not have to be new to the world. But is just being new to the firm sufficient? If we say yes, then we are basically saying that any improvement that increases the profit of a company is an innovation. That would be too liberal to our taste. So where do we draw the line? For now, we suffice to say that, if by adopting the idea, the company qualifies as an early adopter⁷ in its branch, the implementation is new enough to qualify as an innovation.

The second consideration that needs to be taken into account is how recent the implementation must have been done to still count as an innovation. An innovative product that was introduced 20 years ago and that nowadays still makes money for the company has transformed from the innovation it was into the cash cow it now is. In line with the recommendation from the Oslo Manual (OECD, 2005)⁸, we limit the period in which the implementation of the idea must have occurred to three years before the period that is covered by the latest Profit and Loss statement.

- Summarizing, for our purposes, we call the implementation of an idea an innovation if:
- it is done deliberately;
 - it brings a demonstrable profit to the company;
 - it is made in the three years before the period covered by the last Profit and Loss statement;
 - the idea originated in the company or if the company is an early adopter of the idea.

KIPR Kite Innovation Performance Ratio

The next issue to resolve is: how does one determine the profit that can be attributed to an innovation? The general definition of profit is turnover minus cost. The challenge is to determine the change in turnover and change in cost that result from the innovation. Of course, it depends on the relative value of the changes in turnover and costs whether profit is made or not.

Table 1 – Profit or Loss as a result of changes in Turnover and Costs

| ΔTurnover | Positive | 0 | Negative |
|-----------|--------------------------------|--------|-----------------------------------|
| ΔCost | | | |
| Positive | Profit if ΔTurnover > ΔCost | Loss | Loss |
| 0 | Profit | 0 | Loss |
| Negative | Profit | Profit | Profit if ΔTurnover < ΔCost |

The concept of the change in turnover and change in cost that are the result of innovation has close resemblance with the concept of relevant revenue and relevant cost that were introduced in the field of management accounting (Horngren & Foster, 1987) to evaluate managerial decisions.

When the profit is determined for each innovation, all that is left to do is to add them and to divide them by the turnover from the Profit and Loss statement. This, of course, is necessary to allow a meaningful comparison between one company and another. As the resulting fractional number will usually be lower than 0.1, the number is multiplied by 100%. We call this result the KIPR: Kite Innovation Performance Ratio.

$$KIPR = \frac{\Delta Profit_1 + \Delta Profit_2 + \dots + \Delta Profit_n}{Turnover} * 100\%, \Delta Profit_n > 0$$

Please note the restriction that the Δ Profit must be positive to be taken into account for the KIPR. This is a deliberate choice and we believe a very important one. If we would allow the KIPR to become a negative number, it might discourage an entrepreneur or manager to try and innovate. A KIPR of zero would be better than a negative zero, so not trying to innovate would be safer than to try and suffer a loss.

Measuring the KIPR

After having defined what we mean by innovation and having developed a ration to measure, the next step was to test our assumptions. From the above explanation, it is clear that the only way to do the actual measurement properly is by interviewing a senior manager of the company. Within SMEs, he or she is the key decision-maker when it comes to innovation. He or she has to be able to recall all significant implementations of ideas over the last four or so years, but also has to be able to make reasonably accurate estimates of the changes in turnover and cost each implementation entailed. This, practice showed, is not easy. In fact, when we held our first interviews with the managing directors (often also the owners) of companies, we learned that asking the questions was considered confrontational. Entrepreneurs and company owners frequently thought they were innovative, but had to think hard to recall implementations and, if they did come up with a response, much more often than not they initially had no idea whether the implementations had yielded them any profit. For us, this was a revealing finding, as it showed that, despite the fact that no entrepreneur will deny the importance of innovation, when it comes to measuring the effect and making innovation tangible, entrepreneurs are at a loss. In some of the interviews we held, we had to conclude that the implementation mentioned was not really considered new enough to the branch to call them an early adopter of this idea. Hence, in many cases we found the KIPR to be zero percent.

One of the conclusions we drew based on those first interviews was that the interviewer has to have the right skills to conduct the interview properly. The entrepreneur must trust the interviewer. He or she must also be able to explain the purpose of the interview and explain our chosen definition of innovation. Also, the interviewer must interpret the answers given by the manager. Does the example qualify as an innovation? Is the increase in turnover or cost savings ascribed to the innovation by the manager backed up by evidence, or are they reasonable estimates? In our experience, the best interviews were those where the conversation contained some discussion on the topic of innovation in general and the proposed innovations by the manager in particular. In almost every case, the conversation in itself seemed to increase the *innovation awareness* of the manager. It brought the important questions ‘are we an innovative company?’ and ‘are we as innovative as we should be?’ to the surface.

In fact, we had to conclude that *conducting the interview to measure the innovativeness of the company apparently can be coined as an intervention in itself*. So, besides the fact that a metric is needed to establish the true effectiveness of an innovation in terms of profitability, the interview appeared to be an intervention, since it forced the entrepreneur to rethink his assumptions about innovation.

With this observation in mind, we further investigated the extent to which the interview is a factor that influences the entrepreneur’s perception of his/her own company and his/her view on innovation.

Measuring what we want to measure

This last observation, however promising in helping to achieve the mission of making SMEs more innovative, made us very aware of the fact that this phenomenon could also undermine the whole purpose of doing the first measurement, namely setting a baseline so the impact of another intervention could be determined. If the baseline measurement is an intervention in itself, what are we measuring if we come back to measure again? The effect of two interventions? If so, how do we separate them?

This, however, is not the only problem. Another one is that it will take a long time before the effect of any intervention is apparent and result in increased innovation performance. After all, after the implementation of an idea, increased profit must be realized, and it will be only accounted for in the first Profit and Loss statement after that period. Many things can happen in the meantime that will also have an effect on the innovativeness of the company, whether positive or negative.

So, for individual companies, we had to conclude that the metric is only useful for showing how innovativeness - or lack thereof - develops over time. The picture changes if we combine the results for many companies. By comparing the average KIPR score for a group of companies involved in a particular innovation stimulation activity, with the score of a comparable⁹ group of companies that did not, the success of the program should be visible in a higher average KIPR score for the participating companies in the years following the intervention. After all, even if the measurement of the KIPR is an intervention, it should have the same average effect in both groups of companies. The companies in the control group should only be taken into account in the later measurements, if they have not participated in other intervention programs in the meantime, of course.

The call for new metrics revisited

In the first section of our paper, we referred to the High Level Panel on the Measurement of Innovation established by Ms Máire Geoghegan-Quinn, European Commissioner for Research and Innovation, and their call for a new innovation metric.

As stated above, according to the members of the High Level Panel, the new indicator(s) should have a number of desirable properties:

1. Simple and understandable
2. Sizable and direct
3. Objective
4. Presently computable
5. Stable
6. Internationally comparable
7. Decomposable
8. Low susceptibility to manipulation
9. Easy to handle technically
10. Sensitive to stakeholder’s views

Considering our results for all of these criteria, it can be argued that the KIPR satisfies them, with the possible exception of criteria 2 (sizable and direct), 3 (objective) and 8 (low susceptibility to manipulation).

For criterion number 2, the -hardly- exemplifying text reads “*The indicator should cover a significant share of the issue at hand. It should be sizable and relevant to its substance while, at the same time, rich enough to indirectly implicate some of the framework conditions that potentially sustain an innovative society.*” We understand from this that the value of the indicator should not be too small a number. In those instances when it is not zero, the values we have seen varied from 1% to 8%, which seems large enough for us to work with. The KIPR does not point to which measures should be taken to make the European society as innovative as possible.

Both the objectivity of the measurement and insusceptibility to manipulation are hampered by the fact that decisions have to be made on what to call an innovation and what not, and how changes in turnover and cost are ascribed to these innovations. This is precisely the reason why the measurement should be done by a skilled interviewer.

CONCLUSION

De Kite Innovation Performance Ratio as a metric is able to show, as time progresses, if interventions to increase the innovation performance of companies have had any positive effect. The metric can also be used to compare companies in the same field, compare branches to each other, and compare regions or even countries to one another. As such, it can be used to distinguish successful innovation stimulating initiatives from unsuccessful ones. It does not predict which intervention will be successful beforehand. Measuring the KIPR by means of an interview with a skilled interviewer might lead to increased innovation awareness on the part of the management of SMEs, and as such, could be a very useful intervention in itself. ■

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(Endnotes)

- ¹ Saskia Harkema was lector Ondernemen en Innoveren aan De Haagse Hogeschool van 2004 tot 2010.
- ² http://ec.europa.eu/enterprise/policies/sme/facts-figures-analysis/performance-review/pdf/2010_2011/netherlands_en.pdf
- ³ The Netherlands Court of Audit (Algemene Rekenkamer) concluded in the report Innovatiebeleid (Innovation Policy) that they could not conclude that the increase in expenditure on Innovation Policy from van €1.8 billion in 2003 to €3.7 billion in 2010 has led to an increase in innovative capacity of Dutch enterprises. The report also provides an overview of national Dutch innovation instruments and stimulation programs. (<http://www.rekenkamer.nl/Publicaties/Onderzoeksrapporten/Introducties/2011/09/Innovatiebeleid>, in Dutch)
- ⁴ From this point on, we will use ‘intervention’ when we mean any activity, program or instrument from an outside actor to stimulate innovation at SMEs.
- ⁵ Kite120 (Knowledge and Innovation towards Entrepreneurship) is an EFRO funded innovation program that is executed by the Research Department for Entrepreneurship and Innovation at The Hague University of Applied Sciences.
- ⁶ For example, if the tax authorities demand that the tax return has to be done online from some moment in time onwards rather than on paper, that procedure might be cost-effective for the company, but was enforced rather than freely chosen.
- ⁷ The term ‘early adopter’ (Rogers, 1962) originally refers to the first 15% of all users of a new product.
- ⁸ Point 224, page 61.
- ⁹ Comparable in number of companies that are measured, their average size, branches they operate in and particularly with the same average KIPR score for both groups before the intervention.

Abstract

The importance of innovation as an engine for economic growth and the creation of employment opportunities is acknowledged by both academia and politicians. This makes the need for good innovation measures crucial. In the third edition of the Oslo Manual (2005), a need for proper indicators to capture the changes in the nature and landscape of innovation is voiced. According to the manual, a considerable body of models and analytical frameworks for innovation were developed in the 1980s and 1990s. Over time, the scope of what is considered as innovation has been widened and expanded to include marketing and organizational innovation.

In this paper, we focus on innovative performance as a measure of success. This is part of ongoing research in the Netherlands in The Hague region. This research is framed within an approach based on action research. We have worked with 45 SMEs in four sectors. This has formed the basis for the conceptual development of innovative performance as a new metric for the measurement of a successful innovation. In this paper, we review our findings thus far and explore the validity of innovative performance as an appropriate indicator for measuring innovation within SMEs.

