

G:ENESIS

Impact evaluation of Support Programme for Industrial Innovation

Final evaluation report submitted to
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Full report

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Table of Contents

GLOSSARY	V
EXECUTIVE SUMMARY	VI
Introduction	vi
Evaluation approach and methodology	vi
Findings	vii
Analysis and recommendations	x
1. INTRODUCTION	1
1.1. Background to the evaluation	1
1.2. Background to the intervention	3
2. BEST PRACTICE SCAN	6
3. EVALUATION METHODOLOGY	11
3.1. Desktop review	11
3.2. Analysis Framework	12
3.3. Quantitative data analysis.....	12
3.4. Qualitative research.....	14
3.5. Limitations	17
4. FINDINGS	19
4.1. Impact of SPII on South Africa’s competitiveness and broader development objectives	19
4.2. Impact and relevance of SPII in the South African Innovation Landscape 28	
4.3. Achievement of and constraints to SPII’s objectives	32
4.4. Institutional efficiency as it relates to the impact of SPII	36
4.5. Sustainability	40
5. ANALYSIS	41
5.1. Impact.....	41
5.2. Cost effectiveness	48
5.3. Processes.....	49
6. EMERGING THEMES AND RECOMMENDATIONS	51
ANNEXES	56
Annex 1: Refences.....	56

List of Figures

Figure 1: Timeline of SPII's evolution	5
Figure 2: SPII organisational structure	4
Figure 3: Interpretation of SPII's original theory of change	5
Figure 4: Sample and response by scheme	13
Figure 5: Sample and response by location	14
Figure 6: Sample and response by SPII status	14
Figure 7: Was the project commercialised (absolute)	20
Figure 8: Was the project commercialised (relative)	20
Figure 9: How long it took survey respondents to achieve commercialisation	20
Figure 10: Return on investment	21
Figure 11: Length of time to achieve profitability	22
Figure 12: Would you have been able to attempt your project without SPII funding?	23
Figure 13: Did unsuccessful applicants continue despite lack of SPII support?	23
Figure 14: Probit model of commercialisation	24
Figure 15: SPII's contribution to success	25
Figure 16: Average job creation per project	25
Figure 17: Permanent job creation	27
Figure 18: Number of employees trained	28
Figure 19: South African innovation landscape 2013.....	30
Figure 20: Perceived impediments to innovation in South Africa	32
Figure 21: Availability of Scientists and Engineers vs Capacity to innovate (size of bubbles = GDP per capita)	36
Figure 22: Turnover size and additional costs to complete application process	37
Figure 23: SPII theory of change	44

List of Tables

Table 1: Characteristics of SPII schemes.....	vi
Table 2: PPD scheme: Qualifying costs by shareholding.....	1
Table 3: Matching Scheme: Qualifying costs by shareholding.....	1
Table 4: Application breakdown by scheme and project status since 2000	2
Table 5: Application breakdown by province and scheme since 2000.....	2
Table 6: Application breakdown by industry and scheme since 2000.....	2
Table 7: International programmes reviewed	6
Table 8: Data collection tools.....	11
Table 9: Analysis framework themes by DAC criteria	12
Table 10: Data availability.....	13
Table 11: Interview list of key stakeholders.....	14
Table 12: Original case study split.....	16
Table 13: Case studies by province and sector.....	17
Table 14: Average first year ROI by scheme, calculated using reporting data	21
Table 15: Average first year ROI by scheme (restricted data)	21
Table 16: Tax revenue from April 2006 to April 2011	28
Table 17: Survey respondents' expense ranking	31
Table 18: Summary of SPII commitments, MTEF expenditure and fees	33
Table 19: SPII relative to other innovation funds.....	48
Table 20: SPII's performance against international best practice	50

GLOSSARY

CSIR	Council for Scientific and Industrial Research	ROI	Return on Investment
DAC	Development Assistance Criteria	Seda	Small Enterprise Development Agency
DPME	Department of Performance Monitoring and Evaluation	SME	Small and medium enterprise
dti	Department of Trade and Industry	SMME	Small, medium and micro-sized enterprise
IDC	Industrial Development Corporation	SPII	Support Programme for Industrial Innovation
IP	Intellectual Property	TIA	Technology Innovation Agency
MRC	Medical Research Council	TOR	Terms of Reference
PII	Partnership Scheme	TTF	Technology Transfer Fund
PPD	Product Process Development	TVC	Technology Venture Capital
R&D	Research and Development		

EXECUTIVE SUMMARY

INTRODUCTION

The Department of Performance Monitoring and Evaluation (DPME), as part of its mandate under the National Evaluation Policy Framework (NEPF) and in partnership with the Department of Trade and Industry (**the dti**), commissioned Genesis Analytics to conduct an impact evaluation of the Support Programme for Industrial Innovation (SPII) for a thirteen year period from 2000/01 - 2012/13.

SPII is an initiative of **the dti** that is administered by the Industrial Development Corporation (IDC). SPII supports the development of viable, innovative products and/or processes and the commercialisation¹ thereof. Currently, there are three schemes which SPII offers: the Product Process Development (PPD) Scheme, the Matching Scheme, and the Partnership Scheme (PII). These schemes differ according to the size of the applicant firms, percentage of qualifying costs covered and maximum funding amount, as shown in the table below.

Table 1: Characteristics of SPII schemes

Name of scheme	Funding mechanism	Size of applicant firm	Value of grant	Grant limit
PPD	Non-repayable grant	Small, medium and micro-sized enterprises	Between 50% to 85%	Up to R2 million
Matching	Non-repayable grant	Small and medium enterprises	Between 50% and 75%	Up to R5 million
PII	Conditionally repayable grant	Large companies	50%	Minimum of R10 million

The purpose of this evaluation is to provide insight into the effectiveness and efficiency of the current model of implementation of SPII, assess the impact of SPII and to determine how the beneficial impacts can be strengthened.

EVALUATION APPROACH AND METHODOLOGY

Although this was initially considered an impact evaluation in the ToR, many of the evaluation questions are more focused on the implementation of the programme. Furthermore, the limited availability of data has constrained this evaluation's ability to robustly identify and attribute impact in all instances, and so focus is also given to the implementation of SPII, using qualitative and quantitative research to understand the implementation factors that both limit and enhance SPII's impact. The Development Assistance Community (DAC)² evaluation criteria were therefore selected as the guiding framework for the evaluation in order to gather the information required to answer all the questions. This approach provided an in depth assessment of the programme's relevance, effectiveness, efficiency, impact, and sustainability, as well as additionality.

¹ Commercialisation refers to the process whereby a project's output is brought to the market.

² The OECD's DAC (Development Assistance Community) criteria provide a useful framework for evaluating developmental assistance. More information is available at <http://www.oecd.org/dac/evaluationofdevelopmentprogrammes/daccriteriaforevaluatingdevelopmentassistance.htm>.

A combination of quantitative and qualitative methodologies was used in conducting the evaluation. This included:

- Document review of relevant innovation incentives and policy literature;
- Online surveys, completed by a sample of SPII applicants (approved and rejected);
- Data analysis of completed project reporting data from the IDC;
- Key Informant Interviews with a variety of industry stakeholders, including, but not limited to, the SPII and IDC teams, relevant government department representatives, Technology Top 100 companies, and other innovation and enterprise development agencies; and,
- Case Study Interviews with a selection of 20 SPII-funded projects.

The evaluation faced a number of constraints, including limited reporting data, a lower response rate to the survey than anticipated (due in part to a much lower population group than originally conceived), and the refusal or unavailability of some stakeholders to participate in the evaluation. These constraints limited the ability of the team to identify and attribute impact in certain instances and have resulted in the evaluation having a greater focus on the implementation factors that either enhance or dilute SPII's impact rather than a true quantitative impact study. Additionally, the majority of companies interviewed received funding before 2012. As such, many of the responses do not reflect the changes made to SPII post-2012. Despite this, the quality of the evaluation has not been negatively affected.

Based on the challenge of limited data availability experienced during this evaluation, a broader recommendation, for further evaluations conducted by units such as the DPME, is to conduct evaluability assessments of the projects and programmes to be evaluated prior to the finalisation of the ToRs. This would provide insight into the type of evaluation that can be conducted (impact, implementation, design etc.), which ultimately informs the design of the scope of work and ToR, as well as the methodologies to be used and the evaluation questions that can be asked given the context and data available. Had this been done in this case prior to the TOR being issued – it would have more likely been appropriate to focus this evaluation on implementation, rather than on impact.

FINDINGS

The findings of the qualitative and quantitative research processes are presented under five key headings below:

Impact of SPII on South Africa's competitiveness and broader development objectives

This evaluation sought primarily to evaluate the extent to which SPII has directly or indirectly effected social, economic and other development indicators, be they intended or unintended.

Successful commercialisation is the ultimate indicator of project (and innovation) success. Survey responses show that the SPII matching scheme projects have been relatively more successful at achieving commercialisation than the PPD scheme – 53% of SPII matching scheme projects were commercialised whereas this is true for 25% of PPD projects. It was highlighted by industry stakeholders and case study respondents that bridging the gap between the pre-production prototype stage and commercialisation remains the most significant barrier impeding the success of innovations, and that this was exacerbated for smaller firms.

The survey found that 47% of respondents who received SPII support said that they could not have continued without SPII funding and 57% of rejected applicants reported that they were unable to continue with their project. The survey found that as the size of the firm increases, the ability to continue without SPII support increases; however the majority would have been at a smaller scale or over a longer time period.

Further analysis revealed that an accepted SPII application has a higher probability of success than a project that was rejected. This can be the result of two directions of causation; firstly, it could be that SPII funding assists projects to commercialise; or, secondly, it could be that SPII only selects projects that are likely to succeed regardless of whether they receive SPII's funding or not. The size of a company in terms of turnover is also significantly positively correlated with the probability of commercialisation.

Innovation has an ambiguous effect on employment in the short term: it can generate jobs by creating new markets or it can lead to temporary restructuring towards methods that replace labour inputs. However, in the medium to long term, innovation can lead to economic development and improvements to competitiveness which will in turn lead to job creation. The survey results suggest that on average, both accepted and rejected SPII projects create jobs. Despite being unable to attribute increased permanent job creation for companies which are participants of SPII against companies which are not, this illustrates that jobs have been created by companies on SPII. Projects funded by the SPII Matching scheme have been the most successful at producing jobs, while projects funded by PII have been the least successful. The electronics sector dwarfs the other sectors in terms of job creation. However, it must be noted that the SPII scheme and the electronics sector make up approximately 60% of the funded projects.

In total we estimate that SPII funded projects have directly created or retained approximately 3000 permanent jobs. According to the same data ZAR 622 671 640 was received from SPII by the funded projects, which equates to approximately ZAR 207 560 per job. However, it must be noted that SPII, according to its objectives, does not aim to generate employment, but merely to stimulate innovation. It is also important to note that the job figures reported and analysed here relate to those created directly within SPII recipient companies, and does not include those created indirectly once the innovation is commercialised.

Regarding skills development, the survey results from SPII-supported projects show that the majority of respondents trained between one and five employees for their project, while approximately 30% did not train any. The case studies suggest that in one-product companies, the entire staff is re-trained; however, this training is not necessarily technical and is product specific.

Impact and relevance of SPII in the South African Innovation Landscape

SPII contributes to specific stages in the innovation cycle - specifically, SPII's mandate covers the stages from the end of basic research to the development of a pre-commercialisation prototype. The majority of interview respondents believe that SPII fills an important role by funding these stages, as traditional sources of funding are difficult to obtain at these points in the process in South Africa.

In terms of other available funding mechanisms, the Technology Innovation Agency (TIA) and SPII both provide funding for the purpose of prototype development. These could be used in a complimentary manner for innovators requiring support, however, a number of industry stakeholders who have had experience working with TIA noted that SPII is the dominant player

in this space, as it is more efficiently run. This finding was supported by the findings of the 2013 Ministerial Review of TIA, which found that there was a distinct lack of confidence in TIA from both the public and private sector. Furthermore, the Ministerial Review identified poor response times for enquiries and applications, application processes that are unwieldy and not sufficiently differentiated or responsive to the needs of stakeholders, and poor communication, including an unhelpful website, as the factors that drive this lack of confidence.

The survey completed by SPII applicants revealed that the availability of appropriate forms of financing, the cost of innovation and the length of pay-off period associated with innovation are perceived to be the greatest barriers to innovation in South Africa, all of which SPII attempts to address through its provision of grants in the less developed and risk-adverse venture capital market of South Africa. As such SPII was found to play an important role in the innovation landscape, have a direct impact on innovation and have potential indirect impact on long-term job creation and increased competitiveness.

Achievement of and constraints to SPII's objectives

SPII's objectives are not clearly defined and thus the achievement of these is difficult to measure. Between **the dti** and the IDC a business plan is developed each year with targets on how many projects to fund and the monetary value available to commit to projects. When assessed against these targets, SPII has successfully met all of its annual targets and thus would be considered to have been effective. However, this narrow interpretation of assessment criteria presents an incomplete picture of the programme's effectiveness. Currently, there are no targets set with respect to the number of projects successfully commercialised, the number of projects producing a positive return on investment, the number of (direct and indirect) jobs created, or other economically orientated measures of impact. To be considered effective at contributing to broader economic growth and employment creation, SPII would need to perform well in relation to each of these indicators.

Case study beneficiaries and industry stakeholders were asked what they consider to be the key constraints to innovation in South Africa. The constraints consistently listed were: a lack of available funding and a risk averse private investment environment, a fragmented innovation landscape where the relevant agencies work in siloes, the lack of support of linkages across value chains and between relevant agencies, the lack of business expertise on behalf of innovators, and a limited skill base. These findings were corroborated by data on investment in South Africa, the 2012 Ministerial Review and the OECD Science, Technology and Industry Outlook (2012).

Institutional efficiency as it relates to the impact of SPII

The efficiency of the programme is important in so much that institutional efficiency and delivery has a direct effect on the impact of the programme.

Based on IDC data, the average time between submission of an application to the date of rejection or approval is approximately 166 days – nearly six months. However, on the whole, case study respondents reported SPII's application process to be efficient, but this depended on the consultant assigned by SPII to assist in the application process, and the account manager assigned to the project. A number of the case studies noted concerns around the fact that the applicants themselves do not present their case to the investment panel, as this is rather done by the consultant/project manager responsible for each project.

Two factors are considered when evaluating an application, economic merit and the level of innovation. These are currently very broad and open-ended and, given that projects are assessed on a case-by-case basis, allow for a certain amount of subjectivity when evaluating applications. Responses to the survey reported that the rejection process was not well managed, and applicants reported that they did not receive sufficient information on the reasons for rejection.

Smaller companies reported SPII's contracting and reporting processes to be more costly and onerous than larger companies. Respondents also noted that SPII's follow-up reporting after project completion is limited to financials and employment figures. Therefore, the data is unable to establish progress for projects that have not been commercialised yet, or provide reasoning for the lack of commercialisation.

Administrators of SPII were also asked what constraints they face in achieving the programme's objectives. This was consistently reported to be a lack of funding for SPII grants. It was also stated by SPII stakeholders that SPII's account managers and post-investment team is small and is often overburdened.

Sustainability

The sustainability of SPII measured the extent to which the benefits accrued from SPII were likely to continue once SPII funding ended at the project level; as well as the sustainability of the programme as a whole.

Many industry stakeholders confirmed the importance of SPII funding being grant-based as any form of funding that requires full repayment would have the effect of stifling innovation, particularly in the early stages of the innovation process that SPII targets.

The Matching scheme was considered to be the most successful of the schemes as these projects reportedly have the highest commercialisation rate. Although the administrator noted that the PPD scheme was not as successful as the Matching scheme, these projects were considered to need funding the most.

Respondents noted that projects, particularly those of smaller firms, would likely have a greater chance of success if business development support was provided in conjunction with the SPII funding or if projects were incubated during and post-SPII funding.

ANALYSIS AND RECOMMENDATIONS

Based on the findings and analysis of the evaluation, SPII should continue given the important role it plays in the innovation landscape in South Africa. Following from our analysis, we have also identified a number of emerging themes which underpin the current and potential impact of SPII. These are listed below, followed by a list of corresponding recommendations.

- SPII lacks a set of clearly defined objectives, and associated targets, against which the programme's impact can be effectively measured and managed over a defined time-scale. This makes it difficult to measure impact beyond the value of annual project commitments and numbers of projects funded. Other measures against which impact can be measured need to be incorporated, such as those that track the efficiency of the programme (e.g. time to appraise and fund applicants), as well as whether a project reaches the stage of commercialisation or not.

- Based on its mandate, SPII occupies a specified and limited but extremely relevant space in the innovation cycle. SPII's overarching objectives include increasing the number of innovative products and processes developed in South Africa, and achieving a meaningful increase and improvement of the competitiveness and commercialisation of SPII supported technologies. SPII's direct activities are linked to increasing innovation, but not the commercialisation of funded projects. The programme itself therefore does not have a direct impact on job creation, economic growth, or competitiveness as these outcomes can only be achieved through the successful commercialisation of innovative products and processes.
- There is a misalignment in the **dti's** broad objective of job creation and SPII's objective of increased innovation. Innovation has an ambiguous direct effect on employment, particularly over the long term; it can generate jobs by creating new markets, however, innovation can lead to temporary restructuring towards methods that replace labour inputs. The challenge presented by insisting on job creation through innovation, is that this will only happen in the medium to long term, as innovation can lead to economic development and improvements to competitiveness, which will in turn lead to job creation. And should direct job creation be an indicator for project selection and success – the 'innovativeness' of particular projects may become the secondary objective – having the opposite effect in the long term due to a reduction in competitiveness in the short term.
- SPII's appraisal criteria are limited to 'economic merit' and level of innovation, which are not clearly defined and are open to interpretation and variability. These could be unpacked further into a combination of eligibility and competitiveness criteria, the most important being whether a project will commercialise or not.
- The skills, time and funding required to move from prototype (the current limit of SPII's involvement) to commercial product has resulted in a gap to commercialisation for SPII funded projects, in many instances beyond the three year window within which data is collected. This gap is further exacerbated by:
 - The innovation landscape in South Africa is fragmented and compartmentalised, and this limits the creation of linkages between institutional actors (both public and private) whose activities should be aligned around complementary objectives, but are not.
 - The skills shortage in South Africa. Of particular concern is the lack of business skills amongst SMEs required to take the newly developed prototype to market.
- The experiences of participating companies differ according to their size and therefore the scheme under which they are funded. SPII's application and reporting requirements do not differ according to the size of applicant firm, which means that smaller enterprises that receive funding under the PPD scheme have to fulfil the same administrative requirements as much larger and better-capacitated organisations. This translates into an onerous administrative burden on smaller companies that lack the resources and capacity to fulfil these requirements.
- Given SPII's limited resources, the on-going (rolling) consideration of applications does not allow for a strategic approach to building a project portfolio.
- The information and learning processes within SPII have improved in recent years, and draw on client feedback and management interactions, but these are not formalised. To date, the learnings have focused primarily on operational aspects of SPII, and have served to make continuous improvements, however; these learning loops should be expanded to generate

lessons from successful and unsuccessful applications post their interactions with SPII in order to have a clearer picture of the determinants of success.

- There are a number of internal processes that are currently operative and that, if adapted, could improve the efficiency of the programme. These include assigning consultants or account managers with limited knowledge of a specific sector to projects in those sectors, as well as the current practice of preventing applicants from presenting their applications to the investment committee directly, or at least attending the presentation in person.
- Detailed and accurate data of SPII-funded projects is limited. SPII requires that projects report on financials and employment figures for three years after project completion and SPII has experienced difficulties in retrieving these standard reporting data from clients. It is therefore difficult to monitor projects that have not commercialised. This means that there is a lack of the necessary measurement and evaluation systems for rigorous evaluation and identification of determinants of success.

These themes suggest that a number of the factors that have constrained SPII's impact are at the policy and programme design level, as well as at the implementation level. Based on these themes and our belief that SPII plays a critical role in the South African innovation landscape and should continue, the following set of recommendations have been provided, each of which will have cost implications should they be adopted:

Policy and programme design recommendations

1. **SPII should clearly define its objectives, with corresponding targets for both outcome and operational aspects.** These should include the number of firms supported, number of prototypes developed, lead times to approval and disbursement and number of projects that reach the market, and achievement of these should be measured annually. There should be clear recognition that SPII cannot be directly responsible for the short-term fulfilment of job creation, economic growth, or competitiveness targets. However, SPII plays an indirect role in contributing to the achievement of these outcomes (the logic of which is explained by a clear and detailed 'theory of change'), and so a link does exist between SPII and the broader **dti** mandate. A draft logframe has been developed (Annex 2) and can be completed by the SPII team.
2. **SPII's mandate to support and enhance innovation in business/industry should not be overwhelmed by a mandate to address direct job creation.** SPII is not an enterprise development fund. Innovation can generate jobs by creating new markets or it can lead to temporary restructuring towards methods that replace labour inputs. However, the shifts in products, productivity, scale and skills requirements that typically result from successful innovation will only typically lead to job creation in the long term – and to the ultimate goal of innovation-led economic growth and improved competitiveness. This logic is made explicit in SPII's theory of change, so that the focus and implementation of the programme is not confused and compromised by potentially conflicting goals. Fundamentally, growth is achieved through innovation – not through stagnation – and SPII plays an important role in driving innovation.
3. **SPII needs to continue to contribute to the stimulation of the innovation landscape by stimulating innovation in products/services and in geographical areas where opportunities are the greatest.**

Implementation recommendations

Application and funding process

4. **The application appraisal process should more rigorously assess an applicant's prospects of successful commercialisation as a key criterion.** A key component of this is market research, rather than firm level characteristics. SPII does allow for a small amount of market research to be done during the application phase, and where there is capacity, this should be enhanced. However, existing institutions, such as SEDA and other incubators should also be leveraged.
5. **SPII should adopt less of a one-size-fits-all approach to its application and funding processes, which should differ according to scheme** (and hence size of the firm being funded).
 - Consideration should be given to the creation of specialist teams of programme managers within each scheme with specific skills sets for the types of firms they assess and fund.
 - Linkages with business development support organisations, particularly for smaller less-capacitated firms should be encouraged in order to improve their ability to meet application and reporting requirements.
6. In order to strategically build SPII's project portfolio, serious consideration should be given to the following:
 - **Applications for funding should be collectively considered at a limited number of defined points in a year.** This will allow the Investment Committee to consider batches of applications on a comparative and competitive basis.
 - **Defined funding amounts (whether indicative or set as ceilings) should be allocated to each of the three schemes per funding round.** This requires strategic decision-making as to how the portfolio of SPII should be constituted across programmes (in terms of project scale, levels of risk, ROI etc). This process will ensure that funding is competitively allocated and not on a "first-come-first-served" basis. It will also ensure that SPII develops a diverse portfolio of investments which effectively tests a wide range of innovative ideas and approaches. Funding amounts should be flexible, so that uncommitted funds for one scheme can be absorbed by other schemes where greater opportunities exist.
 - **There should be a more targeted and proactive marketing approach to inform potential applicants about SPII**
7. **The programme should reconsider a number of processes in order to improve its efficiency.** These include assigning consultants or account managers with limited knowledge of a specific sector to projects in those sectors, as well as the current practice of preventing applicants from presenting their applications to the investment committee directly, or at least attending the presentation in person.

Linkages support

8. **Greater linkages with other innovation actors and programmes should be encouraged to maximise the impact of SPII.** This will reduce the risk that SPII operates in a compartmentalised fashion, and will ensure that smaller businesses exiting the

programme are afforded access to alternative sources of funding, mentorship and incubation resources that are needed to reduce the barriers to commercialisation. SPII should also look to establish linkages with private partners such as commercial banks and venture capital operations that exist beyond government's mandated agencies (Seda, TIA, TVC etc.). Ideally, SPII should aim to serve as an effective pre-incubator of early stage innovation for review and adoption as much by commercial banks and investors as by other DFIs and state agencies.

9. **SPII should consider explicitly addressing the lack of business skills amongst some of its funded projects, particularly SMEs, through improved linkages.** This could include assisting with linking beneficiaries to training programmes, incubators and other competent service providers who could offer technical assistance towards the end of the funding period to review the project's successes and challenges, to hone the necessary marketing requirements, and, overall, to map a concrete path to the commercialisation of the project.

Formalise internal learnings

10. **SPII should formalise internal processes that generate lessons from applications, from successful and unsuccessful projects, and from applicants' feedback following each funding round.** This could be done through more regular Exco reports or defined time slots in each management committee meeting dedicated to discussing and documenting lessons and feedback, the minutes of which can be distributed to the whole team. This will allow on-going design and process adjustments to continue to be made which reflect the needs of the market and incorporate the cumulative learning and experience in the programme's implementation. This should include details on key success criteria for commercialisation which then serves to inform the application and selection process.

Management information system

11. **A web-based platform for applications, internal appraisals and project reporting data (during and post funding) should be established.** This would allow for a more systematic appraisal of applications. It would also allow for the efficiency of the SPII processes to be monitored, enabling bottlenecks and other sources of inefficiency to be quickly identified and addressed and will enable improved monitoring of the programme's performance and impact.

Monitoring and evaluation

12. **Recipients of SPII funding should have greater accountability to SPII to report progress on the funded project once the funding period has ended,** which can be improved by:
 - Clearly stating reporting requirements in contracts
 - Post-funding reporting requirements should not differ heavily from the reporting requirements during funding (nothing too new or complicated should be added)
 - Reporting should happen through an easy to understand and accessible web-based platform
 - Automated email reminders should be sent periodically to grantees reminding them of their contractual agreement to report, with a link to the online reporting portal attached.

13. **A set of indicators for SPII itself should be determined**, linked to the objectives and targets (particularly the commercialisation of approved projects) highlighted in its theory of change, and benchmarked against the scheme's previous performance.

Implementing agency

14. **SPII should remain a specialised innovation fund and be located within a specialised fund management institution** that has access to the correct networks to serve its role as a player in the landscape and maintain a focused, flexible and opportunity driven approach.

1. INTRODUCTION

1.1. BACKGROUND TO THE EVALUATION

The National Evaluation Policy Framework (NEPF), approved in November 2011, sets out the context for a National Evaluation System for South Africa. The NEPF encompasses various government interventions, including policies, plans, programmes and projects. The Department of Performance Monitoring and Evaluation (DPME) at the Presidency is mandated to conduct evaluations under the NEPF.

An impact evaluation of the Support Programme for Industrial Innovation (SPII) was one of the fifteen evaluations scheduled for 2013/2014. SPII is a Department of Trade and Industry (**the dti**) initiative that is administered by the Industrial Development Corporation (IDC). SPII supports the development of viable, innovative products and/or processes and the commercialisation³ thereof.

The DPME, in partnership with **the dti**, issued a Terms of Reference (ToR) in June 2013 for an impact evaluation of SPII. The central objective of the evaluation is to gauge the impact of SPII and, where possible, suggest how the impact of the programme be improved. The evaluation covers the thirteen year period of 2000/01 - 2012/13.

The DPME contracted Genesis Analytics to conduct this impact evaluation of SPII. An inception report was submitted and approved in October 2013, and a fieldwork report was submitted in November 2013.

1.1.1. Objectives of the impact evaluation

The purpose of this evaluation is to provide insight into the effectiveness and efficiency of the current model of implementation, assess the impact of SPII and to determine how the beneficial impacts can be strengthened. In carrying out the evaluation the Genesis team was guided by a number of overarching questions, namely:

- What is the impact of SPII on South Africa's innovation landscape?
- What impact does SPII have on economic development through technology transfer and technology development?
- Do industry partners realise a significant return on investment (ROI) from SPII; after how long?
- Does South Africa realise a return on investment from SPII against the cost of delivering the programme in terms of:
 - Economic growth and empowerment;
 - Skills development and job creation (rate);
 - Taxable Revenue; and
 - Competitiveness.
- What happens to the Intellectual Property from complete SPII projects?

³ Commercialisation refers to the process whereby a project's output is brought to the market.

- Is SPII still relevant when considering other instruments in the innovation landscape?
- What factors in the South African context enable or constrain the beneficial impact of SPII, including the long term sustainability of those impacts?
- How can the beneficial impacts of SPII be strengthened?
- Is the current model of delivering SPII cost effective in comparison to alternative models?
- What effect do institutional mechanisms (structure, management, administration, and processes) have on the efficiency and effectiveness of delivering programme outcomes?
- How does SPII performance compare to similar programmes nationally and internationally?

Although this is considered an impact evaluation in the ToR, a number of these evaluation questions are also focused on the implementation of the programme. Furthermore, the limited availability of data (as described in section 3.5) has constrained this evaluation's ability to robustly identify and attribute impact in all instances, and so focus is also given to the implementation of SPII, using qualitative and quantitative research to understand the implementation factors that both limit and enhance SPII's impact.

A critical point that the evaluation process highlighted to the evaluation team is the importance of conducting an evaluability assessment prior to finalising and issuing a TOR to ensure that the context and data available can reasonably answer particular types of evaluation questions. Had this been done in this case prior to the TOR being issued – it would have more likely been appropriate to focus this evaluation on implementation, rather than on impact.

1.1.2. Evaluation Criteria

As mentioned, while this evaluation expected to be primarily an impact evaluation, the evaluation questions listed above refer to broader programme evaluation questions that needed to be explored. The Development Assistance Community (DAC)⁴ evaluation criteria were selected as the guiding framework for the evaluation in order to gather the information required to answer all of the evaluation questions included in the ToR.

This approach provides an in-depth assessment of the programme's relevance, effectiveness, efficiency, impact, and sustainability, as well as one further criterion that we believe is important to assess, being SPII's additionality. Each of these measures can be explained as follows:

- **Relevance:** The extent to which the intervention is suited to achieve impact, as well as match the priorities and policies of the target group, recipient and sponsor.
- **Effectiveness:** A measure of the extent to which an intervention attains its targets.
- **Efficiency:** Measures the outputs -- qualitative and quantitative -- in relation to the inputs associated with the programme. It determines the extent to which the intervention uses the least costly resources possible in order to achieve the desired results.

⁴ The OECD's DAC (Development Assistance Community) criteria provide a useful framework for evaluating developmental assistance. This framework is globally recognised and is used by the majority of development assistance organisations, thus enabling comparison between programmes. More information is available at <http://www.oecd.org/dac/evaluationofdevelopmentprogrammes/daccriteriaforevaluatingdevelopmentassistance.htm>.

- **Impact:** The positive and negative changes produced by a development intervention, directly or indirectly, intended or unintended. This involves assessing the main impacts and effects resulting from the activity on local social, economic and other development indicators.
- **Sustainability:** Sustainability is concerned with measuring whether the impacts of an activity are likely to continue after the intervention or incentive has been withdrawn. Projects need to be environmentally as well as financially sustainable.
- **Additionality:** The extent to which the incentive catalyses investment and activity which would not have happened in its absence.

The report is structured as follows: Section 2 of this report describes SPII in detail, followed by Section 3 that presents the global programme and best practice scan. Section 4 outlines the evaluation methods employed, as well as the limitations of the study, and Section 5 presents the findings from the evaluation process, which are drawn from both quantitative and qualitative research. Section 6 then presents the analysis of the findings in a way that answers each of the evaluation questions presented in the ToR and finally, Section 7 presents emerging themes and recommendations.

1.2. BACKGROUND TO THE INTERVENTION

In discussing the SPII programme it is important to start by exploring the definition and process of innovation. According to the World Bank, innovations can be described as *“technologies or practices that are new to a given society. They are not necessarily new in absolute terms. These technologies or practices are being diffused in that economy or society. This point is important: what is not disseminated and used is not an innovation. Dissemination is very significant and requires particular attention in low- and medium-income countries.”*⁵

One of the most important factors that stands out in the above definition of innovation is that a country does not necessarily need to be at the technological frontier to be an innovation leader. Instead, bringing in ideas from other places, rather than focusing on producing them locally, can be a strong driver of innovation and hence economic growth.

What has become clear in the recent decades is that innovation performance is crucial for competitiveness and economic development and can help address global challenges, such as environmental degradation and poverty. Firms that innovate attain higher levels of productivity and competitiveness. In the past two decades, intense levels of globalisation and the advent of the information age has resulted in innovation being not as heavily dependent on the research portion of Research and Development (R&D) as it once was. Today knowledge is easily transferable across international borders, and this is enhanced by the fact that the cost of gaining international information has declined. Innovation has become a fast moving process, with the pace at which entities innovate being closely linked to their success. As a result of this, many governments around the world have set up institutions and funds that are aimed at catalysing innovation in their countries with the hope that this will contribute to economic growth. In particular, domestic use innovations can reduce import requirements, while local innovation can be exported. It is in this context that the South African government introduced incentive programmes such as SPII to catalyse innovation.

⁵ Innovation Policy: A Guide for Developing Countries – World Bank (2010)

SPII

In 1989, **the dti** introduced the Innovation Support for Electronics (ISE) programme to fund up to 50% of specified costs incurred by electronics firms in the development of new products. The justification for supporting innovation in local electronics firms was an increasing net trade deficit in electronics products. The objective of the ISE programme was thus to promote technology development so as to assist import replacement and increased exportation of electronics.⁶ **The dti** appointed the IDC to administer the programme on its behalf. An evaluation of the first few projects suggested favourable results in terms of exports, stimulating further R&D and contributing to tax revenues⁷. Based on these results, the government declared the ISE programme to be successful.

In April 1993, the ISE was extended and restructured to cover all sectors of the economy, except defence, as a means to catalysing a wider range of innovation. The expansion to include all sectors was based on the success of the ISE programme and on the acknowledgement that the ISE programme was too selective and targeted in catering exclusively to electronics firms⁸. The restructured programme was thus named SPII. Specifically, SPII was designed to promote the development of commercially viable, innovative products and/or processes and facilitate the commercialisation of such technologies, through the provision of financial assistance.

Since its inception in 1993, SPII has undergone a number of changes to streamline its processes and to increase its accessibility to South African entities and general citizenry. These changes included the introduction of the Partnership Scheme in 1999 to fund large projects by corporate entities; and the introduction of the Black Economic Empowerment (BEE) Scheme to increase accessibility for BEE companies in 2004. The BEE Scheme was revised in 2005 to broaden its mandate to include support for small, very small and micro-enterprises, and as a result was renamed the Product Process Development (PPD) Scheme. Currently, SPII offers three schemes: The PPD Scheme, the SPII Matching Scheme, and the SPII Partnership Scheme (PII). Financial assistance is only available for projects that have already concluded basic research; and financial assistance ends after the pre-production prototype of the product or process is complete. In 2011 SPII underwent a review process in order to better align it with IDC rules and criteria.

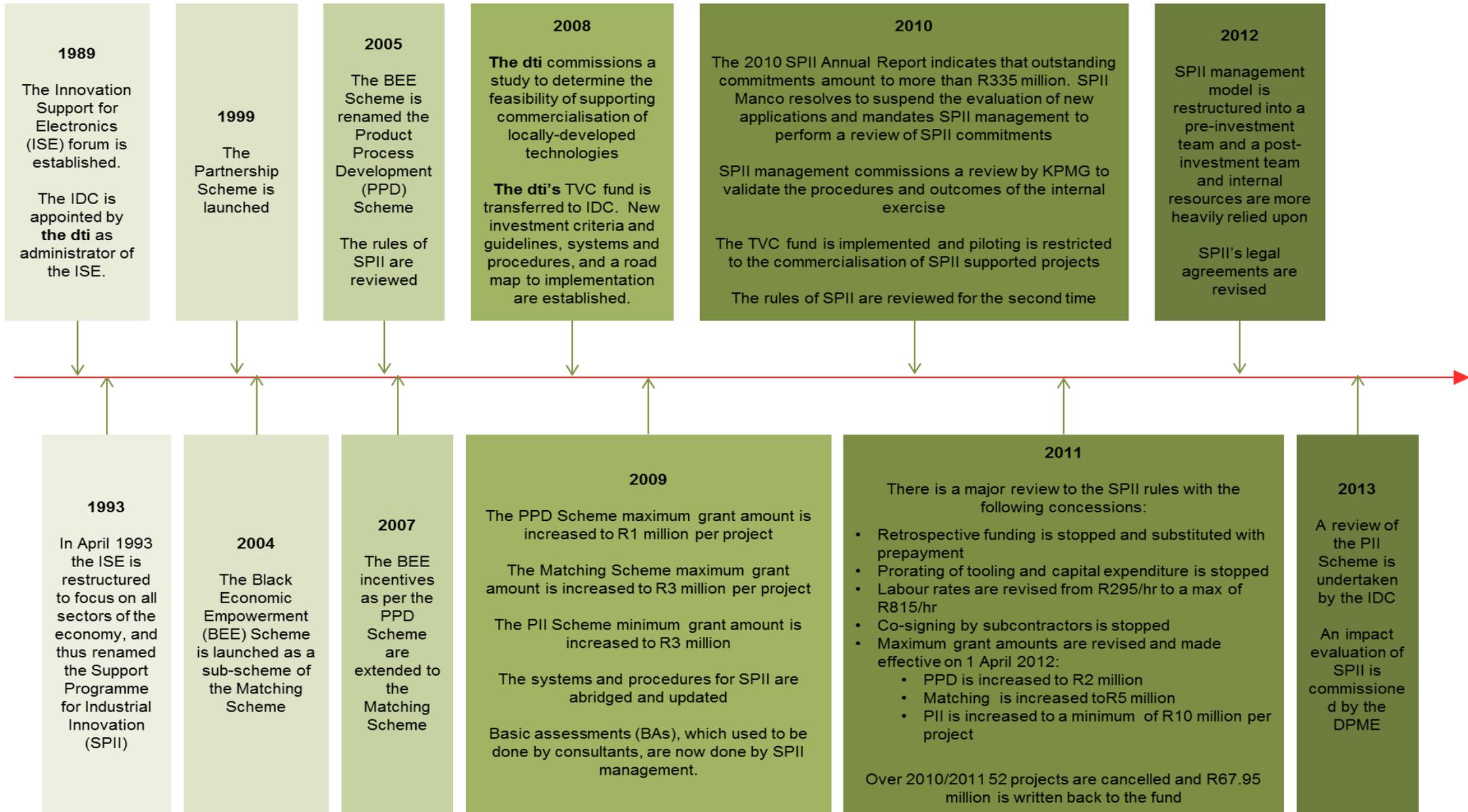
A timeline of the major changes to SPII since its inception are presented in the figure below.

⁶ Joffe, A., Kaplan, D., Kaplinsky, R., Lewis, D., 1995

⁷ Department of Trade and Industry, 1992

⁸ Ibid

Figure 1: Timeline of SPII's evolution



1.2.1. Product Process Development Scheme

This scheme provides assistance to Small, Medium and Micro-sized Enterprises (SMMEs), as defined in the National Small Business Amendment Act 2003, as companies with less than 50 employees, less than R13 million turnover, and less than R5 million in total assets. Financial assistance is also provided as a non-repayable and non-taxable⁹ grant; ranging from 50% to 85% of the qualifying costs incurred during the technical development stage, up to a total of R2 million per project. The grant allocation again depends on the company's shareholding, as per Table 2 below.

Table 2: PPD scheme: Qualifying costs by shareholding

Shareholding	% of qualifying costs
Less than, or equal to, 25% BEE shareholding	50% of qualifying costs
More than 25% but less than, or equal to, 50% BEE shareholding	75% of qualifying costs
More than 50% women or people with disabilities shareholding	75% of qualifying costs
More than 50% BEE shareholding	85% of qualifying costs

1.2.2. SPII Matching Scheme

The Matching Scheme is primarily targeted towards small and medium enterprises (SMEs), where an SME is defined as per the National Small Business Amendment Act 2003 for the manufacturing sector, as an enterprise with fewer than 200 employees, less than R51 million turnover and less than R19 million in total assets. Despite its name, the Matching Scheme does not require a prescribed co-financing amount from another entity other than the beneficiary. Financial assistance is given to these SMEs in the form of a non-repayable grant between 50% and 75% of the qualifying costs incurred during the technical development stage, up to a maximum of R5 million per project. The grant allocation depends on the company's shareholding by BEE, women and people with disabilities; as shown in Table 3 below.

Table 3: Matching Scheme: Qualifying costs by shareholding

Shareholding	% of qualifying costs
Less than, or equal to, 25% BEE shareholding	50% of qualifying costs
More than 25% but less than, or equal to, 50% BEE shareholding	65% of qualifying costs
More than 50% women or people with disabilities shareholding	65% of qualifying costs
More than 50% BEE shareholding	75% of qualifying costs

Large companies that do not satisfy the criteria of an SME as outlined above can qualify for the Matching Scheme, but they only qualify for 50% of qualifying costs.

1.2.3. SPII Partnership Scheme

The Partnership Scheme promotes large-scale technology development by providing financial support to commercially viable technological innovation products or processes. Financial support is provided in the form of a conditionally repayable grant of 50% of the qualifying costs incurred during development activities, repayable on successful commercialisation of the project. Repayment is generally in the form of a levy, based on a percentage of sales generated from the project over a fixed time period. The levy percentage and repayment period are established at the time of the grant. In this way, SPII shares in both the risks and returns of the project.

⁹ As of February 2013

The minimum grant amount is R10 million under the Partnership Scheme. In order to qualify for this scheme, firms need to show evidence of the additionality that will result from the funding. Thus the scheme is primarily targeted at large companies, however, SMEs may also apply if the project for development requires more funding than would be catered for under the Matching Scheme.

1.2.4. Breakdown of applications

Table 4 shows the breakdown of applications by scheme since 2000 and the status of each project;

Table 5 shows the breakdown of applications by province; and, Table 6 shows the breakdown of applications by industry:

Table 4: Application breakdown by scheme and project status since 2000

Status	PII	PPD	Matching scheme	Total
Approved/Signing agreement	0	11	3	14
Being Audited	0	12	11	23
Being developed	3	68	63	134
Cancellation	16	65	124	205
Completed projects	3	78	313	394
Complete-Levy Audit	2	0	0	2
Late Milestones	0	3	1	4
New application	0	8	6	14
Projects under dispute	2	3	7	12
Rejected	15	105	219	339
Unsuccessful	1	16	32	49
Waiting for information	2	6	5	13
Withdrawn	15	170	212	397
Total	59	545	996	1600

Table 5: Application breakdown by province and scheme since 2000

Scheme Province	PPD		Matching scheme		PII	
	Accepted	Rejected	Accepted	Rejected	Accepted	Rejected
Eastern Cape	10	10	16	22	0	0
Free State	6	7	6	8	0	0
Gauteng	127	159	327	287	19	22
KZN	22	25	54	23	0	3
Limpopo	1	1	2	2	0	0
Mpumalanga	1	4	7	8	0	1
North West	15	18	11	16	1	1
Northern Cape	0	3	2	1	0	0
Western Cape	70	43	119	100	7	0

Table 6: Application breakdown by industry and scheme since 2000

Scheme Sector	PPD		Matching scheme		PII	
	Accepted	Rejected	Accepted	Rejected	Accepted	Rejected
Basic Iron & Steel Products	6	5	10	12	0	0
Basic Non-Ferrous Metal Industries	2	0	0	1	0	0
Beverages & Tobacco	1	1	1	0	0	0
Chemicals & Pharmaceuticals	27	23	58	56	8	2
Electrical Machinery	17	25	41	35	1	3
Electronics	128	130	296	269	12	21
Food	1	2	8	2	1	0
Furniture	1	0	4	1	0	0
Leather & Leather Products	0	0	1	0	0	0
Mechanical Machinery	14	15	22	30	3	1
Metal Products	0	2	2	8	0	0
Miscellaneous Manufacturing	42	48	74	85	1	3

Scheme Sector	PPD		Matching scheme		PII	
	Accepted	Rejected	Accepted	Rejected	Accepted	Rejected
Motor Vehicles & Parts	11	10	29	17	2	0
Non-Metallic Mineral Products	0	3	1	1	0	0
Paper & Paper Products	0	2	3	0	0	0
Plastic Products	2	3	5	12	0	0
Rubber Products	1	2	1	2	0	0
Textiles & Clothing	2	1	5	4	0	0
Transport Equipment	0	2	2	4	0	0
Wood & Wooden Products	0	1	1	0	0	0

These tables show that the majority of SPII projects are in Gauteng, the Western Cape and KwaZulu-Natal, and that SPII mainly appeals to the electronics and ICT industries.

1.2.5. Criteria for SPII support

In order to qualify for these schemes, there are a number of key criteria that applicants need to meet. These are briefly outlined below:

- The development must represent a significant advance in technology.
- Development and subsequent production of the project must take place in South Africa.
- All intellectual property rights, in terms of the Intellectual Property Rights from Publicly Financed Research and Development Act, 2008 shall reside in a South African registered company.
- Products developed with support from the SPII Scheme must (where applicable) comply with relevant national and international standards.
- Participating entities must be registered South African companies.
- Only one application may be considered from any company at one time.

There is no explicit requirement for an applicant to prove that they would not be able to fund the project without SPII support.

Similarly, there are guidelines for projects which do not qualify, described below:

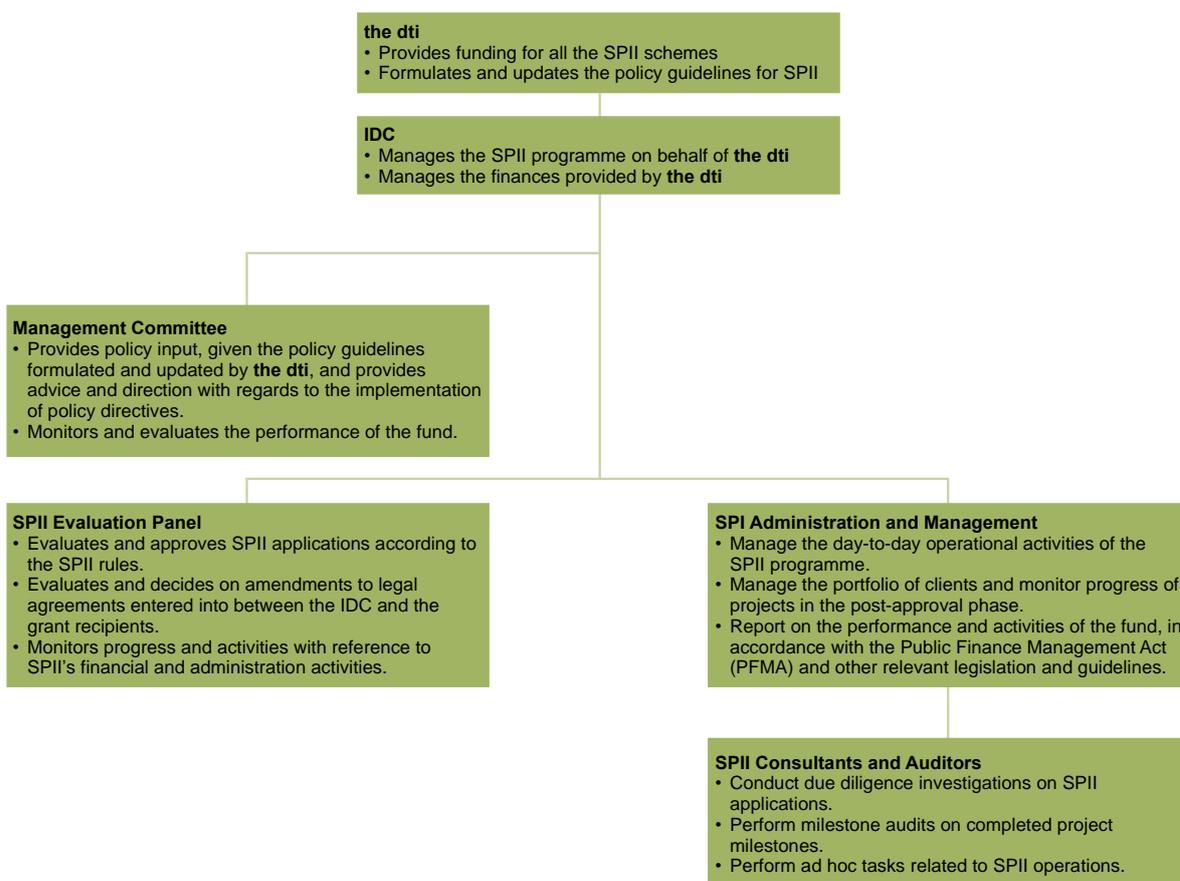
- Products and processes developed for a single client do not qualify.
- SPII does not support basic and applied research.
- SPII typically does not support projects that are more than 50% complete at the time of application.
- Projects where SPII contributions are not significant (less than 20% of total project costs) do not qualify.
- A project that receives any other government funding (at the same time for the same purpose) does not qualify.
- Projects of a military nature will not receive SPII support unless the project will also have a substantial commercial application.

Applicants can apply for a SPII grant at any time and the evaluation panel meets every month to review applications and make investment decisions.

1.2.6. Organisational structure

The management committee of SPII is chaired by **the dti** and is largely focused on policy and strategy while the evaluation panel is chaired by the IDC and is responsible for investment decisions. There is, however, a large amount of overlap between **the dti** and the IDC in terms of individual members. Consultants are contracted by the IDC to conduct due diligence on applications, and to assist applicants with improving aspects of their business plans. There has been a move in recent years to build this function internally to the SPII team. The figure below illustrates the structure of SPII:

Figure 2: SPII organisational structure

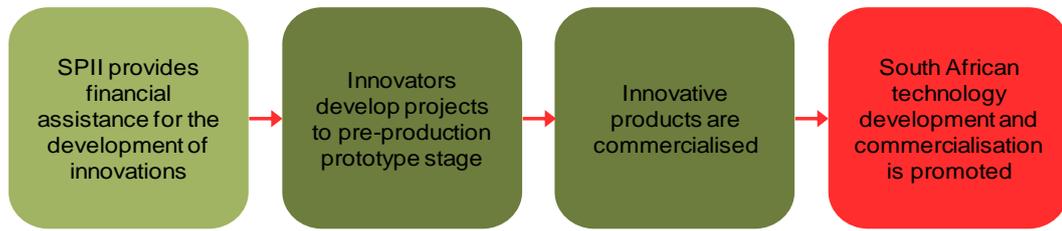


Source: <http://www.spii.co.za/structure.html>

1.2.7. Theory of change

There is no existing theory of change for SPII; however, our interpretation of what it would look like if it had been documented is represented in the figure below. This is based on the programme's objectives as articulated in programme documentation and initial conversations held with the SPII team.

Figure 3: Interpretation of SPII's original theory of change



It is clear that there are gaps in the assumptions and detail underlying this interpretation of the theory of change, many of which were investigated as part of this evaluation. A revised theory of change based on our findings and analysis has been provided in section 5.1.4.

1.2.8. Seminal reviews of SPII

Previous reviews of SPII have been conducted; however, these have been in the context of the greater science, technology and innovation (STI) landscape or in collaboration with the Technology and Human Resources Programme (THRIP). The two seminal reviews are discussed below¹⁰.

Review and Impact Assessment of THRIP and SPII for the Department of Trade and Industry, 2006

In 2006, Professor Pouris from the Institute for Technological Innovation at the University of Pretoria conducted a *Review and Impact Assessment of THRIP and SPII for the Department of Trade and Industry*. The theory-based component of the evaluation suggested that, as with any grant-based incentive, SPII could introduce what it termed *government failure*¹¹ into the market, which could result in the perverse effect of 'crowding out' private sector-led innovation. Whilst SPII is vulnerable to these shortcomings on theoretical grounds, the evaluation found that the collaborative character of the supported projects and their orientation towards exportation mitigated these theoretical deficiencies.

The assessment of SPII's performance indicators showed that SPII-supported products and processes had high turnovers, high export sales and resulted in substantial job creation and tax payments. Interestingly, VAT and company tax expenditure declared by respondents equalled the SPII budget, suggesting that Government expenditure on SPII is fully compensated.

54% of respondents declared that their project would not have taken place in South Africa had they not received SPII support. The remaining 46% who declared that they would have continued without SPII support stated that this would have resulted in less ambitious objectives and longer time horizons.

SPII's administrative management was noted as a concern for beneficiaries. This was primarily around the marketing of the programme, the provision of on-going support, the speed of the

¹⁰ In 2011 an internal evaluation was conducted to better understand SPII's commitments to active projects. As this review exclusively covered SPII's commitments, this is not considered a seminal review.

¹¹ A phenomenon whereby the government's intervention either creates an uncompetitive environment or displaces private sector investment or activity which may otherwise have taken place.

application process and accessibility and communication. This was noted as a particular concern in light of SPII's high overhead costs.

Based on these findings, a number of recommendations were made, the most prominent being that SPII should remain one of the government's instruments for supporting innovation. Other recommendations from this evaluation include:

- Increasing collaboration with other government efforts;
- Replacing the Partnership Scheme with a “technology platforms development scheme”;
- Shifting funding to riskier projects;
- Placing greater emphasis on supporting SMEs,
- Increasing collaboration between participating firms; and,
- Improving SPII's operational functions.

Ministerial Review on the Science, Technology and Innovation Landscape in South Africa, 2012

The Minister of Science and Technology commissioned a Ministerial Committee to review the STI landscape with the purpose of providing an understanding of the National System of Innovation (NSI) and outlining what is required by government to ensure a growing innovation landscape. This review has been discussed in detail in Section 3; the subsequent paragraph only gives an outline of the references to SPII.

The review mentions that the outcomes from SPII have been mostly positive; however, it highlights the fact that SPII does not actively contribute to the development of a productive *triple helix* relationship between government, business and higher education institutions. The other reference to SPII is the commendation of its reporting system, which was suggested to be adopted by other schemes.

2. BEST PRACTICE SCAN

To offer a framework against which SPII can be evaluated, a global scan of innovation interventions was conducted and is presented below. The purpose of this scan was to identify comparable interventions and establish best practices in implementation.

SPII provides direct financial support to industry to encourage innovation, thus, this global scan is concerned with similar direct support measures for innovation, rather than the entire spectrum of policies and programmes. Therefore, 14 international programmes¹² with a similar mission and methodology to SPII were selected for this review. The table below lists the reviewed programmes¹³:

Table 7: International programmes reviewed

Country	Intervention	English name	Externally evaluated
Argentina	Fondo Argentino Sectorial (FONARSEC)	Argentine Sector Fund	

¹³ Other member countries of BRICS were considered for the scan; however, the main instruments used to encourage innovation in these countries are tax incentives.

Country	Intervention	English name	Externally evaluated
Belgium	Financement de la Recherche Industrielle	Support for Industrial R&D	
Belgium	KMO Programma	Flanders: SME Programme	Yes
Bulgaria	National Innovation Fund	National Innovation Fund	Yes
Croatia	Program Provjere Inovativnog Knocepta	Proof of Concept Programme	
Germany	Zentrales Innovationsprogramm Mittelstand (ZIM)	Central Innovation Programme SME	Yes
Greece	Support R&D in Groups of SMEs	Support R&D in Groups of SMEs	
Hungary	Piacorientált Kutatás-fejlesztési Tevékenység Támogatása	Support to Market-oriented R&D Activities	
Latvia	Janunu Produktu un Tehnologiju Izstrade	Support for Development of new Products and Technologies	Yes
Latvia	Janunu Produktu un Tehnologiju Izstrade - Atbalsts Janunu Produktu un Tehnologiju Ieviešanai Ražošana	Support for Introduction of New Products and Technologies into Production	
Mexico	INNOVAPYME	<i>None</i>	Yes
Morocco	Innováct Programme	<i>None</i>	Yes
Turkey	AR-GE, Inovasyon ve Endustriyel Uygulama Destek Programi	R&D, Innovation and Industrial Application Support Programme	
Turkey	Oncelikli Alanlar Arastirma, Teknoloji Gelistirme ve Yenilik Projeleri Destekleme Programi	Support Programme for research, technology development and innovation projects in priority areas	

Vision and mission

The overarching vision of all the reviewed programmes is to increase productivity, employment and competitiveness, with the overall aim of improving economic growth. They all intend to achieve this by encouraging innovation and investment in R&D.

The majority of programmes reviewed had a specific clear emphasis on SME development, with 11 of the 14 having a strong mission to not only encourage innovation within firms, but also develop collaboration between individual firms, industry and research institutions, in an attempt to solidify linkages in the triple helix, which is in accordance with recent thinking on how to stimulate innovation.

All of the 14 programmes aim to achieve their missions by offering direct financial support to firms and consortiums to address the high costs associated with undertaking risky, but potentially very beneficial, projects.

External evaluations of the programmes recommended that the programmes expand funding to all sectors where only certain sectors are targeted. However, this is based on country specific conditions and goals. Instead of focussing on specific sectors and excluding others,

innovation should be encouraged across the board; however, the strategy for each sector would be different.

For example, South Africa is at the technological frontier of mining, and thus an intervention in this sector may focus more on linkages with local research institutions and the development of new technologies, while the electronic industry or automotive industry may require the intervention to focus more on encouraging adaptation of foreign technology and forming linkages with the international knowledge base.

Support mechanisms

All of the programmes reviewed use a non-repayable grant mechanism to fund projects. Although differing percentages of total project costs are covered, smaller firms are supported with higher levels of funding (in percentage terms) than larger firms, with between 35% and 75% of project costs being covered. The exception to this is the *R&D, innovation and industrial application support programme*, in Turkey, which sponsors up to 100% of project costs for start-up firms.

There are also examples of programmes which use a combination of financing instruments, with the *Flanders: SME Programme in Belgium* supplying firms with a grant to cover up to 50% of their costs, after which applicants can apply for soft loans to cover the other 50%.

Beyond supplying financing, the programmes fit into larger policies, which provide linkages to other support programmes, some of which are sibling programmes that assist the innovation project to reach the market or society. The use of grants as a funding mechanism always carries with it the risk of market distortion. Some programmes explicitly address this, for example the *Support to market-oriented R&D activities* programme in Hungary defends its use of grants as a means to address a market failure, where the private sector is unwilling to invest.

Who benefits and what is funded?

Although the main focus of the programmes is on funding SMEs, many of the funds also provide grants to larger companies, research institutions and collaborative projects between firms and research institutions. These grants fund project costs, labour, overheads, equipment and external inputs. In some cases, grants can also be used for innovation infrastructure, production costs, and the commercialisation of the innovation, and thus, contribute to the entire innovation process and the market success of projects.

Box 1: Central Innovation Programme SME – Germany

The *Zentrales innovationsprogramm mittelstand (ZIM)* in Germany is run by the Federal Ministry of Economics and Technology (BMWi) and aims to support the innovativeness and competitiveness of SMEs and public research organisations. The programme makes it clear that for a project to be successful and become an innovation then it must reach the market; thus, it supports the commercialisation process of successful projects. The funding must be applied for within six months of completion of the project. The commercialisation costs which are covered include: management consulting fees, technical support, technology transfer services, training of staff, the cost of securing intellectual property rights, cost of meeting standards, office space for product presentation and certification fees.

Application process

Application processes are generally run in one of two ways: either by periodic calls for proposals, which allow for competitive ranking of projects, or by continuously accepting proposals and evaluating them as they are received. The advantage of periodically calling for proposals is that it allows for more prudent resource allocation, as the projects are essentially competing for resources. However, this process may also exclude urgent projects, if the time between evaluations is large. Although the open application approach does not exclude these more urgent projects and requires less origination effort and marketing to receive an acceptable number of applicants to assess, it is less competitive.

The methodology for the assessment of applications is not explicit for any of the programmes reviewed. Although three projects have a scoring system for each of their identified funding criteria and a minimum score requirement, they do not suggest how these scores are calculated (*Proof of concept Programme – Croatia, Support To Market-Oriented R&D Activities – Hungary, and Support R&D In Groups Of SMEs - Greece*).

The Mexican programme *INNOVAPYME* claims to use an objective scoring evaluation methodology to select applications, but these selected applications still have to travel through two committees before being awarded funding. Most of the programmes evaluate the proposals on a case-by-case basis and employ sector experts to assist in the evaluations. The practice of supporting applicants to improve their application is also employed and improves acceptance rates.

Criteria against which proposals are evaluated can be categorised into the following three groups:

- **Quality of proposal** in terms of pertinence, objectives, expected products and innovative character
- **Quality of expected implementation process** in terms of methodology, implementation capacity, links to other firms or institutions and quality/price ratio
- **Anticipated impact of innovation**, including economic, social and environmental impacts

While the initial two groups are the most common evaluation criteria, some programmes have a large focus on generating impact.

Furthermore, the criteria should attempt to evaluate the additionality of the investment, in other words the application should be assessed to establish whether the project would not have taken place without the intervention. In the external evaluation of *INNOVAPYME* in Mexico, the main criticism of the programme was that it was largely funding projects that would have gone ahead even without the grant. This suggests that in order to ensure that the use of grants does not distort the market, evaluation of applicants to a programme must include an assessment of whether the proposed project will go ahead regardless of whether the funding is awarded or not.

Monitoring and evaluation processes

All programmes employ some form of project monitoring, including periodic reports produced by beneficiaries and designating permanent programme staff to monitoring a project and reporting to the management committee. It is common practice for the programme to withhold payments until receiving a report. Constant monitoring is consistent with best practice in programme management and can improve the achievement of outcomes and objectives.

However, it was found in the external evaluations of the programmes that too stringent administrative processes and requirements can place a burden on the beneficiaries and stifle their progress.

The evaluation of projects is not always explicit, and many 'evaluate' projects based on their final monitoring report or financial statements. However, some programmes require their beneficiaries to report on indicators, such as jobs created, even after the project has received its final instalment of financing, which allow them to conduct some form of evaluation. The evaluation of individual projects is important to assess whether the programme is achieving its goals and if its selection processes are relevant.

Box 2: INNOVAPYME - Mexico

Programa De Apoyo A La Innovación Tecnológica De Alto Valor Agregado or INNOVAPYME is one of three related programmes in Mexico. Its main objective is to enhance SMEs capacity to innovate through support in building businesses, network opportunities and promotion of investment, so as to foster job creation and economic growth. Monitoring and evaluation of projects includes collecting and analysing reports from beneficiaries on the technical and financial performance of the projects, as well as the economic, social and environmental impacts. Furthermore, having external evaluators evaluate individual projects is being considered.

Six of the programmes reviewed have been externally evaluated. All of the evaluations found the programmes to be relevant, effective and impactful; however, it has been noted that programmes should simplify their management processes and lessen their administrative requirements, to allow for easier navigation by SMEs. Finally, as mentioned earlier, the evaluation of *INNOVAPYME* suggested that the programme should only fund projects that were unlikely to become operational if they were to not receive funding.

2.1.1. Best practices

The review of these programmes has found that direct support programmes generally perform well, with a few exceptions performing particularly well. The following best practices have been identified from the scan:

- 1.a) **Clear vision, mission and objectives:** The vision and mission of the intervention must be clear and match with the intervention's intended goals.
- 1.b) **Vision is unambiguous and comprehensive:** Every term used in the vision should have an unambiguous and comprehensive definition.
2. **Open to all industries:** The intervention should not preclude any industries, but rather consider each project and evaluate it based on how the knowledge for the innovation is derived.
3. **Simple management structure:** The fund should not have a complicated management structure or onerous requirement or processes, which may stifle projects.
4. **Simple administrative processes:** The administrative processes should not place an unwarranted burden on the beneficiaries and should rather encourage good business practices.
5. **Strong linkages with other programmes:** The intervention should have strong linkages with other programmes in the innovation environment. Particularly where the

intervention does not support the project’s entire lifespan, it should provide linkages and channels to other relevant support interventions.

6. **Value maximising appraisal process:** The appraisal process should be suited to the resource position of the intervention. For example, if funding for the programme were limited, a competitive bid process would be more prudent than a rolling tender system.
7. **Selection of projects with impact potential:** The application assessment criteria should go beyond the standard considerations, and evaluate the anticipated impact of the innovation, as well as whether the project could go ahead without the funding or not.
8. **Appropriate funding mechanisms:** The funding instruments selected for the programme should aim to address areas of market failure, where the potentially beneficial investments in innovation would not have taken place without the support.
9. **Comprehensive monitoring, reporting, evaluation and learning:** The fund should have a comprehensive monitoring and evaluation framework for itself and the projects it supports. This should include periodic external evaluations of the intervention.

3. EVALUATION METHODOLOGY

A combination of quantitative and qualitative methodologies was used in conducting the evaluation. Table 8 presents the tools used to collect data.

Table 8: Data collection tools

Instrument	Response	Response rate
Key informant interviews	33 interviewees	76.7%
Survey of SPII applicants (approved and rejected)	230 respondents	34.5%
Case studies of SPII funded projects	20 detailed case studies (8 in Gauteng, 8 in Western Cape and 4 in KwaZulu Natal)	
Completed project reporting data review	218	54.4% (of the 401 completed projects only 218 had sales data)

3.1. DESKTOP REVIEW

As a precursor to the development of our research tools and analysis plan, a review of relevant innovation incentives and policy literature was conducted. This included a review of:

- The theory of innovation and national systems of innovation;
- International practices in innovation policy frameworks and instruments;
- A review of the South African innovation policy and industry landscape review;
- An overview of SPII; and,
- A global scan of innovation support programmes

Pertinent segments of this review have been included in the preceding sections and referenced throughout the report, where relevant.

3.2. ANALYSIS FRAMEWORK

The design of the systematic analysis framework was informed by the desktop review. The tool was categorised by the DAC criteria, which have been further refined according to the following themes, each of which had specific indicators.

Table 9: Analysis framework themes by DAC criteria

DAC criteria	Theme
Relevance	<ul style="list-style-type: none"> • The applicability of SPII's objectives in the South African context • The relevance of SPII in the innovation process • The relevance of SPII in relation to other programmes and funding mechanisms • The relevance of the expenses which SPII covers • The extent to which SPII reduces the barriers to innovation in South Africa
Effectiveness	<ul style="list-style-type: none"> • Achievement of programme objectives • Constraints to innovating in South Africa • Achievement of innovation projects that have been funded by SPII
Efficiency	<ul style="list-style-type: none"> • Application and contracting process • Reporting and disbursements • Communication • Management and structure of the programme
Impact	<ul style="list-style-type: none"> • Innovation and competitiveness • Job creation and skills development
Sustainability	<ul style="list-style-type: none"> • SPII's budget • The success of projects SPII has funded
Additionality	<ul style="list-style-type: none"> • Effect of SPII on project continuation • Catalysing private investment

As mentioned above, SPII was evaluated according to each of these criteria and their related themes in terms of whether they enhance or dilute SPII's impact.

A multi-method approach was undertaken to collect data for each of the indicators. This included:

- Document and literature review;
- Online Surveys;
- Data analysis;
- Key Informant Interviews; and,
- Case Study Interviews.

The methodology and analysis framework were approved by the steering committee through their acceptance of the Inception Report (October 2013) and Analysis Framework (November 2013).

3.3. QUANTITATIVE DATA ANALYSIS

Two sources of data were used for the quantitative research portion of the impact evaluation; namely completed project-reporting data from SPII and data generated by the survey questionnaire.

3.3.1. Project reporting data

SPII requires that every completed project submit data on sales, R&D expenditure and tax revenue for three years after completion. This data was received from IDC in 10 Excel sheets for the period from 2004 to 2013. Each sheet contains two years of data for a project, which overlaps across sheets, thus effectively providing us with data from 2003 to 2013. Genesis has matched projects using their unique identifier codes and produced a consolidated datasheet containing **401 completed projects**. However, data for these projects is incomplete and sales data was limited; the following table presents the availability of sales data:

Table 10: Data availability

Years of sales data	Number of projects	Percentage of completed
At least one year	218	54%
One year	95	24%
Two years	60	15%
Three years	46	11%
Four years	17	4%

3.3.2. Administered survey questionnaire

Genesis Analytics developed an online survey questionnaire to ascertain additional data on all applicants of SPII. A contact list of all applicants was supplied by the IDC. The survey was only sent out to applicants who had a valid email address recorded; this amounted to **842 applicants**. The email containing the link to the survey, as well as an accompanying letter from SPII/DPME/the dti, was sent out on the 28th of October. A follow up email reminding applicants to complete the survey was sent out to all 842 contacts on the 31st of October. Genesis Analytics then phoned all those on the contact list who had not yet completed the survey, reminding them to complete it.

Response rate:

- Of the 842 emails sent out, 176 (21%) were returned as undeliverable due to the email address not existing. Thus, the effective sample is 666.
- A response rate of 34.53% (230 responses) was achieved.

The following figures illustrate the characteristics of the responses against the original sample (those applicants with an email address recorded):

Figure 4: Sample and response by scheme

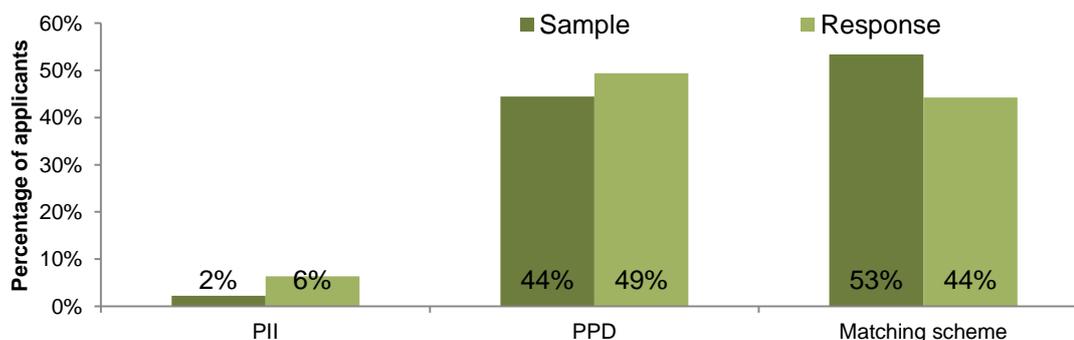


Figure 5: Sample and response by location

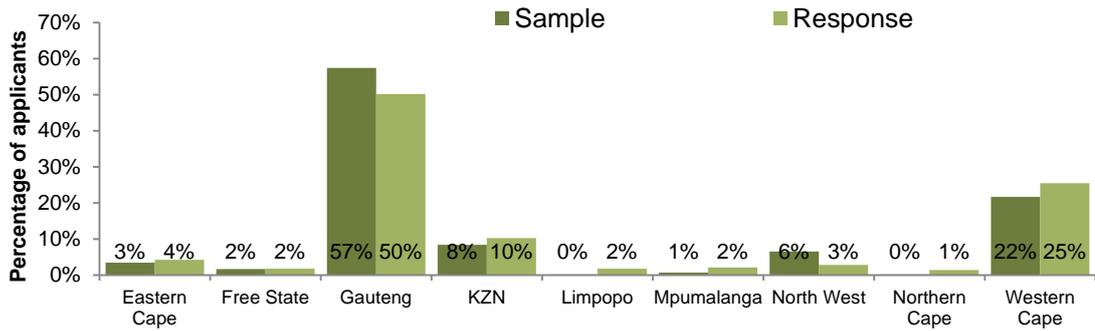
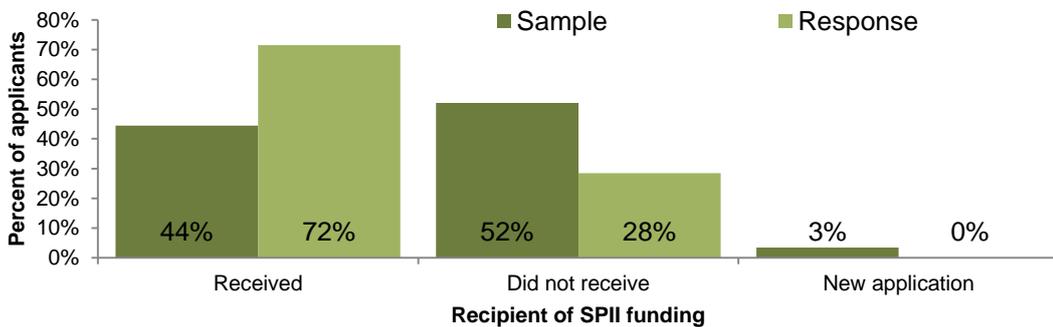


Figure 6: Sample and response by SPII status



The response to the survey is representative of scheme and province; however, it is not representative of whether or not an applicant was a SPII recipient or not. This was expected, as it is less likely that a rejected applicant would respond to such a survey.

It is important to note for the purposes of the findings presented below that the survey respondents received funding from 2004 to 2013 and so a number of challenges/issues presented in the earlier years have been addressed by recent changes within SPII, in almost all instances, supporting the changes that were made.

3.4. QUALITATIVE RESEARCH

3.4.1. Key Informant Interviews

Interviews were conducted with key industry stakeholders either telephonically or through face-to-face interviews. Standardised semi-structured interview guidelines were developed for all industry stakeholders, and were aimed mainly at understanding the South African innovation landscape and the role played by SPII within that landscape. The list of people interviewed is presented in the following table:

Table 11: Interview list of key stakeholders

Stakeholder organisations		Key informant
Government organisations	the dti	Director of innovation and technology: - Ephraim Baloyi SPII representative - Mandla Khoza
	The Department of Science and Technology (DST)	Chief Director of Innovation Planning and Instruments: - Cristina Pinto

Stakeholder organisations		Key informant	
		Chief Director of Sector Innovation and Global Change: - Isaac Maredi Chief Director: Technology Localisation and Advanced Manufacturing - Beeuwen Geryts	
	IDC/SPII	Post investment team: - Ntokozo Mthembu - Nadia Christiansen Management: - Lucky Tetsa - Meryl Mamathuba Administration team: - Nikki Gwaze - Dorcus Tsotetsi Account managers: - Sooko Mafohla - Steven Makhongela - Zandile Fuyane Investment committee - Christo Fourie - Mahomed Moolla	
		National Intellectual Property Management Office (NIPMO)	- Dr. Jonathan Youngleson
		South African Bureau of Standards Design Institute	- Gavin Mageni
Industry	Industry stakeholders	Tech top 100 companies - Paul Lowther (Lowther Communications) - John O'Callaghan (FRAXION)	
Programmes	Technology Venture Capital (TVC) fund	- Craig Sauls - Nelis Geyer	
	Technology Innovation Agency (TIA)	- Pontsho Maruping	
	Small Enterprise Development Agency (Seda)	- Sphiwo Soga	
Science councils	Medical Research Council (MRC)	- Dr. Tony Bunn	
	Mintek	- General Manager: Technology	
Consultants	Independent Consultants	- Rockridge Consultants	
		- Danie Erasmus	
Groups	South African Innovation Network	- Zanele Monnagotla	
University technology transfer	University of Stellenbosch	- Anita Nel	
	North West University	- Dr. Rudi van der Walt	

In addition to the approved stakeholder list, two other interviews have taken place:

- A TIA recipient
- A successful SPII applicant completing milestone two

3.4.2. Case Studies

The original case study sampling methodology was a mixture of intensity sampling, criterion sampling and typical case sampling. By combining these methods, a sample of firms who have received SPII assistance were selected and grouped based on their geographic, scheme type and whether the project was good, typical or bad, as well as industry classification. This method of sampling was approved in the analysis plan. The projects were selected out of the list of completed projects for the Western Cape, Gauteng and KwaZulu-Natal. Table 12 illustrates this split:

Table 12: Original case study split

Scheme	Sector	PPD			Matching			PII			Case
		GOOD	TYPICAL	BAD	GOOD	TYPICAL	BAD	GOOD	TYPICAL	BAD	
Gauteng	Chemicals & Pharmaceuticals	1		1				1		1	4
	Electrical Machinery				1		1				2
	Electronics	1	1	1							3
	Mechanical Machinery	1		1		1					3
	Miscellaneous Manufacturing		1				1				2
	Total	3	2	3	1	1	2	1	0	1	14
Western Cape	Chemicals & Pharmaceuticals				1	1					2
	Electrical Machinery					1					1
	Electronics	1		1				1			3
	Mechanical Machinery										0
	Miscellaneous Manufacturing	1		1							2
	Total	2	0	2	1	2	0	1	0	0	8
KwaZulu-Natal	Chemicals & Pharmaceuticals				1		1				2
	Electrical Machinery										0
	Electronics	1	1	1							3
	Mechanical Machinery										0
	Miscellaneous Manufacturing										0
	Total	1	1	1	1	0	1	0	0	0	5

However, when contacted many respondents originally selected were unable, unwilling or ineligible to be part of the study. The following reasons were noted as being the reasons why the original sampling frame was ineffective:

- The industry in which the projects were located was incorrectly recorded;
- PII recipients were unwilling to be part of the study due to another internal evaluation happening concurrently¹⁴; and,
- The people in charge of the older SPII funded projects had left the recipient enterprises, and the enterprise was unable to give information on the project as the institutional knowledge of SPII no longer existed.

This resulted in the following response rate:

- Five (out of a targeted eight) case studies conducted in the Western Cape;
- Three (out of a targeted five) case studies conducted in KwaZulu-Natal; and,

¹⁴ The Genesis evaluation team was not informed of this concurrent evaluation being undertaken on PII. It would have been useful to collaborate, or at least to be aware the evaluation of when communicating with the external stakeholders.

- Four (out of a targeted 14) case studies conducted in Gauteng.
- In addition, one case study was conducted on a project that fell outside of the original sampling frame, as they had an intense experience with SPII and provided interesting learnings.

Due to this low response a decision was taken to deviate from the original methodology by opening up case study selection to firms that were outside of the original sampling frame. The new frame included any completed project from the three provinces. This deviation was included in the field report to which no objections were raised. The following split was achieved:

Table 13: Case studies by province and sector

Province	Response
Western Cape	8
Gauteng	8
KwaZulu-Natal	4
Sector	
Electronics	11
Chemicals and pharmaceuticals	4
Rubber products	1
Miscellaneous manufacturing	1
Motor vehicles and parts	1
Electrical machinery	2
Scheme	
PPD	9
Matching	10
PII	1

In-depth interviews were conducted with the selection of 20 participant firms with completed SPII projects in Gauteng (8), Western Cape (8) and KwaZulu-Natal (4) using semi-structured interview guides to allow for freedom of response and to gain further insight into their experiences with the programme.

3.5. LIMITATIONS

As with any research, this research relied on a number of critical assumptions and was subject to inherent constraints. These constraints have limited the ability of the team to identify and attribute impact in certain instances and have resulted in the evaluation having a greater focus on the implementation factors that either enhance or dilute SPII's impact. Despite this, the quality of the evaluation has not been negatively affected, however as noted above, this evaluation may appear to be more implementation focused than originally intended due to the lack of impact data. The limitations are listed below:

SPII project data

- There were a number of gaps in the data received from the IDC, particularly those projects that were completed between 2000 and 2002. This has resulted in the analysis of reporting data having to fall within the period 2003 to 2012.
- The three years of reporting data on projects post-completion is incomplete
- There are 401 completed projects, of which only 218 have sales data for at least one year (not three years as anticipated).
- The reporting data is only audited for those projects that were candidates for yearly prizes.

- The minimal data available significantly reduced the type of impact analysis that was possible. For example, analysis could not examine the businesses over longitudinal time periods.

Survey

- The survey could only be sent to applicants with an email address listed in the database provided by the IDC.
- Of the 842 emails sent out, around 176 addresses were invalid making the actual sample only 666.
- Our follow up resulted in some respondents responding negatively to the email and declined to take part in any evaluation of a government-supported programme. This was both for the case studies and survey questionnaire.
- Random response from the sample population is unlikely as those who were not grant recipients would not have any incentive to participate in the evaluation, thus survey responses are likely to be biased towards those who were not rejected.
- Corroborating data was not forthcoming (this was confirmed by the SPII staff as even they find it difficult to get evidence even when projects are under contract terms).
- It is important to note that the majority of companies interviewed received funding before 2012. As such many of the responses do not reflect the changes made to SPII post-2012.

Key informant interviews

- The identified patent lawyers were occupied with other business and despite assuring a response to our questions on multiple occasions; they never found time to respond.
- The key informant from the Council for Scientific and Industrial Research (CSIR) did not feel they were the relevant person to speak to. Genesis was given multiple referrals to other stakeholders within the organisation; however, none of these resulted in a consultation.

Case studies

- The initial sampling frame for case studies did not return a sufficient number of willing participants, thus the sampling methodology was adapted to include any projects from the three provinces of interest.
- Enterprises with older SPII funded projects have lost the person responsible for the SPII funded project and were unaware of the details of the SPII funding experience.
- The database of projects provided by the IDC has errors in terms of what sector the project falls in, with many of the case studies being listed in the incorrect sector.
- The total number of enterprises under the PII scheme is extremely limited, with only seven PII projects ever reaching completion, thus the pool to select out of is very small. Moreover, the IDC is currently conducting an internal review of that programme resulting in the PII recipients being unwilling to take part in another evaluation. Thus, only one PII recipient was interviewed, representing 14% of the population.
- The case studies have only amounted to 20 instead of the target of 27 cases, and the sector split is not what was initially proposed.

- In terms of corroborating evidence some of the participants were resistant to handing over their organisation's financial statements as they felt this was sensitive information.
- The majority of companies interviewed received funding before 2012. As such many of the responses do not reflect the changes made to SPII post-2012.

4. FINDINGS

The findings from the evaluation process are discussed in detail below. The findings presented draw on both the qualitative and quantitative research process.

4.1. IMPACT OF SPII ON SOUTH AFRICA'S COMPETITIVENESS AND BROADER DEVELOPMENT OBJECTIVES

The impact of SPII on South Africa's competitiveness and broader development objectives measures the extent to which SPII has directly or indirectly effected social, economic and other development indicators, be they intended or unintended. This evaluation focuses on the impact of SPII on:¹⁵

- The achievement of projects
- Innovation and competitiveness
- Job creation and skills development

4.1.1. Achievement of projects funded by SPII

Successful commercialisation is the ultimate indicator of project success. However, it must be noted that SPII has no influence on the commercialisation process of projects once SPII funding has reached completion. It must also be noted that many projects take longer than three years to reach commercialisation post SPII support; thus, the reporting data likely underestimates the number of commercialised projects because they are still in the process. Analysis of the reporting data was therefore supplemented by survey data. When splitting this measure of success by scheme, we find that the SPII matching scheme funded projects have been relatively more successful at achieving commercialisation than the PPD scheme. Figure 7 and Figure 8 illustrate this finding; while Figure 9 presents the time it took survey respondents to achieve commercialisation:

¹⁵ Given the nature of the programme and the data available, determining quantitative attributable impact of the programme is difficult due to issues of endogeneity and reverse causation. It is highly likely that SPII selects projects that would have succeeded, as opposed to the projects succeeding due to SPII funding.

Figure 7: Was the project commercialised (absolute)

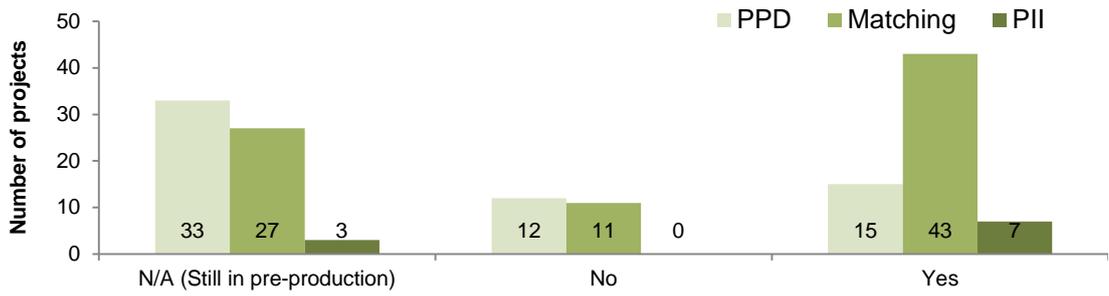


Figure 8: Was the project commercialised (relative)

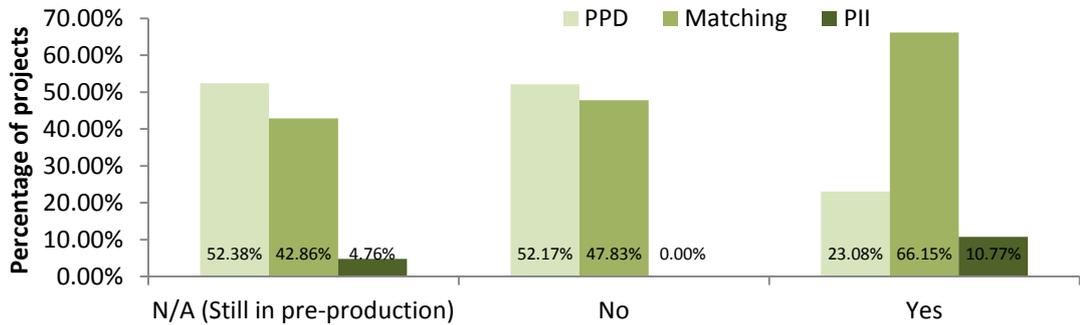
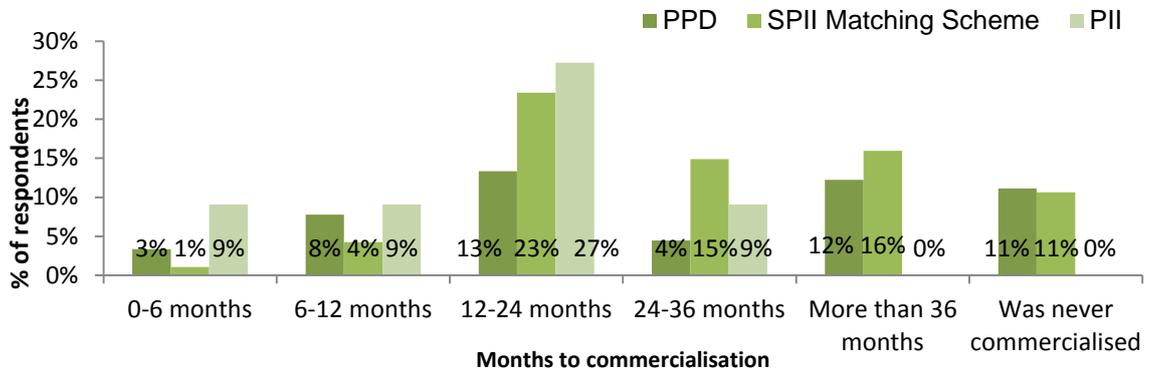


Figure 9: How long it took survey respondents to achieve commercialisation¹⁶

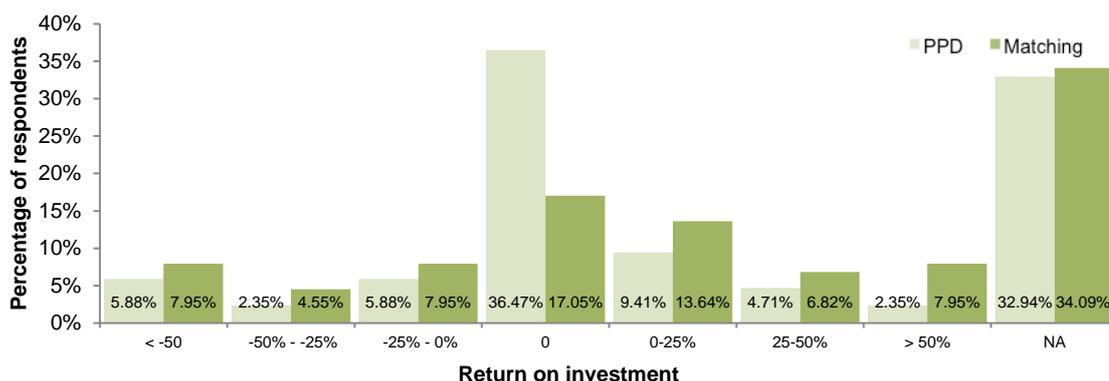


It was highlighted by industry stakeholders and case study respondents that bridging the gap between the pre-production prototype stage and commercialisation was the most significant barrier impeding the success of innovations, and that this was exacerbated for smaller firms.

Another indicator of achievement is the return of investment (ROI) produced by the innovation. As shown in Figure 10 below, projects on the Matching scheme have been more effective at realising a positive return than those on the PPD scheme.

¹⁶ The percentage of respondents who are still in the pre-production phase are not included in the graphic

Figure 10: Return on investment¹⁷



The reporting data captured on completed SPII projects should collect information for three years post funding support. However, in practice the data contains many missing values, despite the fact that it is obligatory for grantees to report. Even of those projects with three years of data, many have not yet begun to experience profitability and reported a negative return on investment, as it often takes longer than three years to realise a positive ROI.

Using this limited data, the ROI for year one of commercialisation was calculated and the average ROI for year one is 173% for funded projects with a standard deviation of 1163 percentage points. This high standard deviation means that there is a lot of variation between projects' ROIs with some experiencing extremely large returns and others receiving very large negative returns. Thus, the average ROI is not a useful indicator of the programme's achievement. However, this is characteristic of the innovation space, as it is a risky area of investment. Table 14 breaks down the average ROI by scheme and shows how imprecise the calculated averages are.

Table 14: Average first year ROI by scheme, calculated using reporting data

Scheme	Mean	Standard deviation	Frequency
PPD scheme	579%	2777	25
Matching scheme	95%	363	129
Total	173%	1163	154

Moreover, the ROI calculated using the reporting data should not be used as an indicator of SPII's achievement, as it is not representative or calculated over a long enough period of time.

In an attempt to produce more precise results, the data is restricted to projects with an ROI under 250% for their first reporting year. However, even after removing the 19 outliers from the sample, the standard deviations remain high. After investigating the data graphically, it can be seen that the distribution of ROIs is skewed towards -100%, which is understandable in the first year of sales reporting. In year two, the figure improves, but the sample size is too small to evaluate. The following table presents the results for the restricted sample:

Table 15: Average first year ROI by scheme (restricted data)

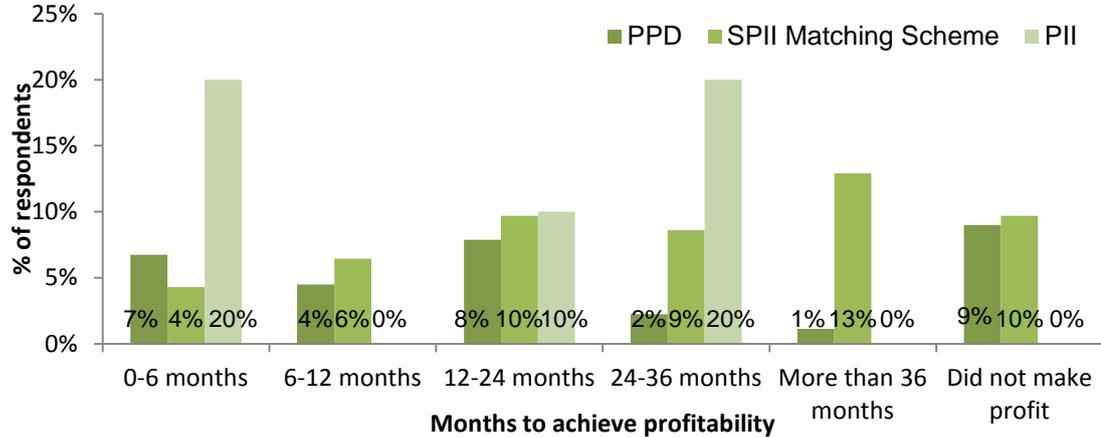
Scheme	Mean	Standard deviation	Frequency
PPD scheme	-36%	58	22
Matching scheme	-20%	83	113
Total	-23%	80	135

¹⁷ PII was omitted due to the small sample size

Finally, the ROI of the entire programme is considered. This is calculated using the data on all grants dispersed and all reported sales. The ROI of SPII is 456%.

The time it takes a project to begin making a positive ROI is extremely varied by project and there are no strong significant findings on what the average length of time is. Figure 11 presents how long survey respondents reported it took them to make a profit:

Figure 11: Length of time to achieve profitability



4.1.2. Innovation and competitiveness

The majority of respondents from the case studies felt that SPII filled a very important gap in the innovation cycle. Furthermore, the survey found that only 9.93% (15) of respondents who received SPII support said that they could have continued without SPII funding, while 57% of rejected applicants reported to not have continued with their project.

Furthermore, Figure 12 and Figure 13 below illustrate these findings and how there appears to be a relationship between turnover size of a firm and the ability to continue without SPII funding. Smaller companies overwhelmingly noted that without SPII the project would not have continued, and larger companies generally noted that the project would have continued, however, this would have been at a much slower pace - which can be extremely detrimental in the innovation space. These companies reported that in the innovation landscape timing is essential to the success of the project, and thus SPII played a crucial role in the project.

Figure 12: Would you have been able to attempt your project without SPII funding?¹⁸

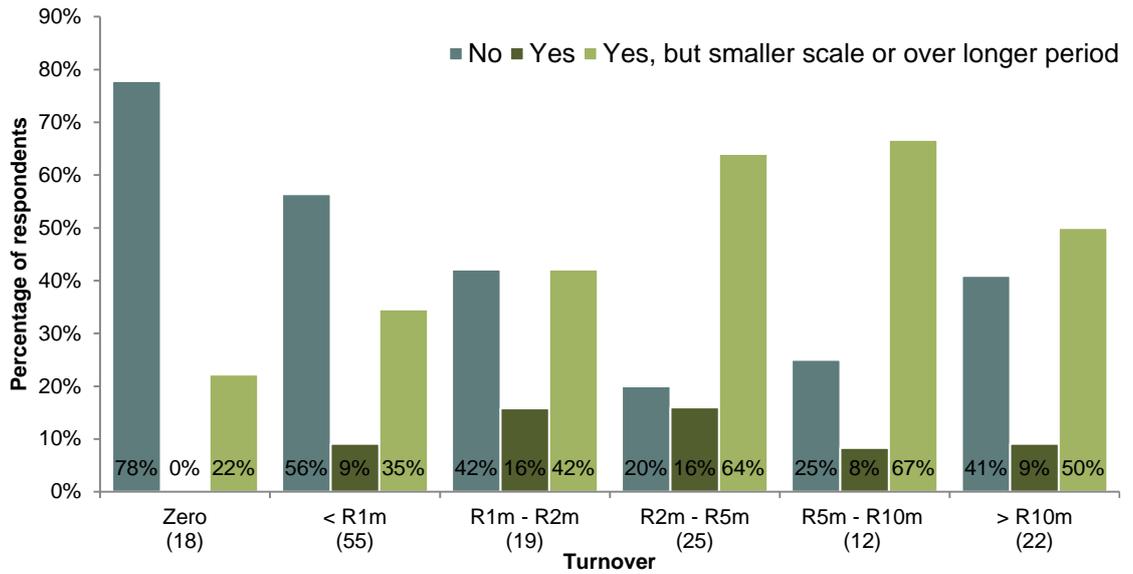
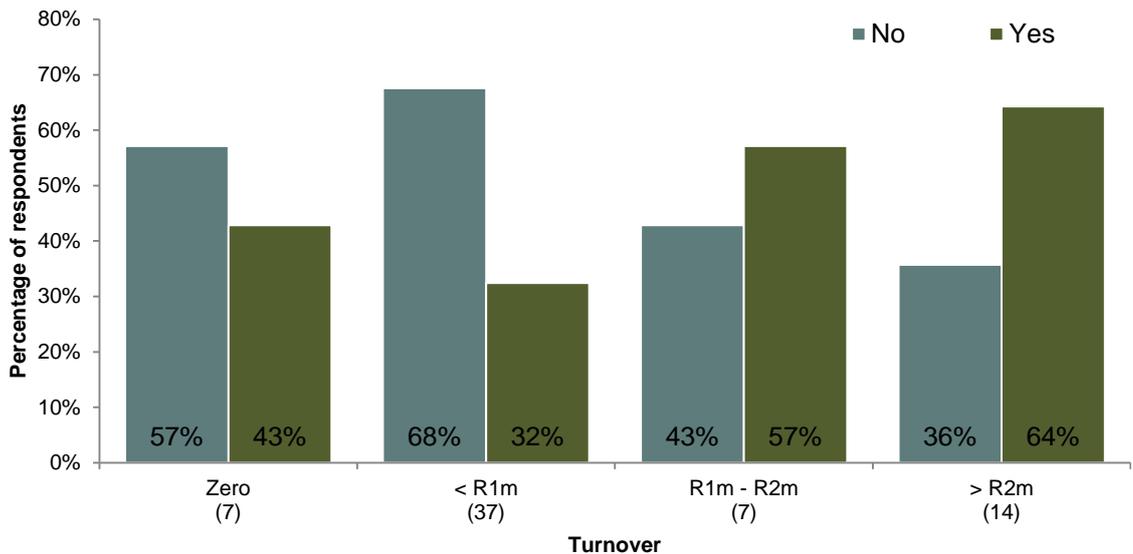


Figure 13: Did unsuccessful applicants continue despite lack of SPII support?



These results cannot be interpreted as SPII creating innovators, but rather that SPII helps facilitate and enable innovation, as it provides those with innovative ideas with access to finance, the absence of which represents a binding constraint on further investment in the idea.

To test the probability that a SPII recipient is likely to commercialise the funded innovation, a probit model¹⁹ is used. It is important to note that issues relating to the representativeness of the sample and its size reduce the generalisability of the model; however, it is still estimated to establish the probability of commercialisation for the respondents of the survey. The dependent variable is a binary variable with 0 representing failure to commercialise and 1 representing commercialised. The controls included are:

¹⁸ Number of respondents reported in brackets

¹⁹ Probit Analysis is a type of regression used with binary response variables

- Whether the project was a recipient of SPII funding
- The turnover group the enterprise undertaking the project falls into
- Whether the project received a SPII matching scheme grant or a PPD grant
- Province controls, to account for the differences between provinces

The table below presents the findings of the estimation:

Figure 14: Probit model of commercialisation^{20 21}

Dependent variable: Whether commercialised or not	
Independent variable	Coefficient
SPII recipient	0,75* (0,026)
Level of turnover	0,41** (0,000)
Scheme	0,18 (0,556)
Constant	Yes
Controls for province effects	Yes

The coefficients on the independent variables of a probit model cannot be interpreted directly due to its non-linear nature and we make no attempt to determine the marginal effects of the independent variables on the probability of commercialisation.

However, the signs of the coefficients indicate the following:

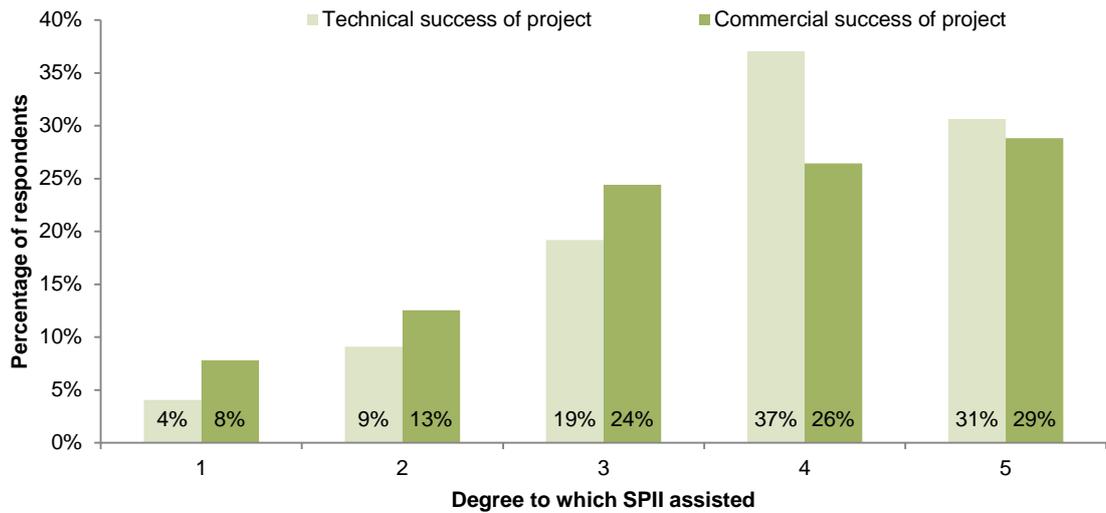
- Holding all else constant and on average, an accepted SPII application has a higher probability of success than a project that was rejected. This can be the result of two directions of causation; firstly, it could be that SPII funding assists projects to commercialise; or, secondly, it could be that SPII only selects projects that are likely to succeed regardless of whether they receive SPII's funding or not. However, it is also possible that it is a combination of these, that SPII both selects good projects and assists them in getting to market.
- Holding all else constant and on average, the size of a company in terms of turnover is significantly positively correlated with the probability of commercialisation. This suggests that smaller enterprises are less likely to succeed, but it does not provide a reason for this – although this makes intuitive sense given the multiple resource constraints faced by small enterprises.
- Holding all else constant and on average, whether the project was funded through the PPD or matching scheme is irrelevant in determining whether a project is commercialised or not.

The reporting data collected by the IDC includes a five-question survey, asking to what degree SPII contributed to the 'significant advancement in technological expertise, job creation and retention, technical success of the project and the commercial success of the project'. The respondents are asked to rate the degree of contribution from 1 to 5. Respondents generally feel that SPII contributes to both the technical and commercial success of their projects. Figure 15 below illustrates this finding:

²⁰ p-values are represented in the brackets

²¹ ** significant at the 1% level, * significant at the 5% level

Figure 15: SPII's contribution to success



4.1.3. Job creation and skills development

Innovation has an ambiguous direct effect on employment; it can generate jobs by creating new markets or it can lead to temporary restructuring towards methods that can replace labour inputs. However, in the medium to long term, innovation can lead to economic development and improvements to competitiveness which will in turn lead to job creation. The survey results report that on average, both the SPII funded and non-SPII funded innovation projects created jobs²². The results are displayed below in Figure 16:

Figure 16: Average job creation per project



With regards to permanent positions, no statistically significant difference was found between the projects that received SPII funding and those that did not. This may be a result of the small sample size of rejected applicants that were able to answer this question. Despite being unable to attribute increased permanent job creation for companies that are participants of SPII against companies that are not, the findings below illustrate that many jobs have been created by companies on SPII.

Using the reporting data from the IDC, the average number of permanent jobs created per sector and scheme is calculated. The total number of jobs created is calculated by multiplying

²² SPII does not define the characteristics or criterion for a job and therefore is a loose concept that does not necessarily equate to a fulltime equivalent.

the average by the total number of projects in each sector and scheme; these findings are illustrated in Figure 17. This method is used so as to include the projects that did not report on job creation. Projects funded by the SPII matching scheme have been the most successful at producing jobs, while projects funded by PII have been the least successful. The electronics sector dwarfs the other sectors in terms of job creation. However, it must be noted that the SPII scheme and the electronics sector make up approximately 60% of the funded projects.

In total we estimate that **SPII funded projects have directly created or retained approximately 3000 permanent jobs**²³. According to the same data ZAR 622 671 640 was received from SPII by the funded projects, which equates to approximately ZAR 207 560 per job. However, it must be noted that SPII, according to its objectives, does not aim to generate employment, but merely to stimulate innovation. It is also important to note that the job figures reported and analysed here relate to those created directly within SPII recipient companies, and **does not include those created indirectly once the innovation is commercialised**.

Regarding skills development, the survey results from SPII-supported projects show that the majority of respondents trained between one and five employees for their project, while approximately 30% did not train any. The case studies suggest that in one-product companies, the entire staff is re-trained; however, this training is not necessarily technical and is product specific, such as training sales people in the knowledge of the new product.

²³ This is estimated by calculating a weight for each sector and scheme using a sample of completed projects with job data and then applying this weight to the average sector/scheme.

Figure 17: Permanent job creation

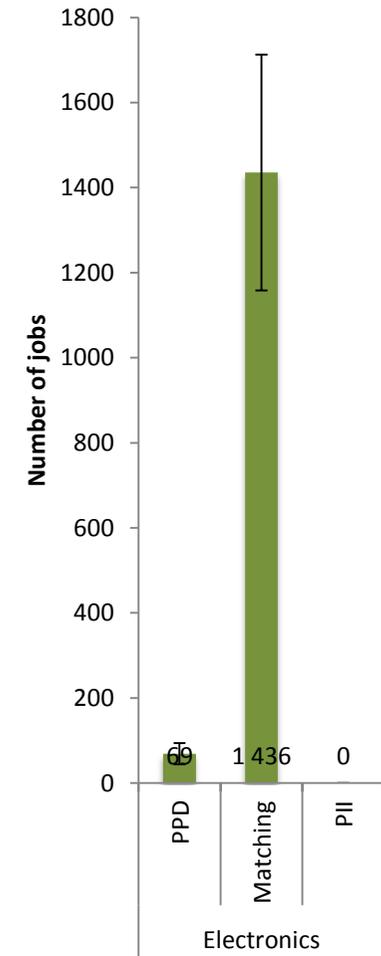
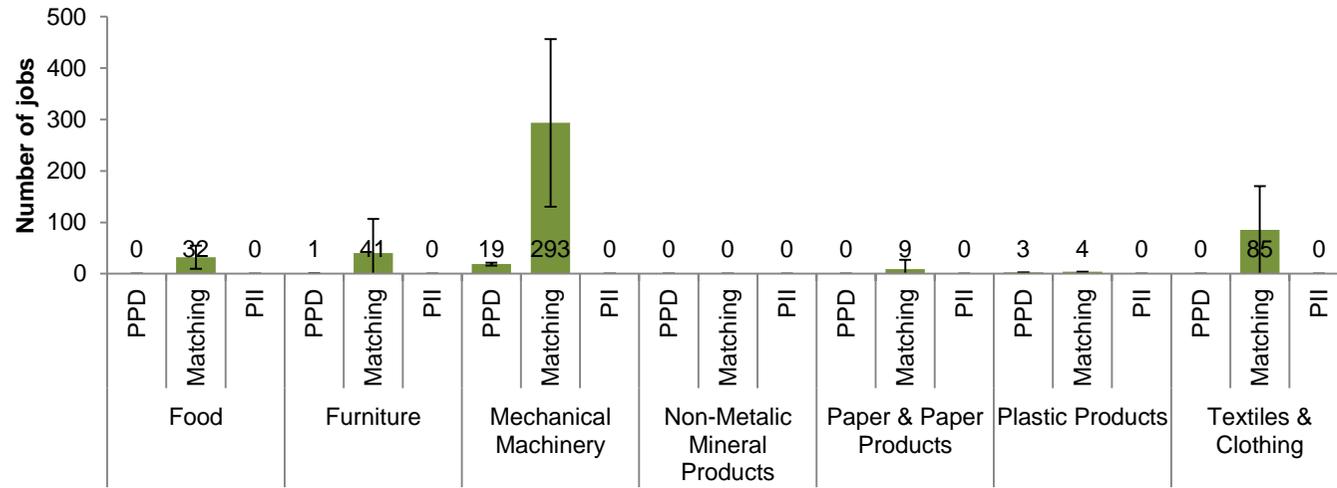
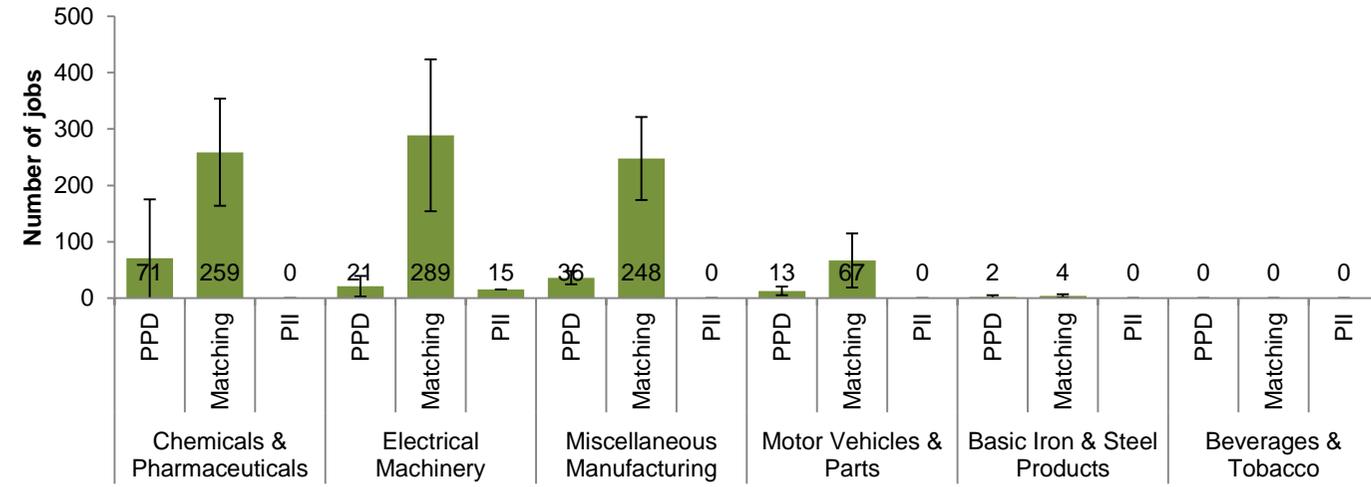
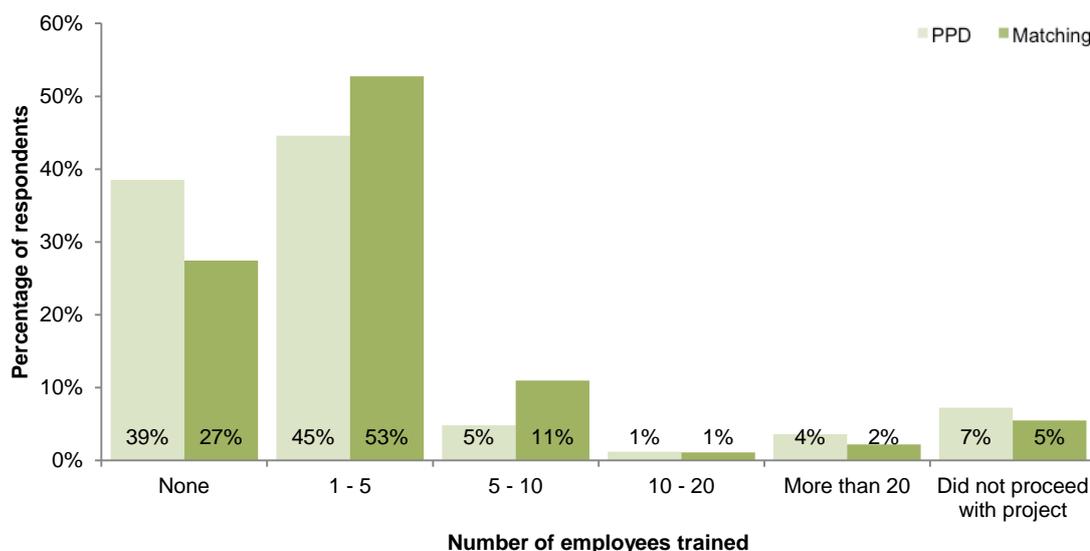


Figure 18: Number of employees trained²⁴



4.1.4. Tax revenue

Both the survey and the IDC's reporting data had limited information on the tax revenue generated by SPII recipients. Thus the tax revenue information presented in Table 16 is information provided in SPII's annual reports.

Table 16: Tax revenue from April 2006 to April 2011

	01 April 2010 to 31 March 2011	01 April 2009 to 31 March 2010	01 April 2008 to 31 March 2009	01 April 2007 to 31 March 2008	01 April 2006 to 31 March 2007
Taxes paid – company tax	R11.1m	R6.2m	R35.1 million	R149.3m	R223.3m

Source: SPII Annual Report 2010/2011

4.2. IMPACT AND RELEVANCE OF SPII IN THE SOUTH AFRICAN INNOVATION LANDSCAPE

Impact and relevance of SPII in the South African context assesses the programme's relevance in the broader South African innovation landscape and the extent to which the programme is suited to the needs of the beneficiaries and its ability to achieve impact. The indicators used to assess this were:

- The applicability of SPII's objectives in the South African context
- The relevance of SPII in the innovation process
- The relevance and impact of SPII in relation to other programmes and funding mechanisms
- The impact SPII has in reducing the barriers to innovation in South Africa

²⁴ PII omitted due to small sample

- The appropriateness of the expenses which SPII funds

4.2.1. The applicability of SPII's objectives in the South African context

SPII's mission is to "promote and assist technology development in the South African industry through the provision of financial assistance for projects that develop innovative products and/or processes"²⁵. SPII administrators noted that SPII is housed within **the dti**, and so also aims to promote economic growth, employment and equity. As a means of achieving SPII's objectives, **the dti** in consultation with the IDC produce an annual business plan that sets targets around the number of contracts to be approved and the values to be disbursed based on the previous year's performance. Targets are not based on job creation or the number of projects that are commercialised.

Furthermore, the programme has been linked with Outcome 4 of the President's Delivery Agreement, which is centred on job creation and decent employment. Industry stakeholders' opinions varied around the extent to which SPII furthers these objectives. Generally respondents felt that SPII makes an *indirect* contribution to these objectives - innovation in itself typically creates relatively few direct jobs. However, when products or processes are successfully commercialised, a significant number of indirect jobs may be created. It was frequently noted that there should be better monitoring of these indirect impacts. Regardless, it is extremely important to note **SPII was not designed to achieve these broader objectives**. The Delivery Agreement and labour focus are relatively recent developments in SPII's long history.

Industry stakeholders²⁶ reported that South Africa is producing a substantial amount of research. However, very little of this is converted into commercialised products or processes. A number of stakeholders noted that SPII enabled the translation of some research into working products/processes.

4.2.2. The relevance of SPII in the innovation process and in relation to other programmes and funding mechanisms

SPII contributes to specific stages in the innovation cycle - specifically, SPII's mandate covers the stages from the end of basic research to the development of a pre-commercialisation prototype. Industry stakeholders were of the opinion that SPII does fill an important role by funding these stages, as traditional funding from commercial banks is difficult to obtain at these points in the process in South Africa. Although it was felt that SPII fills an important gap, over 50% of industry stakeholders noted that the further jump to commercialisation can be significant and requires funding support, which SPII does not provide for. This is reiterated globally, where the phrase "the valley of death"²⁷ has been coined for the stages from basic research to commercialisation as a result of the difficulties in obtaining funding.

There are a number of different players in the innovation landscape in South Africa. Figure 19 below plots the location of these players in the innovation landscape. As this illustrates, both TIA and SPII provide funding for the purpose of prototype development. A number of industry stakeholders who have had experience working with TIA noted that SPII is the dominant player

²⁵ http://www.spil.co.za/SPII_intro.html

²⁶ Included in the "industry stakeholders" group are representatives from Tech Top 100 companies, science councils, universities, independent innovation consultancies, relevant government programmes, and relevant government organisations.

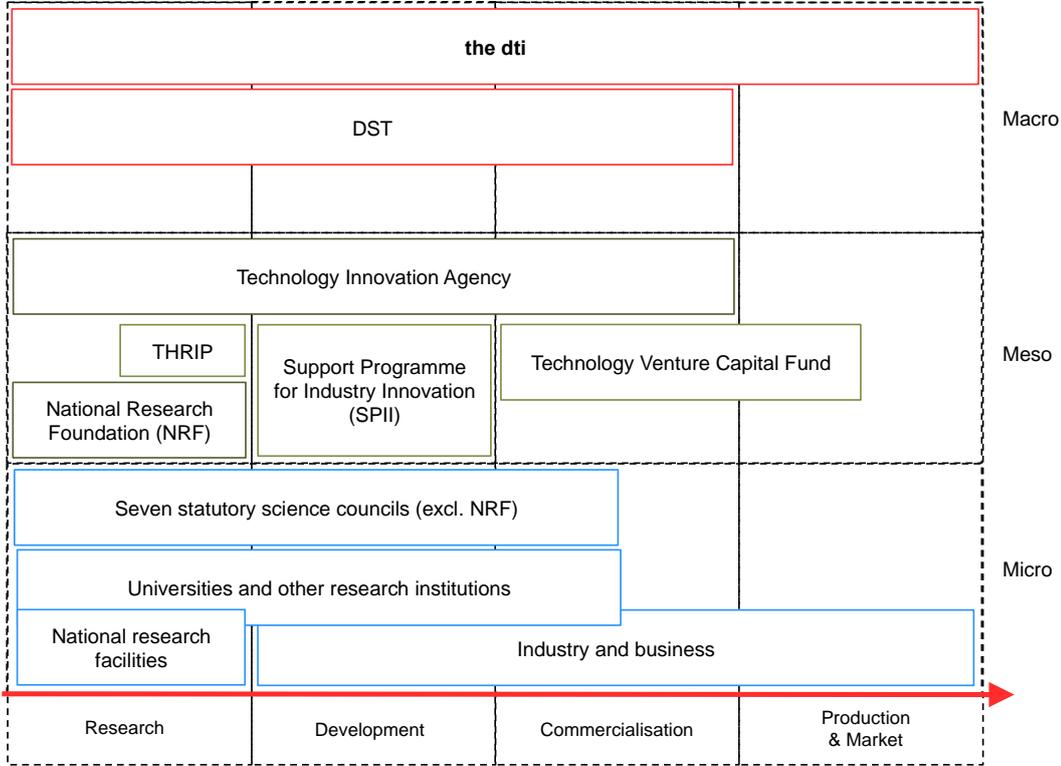
²⁷ The Science and Technology Committee appointed by the UK House of Commons (2013). Bridging the valley of death: improving the commercialisation of research.

in this space and is the more efficient and effectively run programme²⁸. A Gauteng-based electronics company that had had experience working with both programmes and found that SPII's processes were better than those of TIA.

This finding is further confirmed by the 2013 Ministerial Review of TIA²⁹, which found that there was a distinct lack of confidence in TIA from both the public and private sector. Furthermore, the Ministerial Review identified poor response times for enquiries and applications, application processes that are unwieldy and not sufficiently differentiated or responsive to the needs of stakeholders, and poor communication, including an unhelpful website, as the factors that drive this lack of confidence.

Finally, the Ministerial Review found that the current relationship between the DST Executive and the TIA Board and Executive is not amicable and that at the heart of this disjuncture is the differing interpretation of the scope and breadth of the TIA mandate.

Figure 19: South African innovation landscape 2013



Source: Genesis Analytics, 2013

4.2.3. The appropriateness of SPII funding

Qualifying expenditures that SPII covers were generally considered to be appropriate. However, it was noted that SPII does not cover overhead costs of employees and that in some case studies; the beneficiaries noted that although SPII covers various labour related costs, the ceiling on professional fees, which is determined by position and qualification, is prohibitive.

²⁸ This may be as a result of TIA's lack of maturity in this space and its recent changes.
²⁹ The Review of The Technology Innovation Agency - Prepared for the Minister of Science and Technology, April 2013

Whilst this exceeds the mandate of SPII, as mentioned above, a number of beneficiaries noted the need to cover tooling-up, market research and marketing costs. Industry stakeholders and the case studies confirmed this by noting that the allocated R50 000 for market research from SPII was insufficient to develop a business plan able to convince venture capitalists to invest. Moreover, PPD applicants found marketing, tooling-up, quality assurance and market analysis relatively larger than the matching fund applicants did, highlighted in Table 17. Table 17 presents applicants' ranking of expenses from largest to smallest:

Table 17: Survey respondents' expense ranking³⁰

Expense	PPD	Matching
Piloting and prototype development	1	1
Research expenditure	2	2
Technology acquisition	3	3
Marketing	4	6
Industrial design	5	4
IP protection	6	5
Tooling-up	7	9
Quality assurance	8	10
Production start-up	9	7
Market analysis	10	11
Consultants	11	8
Training	12	12

There were mixed reactions as to the appropriateness of the values of the grants. Many beneficiaries noted that while they could not expect SPII to fund the full value, funding the shortfall was problematic. This was particularly true of the smaller companies that found it difficult to obtain funding from the more traditional sources such as commercial banks. However, it was generally agreed that having 100% grants opens the programme to risk and that having to put down a small contribution signals the innovators' confidence in their product. Furthermore, providing 100% grants may contravene the World Trade Organisation's regulations and be viewed as uncompetitive behaviour.

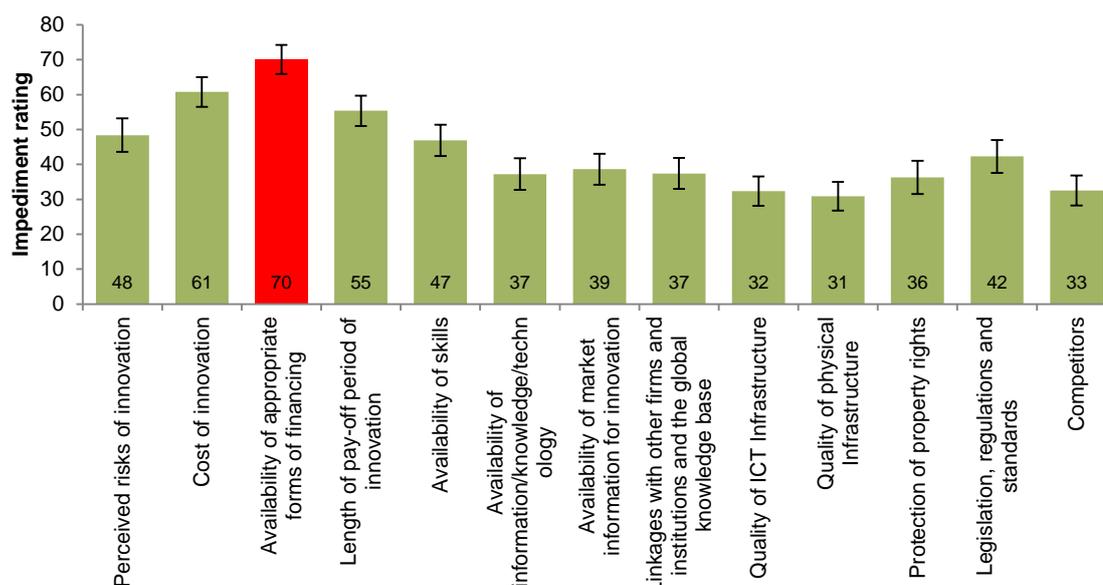
4.2.4. The impact SPII has in reducing the barriers to innovation in South Africa

The results of the survey of successful and unsuccessful SPII applicants reveal that the availability of appropriate forms of financing is perceived to be the greatest barrier to innovation in South Africa. This is supported by the findings from the *South African Innovation Survey* conducted in 2008, where the three most-cited factors that hamper innovation were: the lack of funds within the respondent's enterprise or group, lack of finance from sources outside of the respondent's enterprise, and the high costs of innovation.³¹ This issue is compounded by the finding that the cost of innovation and the length of pay-off period associated with the innovation are the second and third greatest perceived impediments, respectively. **Figure 20** below illustrates the perceptions of survey respondents as to what the greatest impediments to innovation are. This question was answered using a sliding scale between 0 and 100, with 100 meaning insurmountable and 0 meaning not a consideration.

³⁰ PII applicants' rankings were omitted due to the small sample size

³¹ HSRC (2008). *The South African Innovation Survey* pg 47

Figure 20: Perceived impediments to innovation in South Africa



The key informant interviews and case studies further confirms that, while developed countries have advanced venture capital and angel financing networks, South Africa’s venture capital market is less developed and more risk-adverse. Moreover, in the *Investment Climate Survey* (ICS), it was found that Black-owned small enterprises were the most likely to list the availability and cost of financing as a significant obstacle to their business operations.³² SPII does not directly overcome this constraint as it only assists with the early stages of the innovation cycle, rather than the typical venture capital stages of getting the product/process commercialized and to the market.

Another major barrier that was identified through the case studies and key informant interviews is the lack of the necessary business skills needed to manage the innovation process and then to commercialise it. This lack of business skills is particularly apparent in the smaller and start-up companies. This finding is supported by research done by the Southern Africa Innovation Support (SAIS) programme – whereby a lack of general business skills and entrepreneurial acumen were found to be key factors that negatively impact on NSIs; and result in poorly managed interventions, compromising the sustainability of many initiatives³³. Currently, SPII is not mandated to offer business support to overcome this impediment.

4.3. ACHIEVEMENT OF AND CONSTRAINTS TO SPII’S OBJECTIVES

This criterion measures the extent to which the programme is meeting its objectives, and identifies the constraints to attaining these. In particular, the evaluation covered the following indicators:

- Achievement of SPII’s objectives
- Constraints to SPII achieving its objectives

³² An Assessment of the Investment Climate in South Africa, The World Bank

³³ Southern Africa Innovation Support Programme (2013). Assessing Innovation Priorities in Partner Countries

4.3.1. Achievement of SPII's objectives

SPII's objectives are not clearly defined and thus the achievement of these is difficult to measure. The current objectives are to:

- Achieve a meaningful increase and improvement of the competitiveness and commercialisation of SPII supported technologies;
- Achieve a meaningful increase in the number of innovative products and processes developed in South Africa; and,
- Achieve increased and balanced participation (of women, previously disadvantaged individuals, BBBEE and youth in technology development)

Between **the dti** and the IDC a business plan is developed each year with targets on how many projects to fund and the value to be committed to projects. When SPII's performance is assessed against these targets and against its expenditure as a percentage of the Medium Term Expenditure Framework (MTEF) spent annually, **SPII has met all its targets and thus would be considered to have been effective.** The table below summarises the current commitments and available MTEF budget:

Table 18: Summary of SPII commitments, MTEF expenditure and fees³⁴

	PPD	Matching	PII
Committed	R 62 574 713	R 111 048 718	R 6 140 338
MTEF (Surplus/deficit)	(R 27 703 806)	R 14 059 079	R 4 398 475
Management fee	R 13 270 000		

Two moratoriums on funding commitments have been drafted recently in attempts to curb the overall deficit. As mentioned above, targets are set through establishing the number of projects to be funded and the value. Currently, there are no targets set with respect to the number of projects successfully commercialised, the number of projects producing a positive return on investment, the number of (direct and indirect) jobs created, or other economically orientated measures of impact.

4.3.2. Constraints to SPII achieving its objectives

Case study beneficiaries and industry stakeholders were asked what they consider to be the key constraints to innovation in South Africa. The constraints consistently listed were: a lack of funding, a fragmented innovation landscape, the lack of linkage support, the lack of business expertise on behalf of innovators, and a limited skill base; each of which are described below. The lack of appropriate funding was supported by the survey findings presented in Figure 20.

Lack of funding

The South African banks and other private investors are considered to be relatively risk averse. This risk aversion restricts enterprises from entering into the innovation landscape, as they cannot obtain the necessary funding. Beyond the survey data supporting this, South Africa's relatively low percentage of GDP invested in R&D validates this finding; South Africa invests 0.76%³⁵ of its GDP in R&D, while the average for emerging markets is 1.3%.³⁶

³⁴ SPII Dashboard, as of 5 February 2014

³⁵ HSRC (2014) South African national survey of research and experimental development

³⁶ Battelle (2014) Global R&D Funding Forecast

Fragmented innovation landscape

The South African innovation landscape is reportedly highly fragmented, where the various agencies, including the DST, **the dti**, Seda, TIA, innovation hubs and SPII work in silos and their linkages with private players are limited. It was noted in the key informant interviews and the case studies that there is much confusion over the positions that TIA and SPII fill, and that there is duplication across the two funds. Should effective collaboration take place between the relevant agencies, projects could successfully transfer from one stage in the innovation cycle to the next; however, this transition is not currently facilitated because of the fragmented nature of the industry. This finding is supported by *The Ministerial review* (2012), which found that the national system of innovation (NSI) in South Africa is extremely fragmented; in particular, there is a lack of coordination between the different government departments that form part of the NSI.

The potential gain from collaboration among government organisations is illustrated in the example of a small Gauteng-based manufacturing company interviewed as part of the case study process. In addition to SPII, this company received funding from the Technology Venture Capital fund (TVC) and Seda's Technology Transfer Fund (TTF). These additional funding sources enabled the successful transition of this project from research through to commercialisation. There was no communication between these agencies throughout the process and the various agencies did not recommend the other agencies to the applicant. However, the combination of these agencies' contributions was considered to be instrumental to the project's success, and the applicant would not have known about them if not for his own independent research. It is highly likely that other companies are not benefiting from the potential combination of such support.

In an attempt to overcome this barrier it was proposed that a Technology Platform scheme be piloted in 2013/2014. The Technology Platform is a collaborative effort between government, clusters of firms and universities and/or research councils with a common interest in particular technologies. This support is conceived to span the entire life cycle of a project, from concept to beyond the prototype stage. Interviews with SPII administrators suggest that this is underway; particularly in terms of greater collaboration with TIA; however, industry stakeholders and case studies still perceive this to be a fragmented landscape with little coordination between agencies. If this collaboration strategy is implemented effectively over time, these perceptions may change.

Lack of linkage support

Industry stakeholders noted that South Africa operates in a "closed innovation" space whereby innovators protectively keep their ideas to themselves rather than openly sharing and learning from other innovators. This environment, in conjunction with the lack of linkage support in the innovation landscape, limits innovation in the country. The case studies consistently noted linkages support as being necessary to ensuring successful commercialisation. The type of support needed varied by company.

Respondents commonly noted the following linkages, which revolve around SPII taking on a facilitation role, as being necessary for the successful commercialisation of their project: links to other SPII projects for mentorship opportunities, introductions to international investors and/or clients through exhibitions, introductions to other government departments for procurement opportunities, links to suppliers through a trusted supplier database, and introductions to other government funding agencies or programmes.

SPII does indicate that there are aspirational goals to support linkages; and have a few working partnerships in place, however, these are currently limited. A particular obvious example is demonstrated by the number of links to other useful sites on SPII's website, of which there are two, one to the IDC and the other to **the dti** – neither of which are particularly helpful to innovators looking for support linkages.

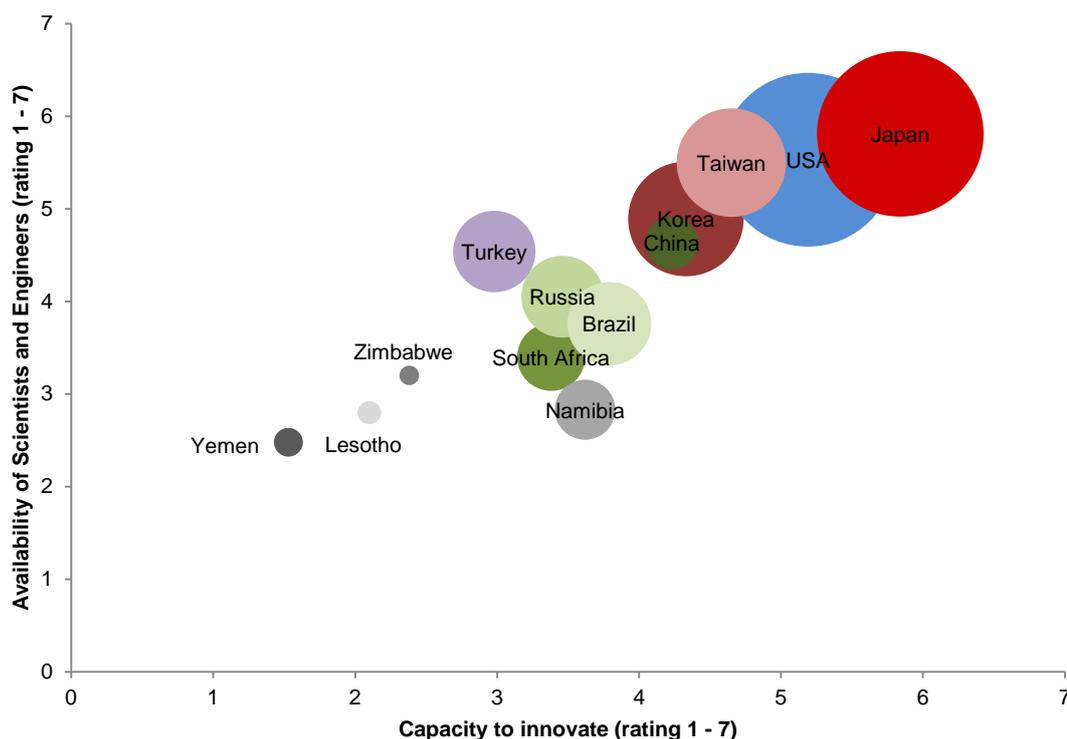
Limited skills base

The skills base in innovation is limited in two regards, the lack of experienced business people in innovation and the lack of technical skills. Innovators in South Africa are typically inexperienced business people who have creative technical ideas that are conducive to research and development. However, this does not always translate into the successful commercialisation of these ideas. The lack of business expertise amongst SPII recipients is so prevalent that 71% of industry stakeholders noted the need for business development support for innovators. This was further confirmed in the case studies where the smaller, start-up companies consistently commented on the need for business development support and/or mentorship.

This is not only a South African phenomenon and according to the latest *OECD Science, Technology and Industry Outlook (2012)*, many countries are beginning to distinguish between *financial measures*, which includes direct funding and indirect funding, and *non-financial measures*, such as providing a range of services, such as provision of support services, skill development and consultancy services. There is a growing trend globally towards providing non-financial measures as many SMEs find this more appropriate than the former.

Additionally, complex, technical innovations require technically skilled individuals, generally with tertiary degrees. Many case studies noted that finding such employees or local subcontractors is difficult and often requires subcontracting international expertise. Two engineering companies, one in the Western Cape and one in Gauteng, raised this as a concern. This was also a major constraint to a medium-sized Western Cape based electronics firm. Both the 2007 *OECD Review of Innovation Policy in South Africa* and the 2012 *Ministerial review* noted that one of South Africa's weaknesses in the innovation landscape was a lack of skilled human capital, particularly in the areas of mathematics, science and technology, and engineering. This lack of technical skills is illustrated by the following figure, which shows how South Africa has a relatively low availability of technical skills:

Figure 21: Availability of Scientists and Engineers vs Capacity to innovate (size of bubbles = GDP per capita)



Source: Genesis Analytics, 2013, data sourced from The Global Innovation Index Report, 2013, and The Competiveness Report, 2013

4.4. INSTITUTIONAL EFFICIENCY AS IT RELATES TO THE IMPACT OF SPII

The efficiency of the programme is important in so much that institutional efficiency and delivery has a direct effect on the impact of the programme. Efficiency was measured by assessing the outputs of SPII in relation to the various inputs. The following indicators were assessed:

- Application and contracting processes
- Reporting and disbursements
- Communication
- Management and structure of the programme

4.4.1. Application and contracting processes

The application process involves the submission of an application, which goes through a basic assessment conducted by an account manager, after which, if it is found to be eligible, goes through a due diligence.³⁷ If the application passes this stage then a consultant or account manager, in consultation with the applicant, prepares a presentation of the proposal that is

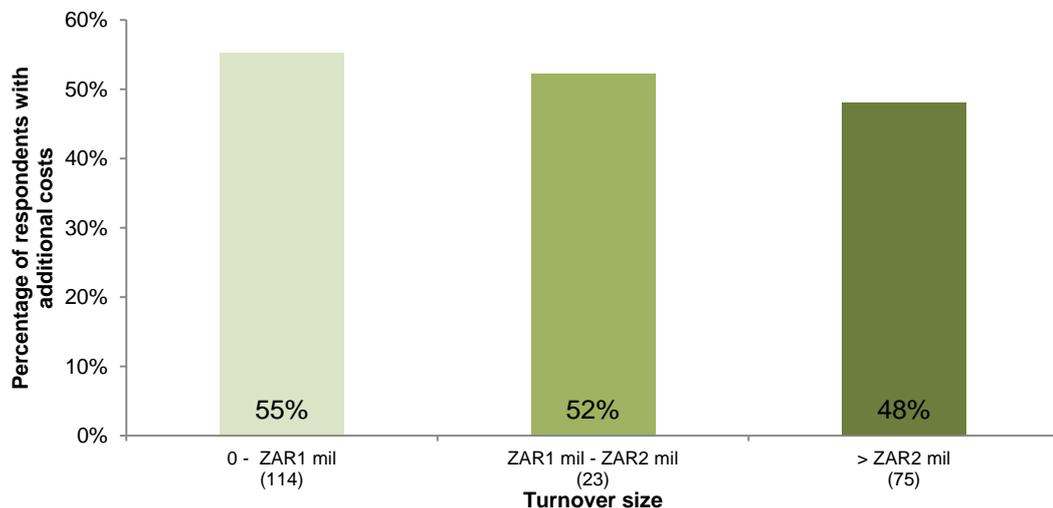
³⁷ Currently, only approximately 45% of the due diligence work is completed internally and there is still a reliance on external consultants.

presented by the consultant or account manager to the evaluation committee, where a decision is made on whether to support the project or not.

On the whole, the case studies reported that the application process was efficient, however, this depended on the consultant that SPII assigned to the project to assist in the application process and the account manager assigned to the project³⁸. Where consultants were adequately skilled and suited to the project, they were seen as being extremely efficient and helpful in the application process.

Most case studies suggested that the application process could be further improved by migrating it to an online platform, suggesting that over time this could extend to include the disbursement process. Furthermore, the survey results report that the smaller an enterprise is in terms of turnover, a greater number of additional costs, such as legal fees and external consultants, are incurred to complete the application process, which the case studies found to be a result of the smaller firms not having the in-house expertise or experience. Figure 22 illustrates this:

Figure 22: Turnover size and additional costs to complete application process³⁹



A number of the case studies noted concerns around the fact that the applicants themselves do not present their case to the investment panel, as this is rather done by the consultant/account manager responsible for each project. This can be beneficial for applicants with limited presentation skills. However, as the applicant has the greatest understanding of their proposal and project, there was consensus that he/she should at least be present to answer any questions of clarity for the investment panel. Further, innovation is largely driven by the innovator themselves, particularly in small businesses, thus SPII is in many ways investing in the innovator and not only the innovation itself. Finally, having the applicant promote and defend their proposal to the investment committee overcomes the possibility that the nature and rationale of the innovation is misinterpreted or misrepresented by the consultant/account manager.

The application of one of the larger companies based in Gauteng interviewed was significantly delayed when it was requested to prove that its innovation was a “world first.” There seems to

³⁸ In some cases these roles are separated whereas in some cases the account manager assumes the role of the consultant.

³⁹ Number of respondents in brackets

be inconsistency in the evaluation of this measure, in that it is applied in some cases but not all – further, as per the World Bank quote in the introduction – to be innovative a product does not have to be ‘world first’ but can be something that is being newly applied in a new environment (e.g. South Africa).

Another policy-linked matter is that of the restrictions around intellectual property (IP), whereby it cannot be sold for a period of three years post-SPII funding. The European Commission’s research into IP best practice found that it is best practice to vest initial ownership of results and inventions funded by public funds to the public research organisation where the research was conducted⁴⁰. However, this was said to discourage private sector partners, given that the purpose of innovation is to realise a competitive advantage, which is frequently embodied in the IP. An example of this is the above-mentioned large company that withdrew from SPII as a result of pressure from a private sector investor.

Many of the smaller companies found the contractual documentation to be complicated and onerous, requiring legal expertise. A start-up electronics company based in the Western Cape is illustrative of this – the applicant could not understand the intricacies of the contract and thus would have had to incur the legal costs of a lawyer to review it, had the applicant’s wife not been an attorney.

Two Western Cape based companies stated that the contractual agreements linked to the project’s suppliers are unnecessarily restricting. Once the companies had received the SPII grant, both of them had difficulties with their suppliers; however they could not let the suppliers go as they were written into the SPII contract.

It was stated by SPII stakeholders that SPII’s account managers and post-investment team is small and is often over-burdened. Furthermore, this team has to manage the existing projects, disbursements and reporting requirements as well.

SPII stakeholders noted that two factors are considered when evaluating an application, being economic merit and the level of innovation. These criteria are not clearly defined and are open to interpretation. Each application is evaluated against these criteria on a case-by-case basis. Other questions are asked⁴¹, but are not taken into consideration when evaluating whether the project should receive funding or not.

The records of applications from October 2000 to November 2012, supplied by the IDC, show that the average time between submission of an application to the date of rejection or approval is approximately 166 days – nearly six months, while the internal target is six weeks.⁴²

4.4.2. Reporting and disbursements

The gaps in reporting data received from the IDC for this evaluation illustrates SPII’s challenges with reporting compliance. Despite these reporting requirements being obligatory, no punitive measures or incentives are in place to ensure compliance to them.

The case studies illustrated that SPII’s reporting requirements are appropriate for larger companies; however, for smaller companies they can be arduous and resource consuming.

⁴⁰ European Commission (2004) Management of intellectual property in publicly-funded research organisations: Towards European Guidelines

⁴¹ These questions relate to the additionality of the project and possible other impacts, such as job creation. However, these questions are not documented and are not used consistently across applications

⁴² SPII Business Plan, 2013

This is illustrated in the case of a small chemicals company with only four employees. As there are limited resources in the company, meeting the reporting requirements detracted from the firm's core business. Aside from the time-consuming nature of the task, the SPII administrators noted that many of the small companies do not know how to meet the reporting requirements as they have limited business skills. As such, one suggestion was made that support be provided to these companies when the reports are due.

A number of beneficiaries who were on the scheme at the time that disbursements were made *ex post* noted that this resulted in cash flow problems and were happy to hear that the process had changed to one of *ex-ante* disbursements of funds.

The same small chemicals company commented on the inflexibility of SPII's reporting requirements. The company's patent is registered in a holding company; however, the business's operations are conducted through a different company. The applicant company was the holding company; so all reports had to be based on this company despite the fact that this was solely a holding company and the applicant had requested to do otherwise. As a result of this, SPII's MIS data shows the performance of the company to be very limited despite the fact that the project is profitable and has led to approximately 10 additional staff members being employed since its SPII funding - these operations are recorded on the operational company's books.

It has been noted that SPII's follow-up reporting in the three years after project completion is limited to financials and employment figures. Therefore, the data is unable to establish progress for projects that were not yet commercialised in those three years, or provide reasoning for the lack of commercialisation.

4.4.3. Communication

The case studies revealed mixed responses on the communication processes of SPII; this was highly dependent on timing and the nature of the process.

Regarding the marketing of SPII, it was revealed that SPII does not market itself as it is already oversubscribed. 82.8% of survey respondents claimed to have come to know about SPII through word of mouth, referral from another programme or independent research.

When case study respondents and industry stakeholders were asked about how they feel about the marketing of SPII, it was noted that marketing SPII in an open and untargeted way could open the programme up to a large number of applicants, increasing the administrative burden on a small team with a limited budget which is already well subscribed. It was suggested by a case study respondent that SPII should only market itself through existing innovation networks, such as innovation hubs and technology transfer offices.

4.4.4. Management and structure of the programme

The SPII team reported concerns around the arduous legal and financial processes a project must go through before being approved as this is decreasing SPII's appetite for risk. The importance of experienced, suitable account managers was also highlighted as essential to the successful running of the programme. The case studies reported mixed experiences with these account managers, which were heavily dependent on the suitability of the account managers' background and skills to the innovation of the case study.

The management of the SPII programme was generally noted by industry stakeholders to be better than the other innovation programmes in South Africa, with the administration of the programme and the programme's reliability noted as differentiating factors.

In terms of structure, SPII administrators suggested that SPII should have greater collaboration with Seda and TIA. As these programmes are more focused on the commercialisation process, projects should be introduced to other institutions that focus on the next phase of the innovation cycle to improve their chance of successful commercialisation. The head of Development Finance at the IDC explained that SPII has a tentative relationship with TIA at the lower levels of implementation; however, more direction is needed from a departmental level to ensure true collaboration and synchronisation.

Administrators of SPII were also asked what constraints they face in achieving the programme's objectives. This was consistently reported to be a lack of funding. This is evidenced by the fact that two moratoriums on funding commitments have recently been implemented. The MTEF allocation is currently approximately R54 million per annum, which is consistently fully utilized. In addition to this, as of September 2013, there was approximately R226 million on SPII's commitment register that was due to be disbursed.

4.5. SUSTAINABILITY

The sustainability of SPII measured the extent to which the benefits accrued from SPII were likely to continue once SPII funding ended. The indicators assessed include:

- The sustainability of SPII's budget
- The success of the projects which SPII has funded

4.5.1. The sustainability of SPII's budget

SPII administrators felt that because SPII (the PPD and Matching schemes specifically) has always been a grant-based scheme, it was unlikely that other more sustainable funding mechanisms would be considered. Many industry stakeholders confirmed the importance of SPII funding being grant-based as any form of funding that requires repayment can stifle innovation, particularly in the inherently risky stages of the innovation process that SPII targets. Given that SPII is grant-based, the programme itself is not financially sustainable, nor was it designed to be.

SPII administrators raised concern around PII's viability, value for money and sustainability. The size of these projects and the corresponding grants are so immense in comparison to the other schemes that one large project could essentially use the vast majority of SPII's budget. PII uses repayable grants, but the low number of PII-funded projects means that this does not contribute significantly to the sustainability of the SPII programme as a whole.

4.5.2. The success of the projects which SPII has funded

A SPII administrator noted that the PII programme has had extremely limited success, and that there is currently a process underway to determine why these projects have not been successful. The Matching scheme was considered to be the most successful of the schemes as these projects reportedly have the highest commercialisation rate. Although the administrator noted that the PPD scheme was not as successful as the Matching scheme, these projects were considered to be the most in need of funding.

Respondents noted that projects would likely have a greater chance of success if business development support was provided in conjunction with the SPII funding or if projects were incubated during and post-SPII funding.

5. ANALYSIS

The following analysis builds on the findings outlined above in order to answer the specific questions that were raised in the ToR.

5.1. IMPACT

5.1.1. What is the impact of SPII on the innovation activity in South Africa?

SPII is considered to be one of the more effective innovation incentive programmes in South Africa and plays an important role in overcoming what is considered to be the greatest constraint to innovation in the country – access to finance. This is particularly true given the limited and risk-averse nature of the venture capital and angel financiers in South Africa, as well as the areas in the innovation cycle that SPII targets, namely basic research to pre-commercialisation prototype.

The survey data showing that the majority of successful SPII applicants would not have been able to continue their project without SPII funding, or that it would have taken longer further indicates the important role SPII has played in increasing innovation activity in South Africa.

However, the demand for SPII funding far exceeds the amount it is allocated to commit to projects each year, thus limiting the number of projects that can be approved. This suggests that the potential exists for the programme to have a far greater influence on innovation activity, although this depends on the effectiveness of SPII's marketing, applicant selection processes and linkage support.

5.1.2. What impact does SPII have on economic development through technology transfer and technology development?

An innovation project only contributes to economic development if it is commercialised. SPII provides funding during a fundamental stage in the innovation process, but due to the fact that funding ends at the pre-commercialisation prototype phase, economic development cannot be *directly* attributed to SPII. One of the major themes that emerged during this evaluation was the challenge innovating firms face in bridging the gap from prototype development to commercialisation. While SPII, under its current mandate and activities, cannot address this challenge directly, by collaborating closer with other agencies that support commercialisation, through funding and other mechanisms of support, such as mentoring, business development service provision and/or incubation, this gap could be reduced and technology transfer and development could be enhanced – thus enhancing the economic impact of the incentive. SPII does provide hand-holding support to applicants during the basic assessment stage of the application process, but this remains limited to the proposal development process, rather than throughout the funding period. SPII is also looking at establishing closer links with the TIA technology stations, with a particular focus on incubation, but this remains aspirational at this stage and is limited to a set of state-funded agencies. The role for private incubators and other service providers of a range of support mechanisms could be further explored.

Nevertheless, the data collected by the IDC reports that ZAR 3 459 014 309 in sales⁴³ has resulted from SPII funded innovations since 2000⁴⁴ and that SPII has disbursed ZAR 622 671 640 over the same period. The sales figure is also likely to be an underestimate, as many projects have not submitted sales data and even the ones that have, have done so for a maximum of approximately four years. Furthermore, the survey data shows that an accepted SPII application has a higher probability of success than a project that was rejected, which can be the result of either SPII funding assisting projects to commercialise or SPII only selecting projects that are likely to succeed, or a combination of these.

A challenge with defining SPII's impact on economic development is that the data on SPII-funded projects post funding is limited. SPII requires that projects report on financials and employment figures for only three years after project completion and SPII has experienced difficulties in retrieving this standard reporting data from clients. This does not allow for the monitoring and evaluation of projects that have not commercialised. This means that there is a lack of the necessary measurement and evaluation systems for rigorous evaluation and identification of determinants of success.

5.1.3. Do industry partners (recipients) realise a significant return on investment (ROI) from SPII in terms of profitability, skills development, and sustainability of the enterprise? After how long is the ROI realised?

The survey data shows that 57% of projects have not yet been commercialised, and thus have not produced a ROI. Furthermore, according to the reporting data 20.42% of the matching fund and 14.11% of the PPD supported enterprises are experiencing a negative ROI because of the time it takes to begin generating profit, with some survey respondents reporting that it took them longer than three years to generate a return.

The ROI for year one of commercialisation for funded projects was calculated and the average ROI for year one is 173%. However the standard deviation for this is extremely high, demonstrating that there is a lot of variation between projects' ROIs with some experiencing extremely large returns and others receiving very large negative returns. Thus, the average ROI is not a useful indicator of the programme's achievement, but the variation in results does demonstrate the risky nature of the investments SPII makes.

It appears that the matching scheme has been more effective at realising a return than the PPD scheme. The ROI of the entire programme was calculated, using the data on all grants dispersed and all reported sales, to be 456%. Because innovation and SPII funding can result in the financial or strategic repositioning of a business, it often does realise a return on investment in terms of enhanced competitiveness and sustainability. However, these ROI figures are highly unreliable due to the nature of the data on sales figures only being collected for three years post-funding and with many projects not even complying with this reporting requirement. We believe that SPII cannot be accurately evaluated on this indicator for that reason.

In terms of skills development, 45% of PPD- and 53% of matching scheme-funded survey respondents have trained 1-5 employees. The majority of this is on-the-job training, rather than formalised, accredited training. Thus, the training is highly specific to the company in question.

⁴³ The sales figure cannot be solely attributed to the SPII funding, but to the innovation projects themselves

⁴⁴ This value cannot be solely attributed to SPII's input, as projects may have had other driving inputs.

5.1.4. Does South Africa realize a significant return on investment from SPII against the cost of delivering the programme in terms of:

- **Economic growth and empowerment;**
- **Skills development and Job creation;**
- **Taxable revenue;**
- **Competitiveness.**

In total we estimate that SPII funded projects have directly created or retained approximately 3000 permanent jobs. According to the same data ZAR 622 671 640 was received from SPII by the funded projects, which equates to approximately ZAR 207 560 per job. However, one of the major findings of this evaluation is that SPII does not contribute to the above four areas directly. Only after they are successfully commercialised do SPII investments actually contribute to enterprise and economic growth, permanent job creation, tax revenues and competitiveness. This is true by definition – there is no “economic value” until commercialisation happens.

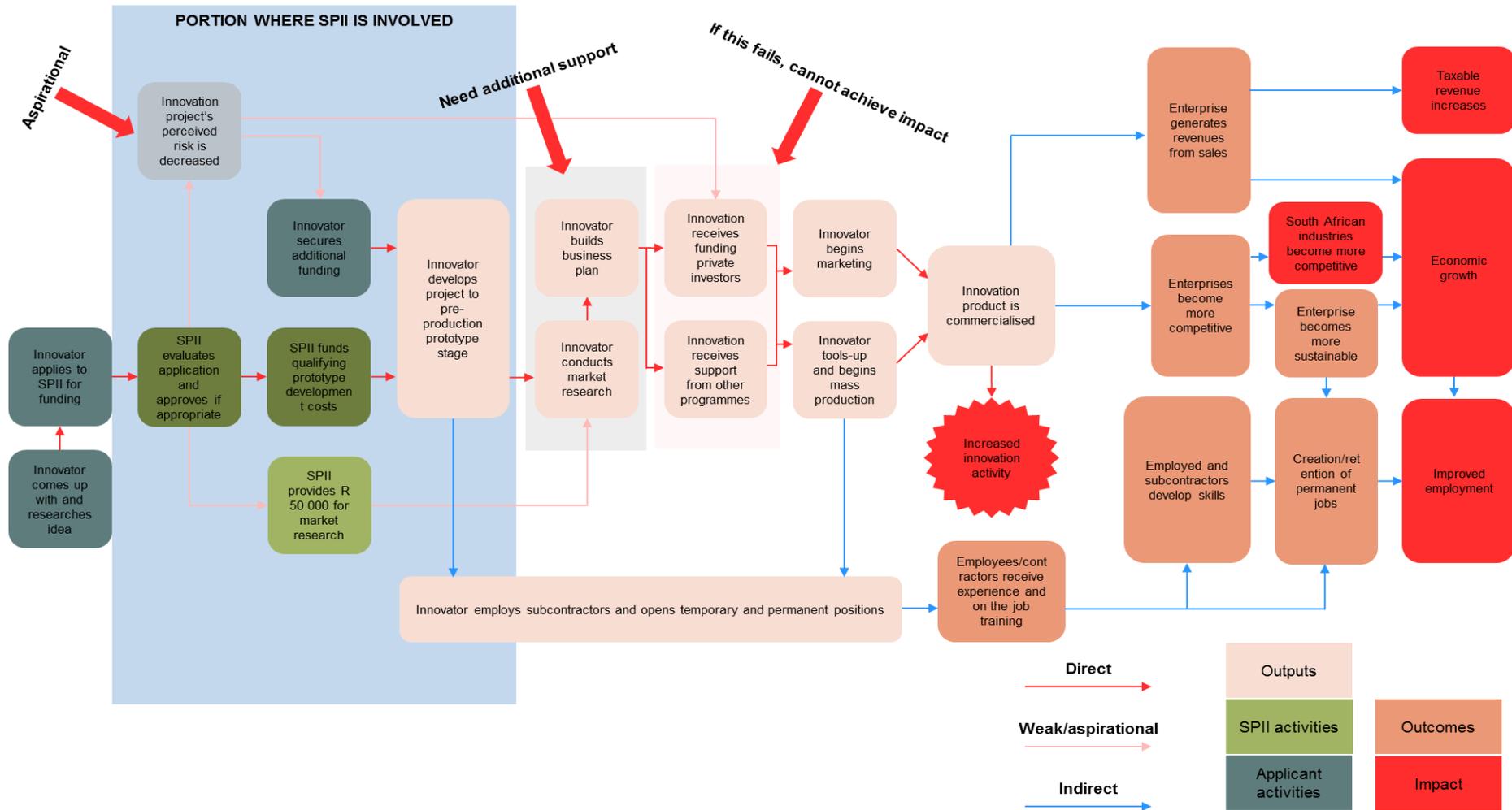
SPII, according to its objectives, does not aim to generate employment or economic growth, but merely to stimulate innovation and enhance commercialisation. SPII should therefore do what it can to facilitate and enable the development of innovation projects that will ultimately result in commercialised products/processes. It should also be noted that SPII’s budgets are at a scale below which any meaningful contribution to economic growth and job creation are feasible or likely. Given that SPII seeks to drive commercial technology development – it should focus on indicators that measure competitiveness such as those associated to patents, prototypes and licensing deals.

The theory of change in Figure 23 below demonstrates SPII’s direct and indirect impacts. The blue block on the left illustrates where SPII is involved and thus the extent to which SPII can be held accountable. This emphasises the limited direct contribution of SPII to broader economic development indicators. The blue block on the left also illustrates part of what the original theory of change for SPII would have looked like had it been documented. This shows that the programme was originally focused solely on driving innovation without the broader mandate of job creation and economic growth. The limited direct contribution of SPII to broader economic development indicators emphasises the importance of improving SPII-funded projects’ chances of commercialisation and success through linkages with other funding and support mechanisms, as well through market research and business plan development.

Further, while it is possible to measure these macro-level economic development indicators within the businesses funded by SPII, SPII is not the only contributor to the achievement of these indicators and so attribution becomes a serious challenge in this instance.

Job creation in particular is difficult to measure, given that the job figures reported and analysed as part of this evaluation relate to those created directly within SPII recipient companies, and does not include those created indirectly once the innovation is commercialised. Further, innovation has an ambiguous direct effect on employment, in the long term; it can generate jobs by creating new markets but it can also lead to temporary restructuring towards methods that replace labour inputs. However, in the medium to long term, innovation can lead to economic development and improvements to competitiveness which will in turn lead to job creation.

Figure 23: SPII theory of change



There is not an existing logframe for SPII. As such, a skeletal logframe has been provided in Annex 2. One of the key activities of the SPII team going forward will be to populate this further.

Nevertheless, following the logic that, as reported in the survey, SPII funded projects would not have taken place or would have taken place over a longer period or on a smaller scale if they had not received SPII funding, and that these same projects reported creating or retaining jobs, it follows that the SPII funding indirectly impacted on job creation or retention.

5.1.5. What happens to the Intellectual Property from completed SPII projects?

- To what extent are they commercialised, if not, why not?
- To what extent are benefits realised in South Africa, if not, why not?

Rules around IP in South Africa

SPII rules

For both the PPD and Matching schemes, the IP developed as a result of a project supported by SPII must reside in a South African company from the start of the development activity until 3 years after the completion of the project. For the PII scheme, the IP developed must reside in a South African company and will be owned by the IDC and the applicant in proportion to the respective contributions of the PII scheme and the applicant. The co-ownership will last for the duration of the contract, after which ownership will revert to the applicant.

Intellectual Property Rights from Publicly Financed Research and Development Act 51 of 2008

This Act ensures that the IP emanating from publicly financed research and development remains in South Africa. NIPMO was established to ensure compliance with this Act, innovators must approach NIPMO when wishing to sell IP offshore.

Given the limited available SPII data, these impact questions are difficult to answer for the programme as a whole. Section 4.1.1 above shows that 42% of survey respondents' projects that were supported by SPII have commercialised, while 44% are still in pre-production and 14% did not commercialise. The Matching scheme appears to be more successful than the PPD scheme in terms of commercialisation. Whether that IP from commercialised projects has remained in the country or not cannot be determined from the data available.

However, in terms of process, a number of case study respondents cited a number of challenges with SPII's rules related to IP. While there are mechanisms within SPII for clients to motivate the selling of their IP, there are instances of firms resigning from the programme because of the IP rules. This is particularly the case for international investors who require security for their investment and who are inherently sceptical of the extent to which the government has control over the IP. However, there are also cases where SPII's IP restrictions have benefitted the company in question. While responses to this issue are mixed, this raises broader questions around South Africa's industrial growth and the effect IP regulation has on foreign investment in the country, which is outside the scope of this evaluation. However, research by the European Commission regarding the management of IP from publicly-funded research found that best practice is to vest initial ownership of results and inventions funded by

public funds to the public research organisation where the research was conducted⁴⁵. This has been recognised by several studies and by an increasing number of countries, which have passed specific regulations to that effect.

Another process-related concern raised in some case studies was that of the need for more support from local patent lawyers.

5.1.6. **Is SPII still relevant when considering other instruments in the innovation landscape?**

The majority of respondents to this evaluation believe that SPII is still highly relevant when considering other instruments in the innovation landscape. SPII is one of the only programmes funding projects in the pre-commercialisation prototype stage of innovation, and while TIA overlaps with SPII in this stage, industry stakeholders and one case study that had experience with both interventions reported that SPII is run more efficiently. However, it should be noted that TIA has been going through a period of redefining its role and the differences in the programmes' mandates and structures make it difficult to compare the two programmes. Nonetheless, the synergies between SPII and TIA have been recognised and the two programmes have a memorandum of understanding and are attempting to collaborate much more closely, in terms of both the role of TIA's technology stations and where, between the two funds, duplication can be minimised and synergies enhanced. There are a number of different types of entities in South Africa that address R&D and innovation - the purpose of having multiple entities playing in a similar space is the ability to seek synergies and harmonization to benefit from the complementarities – currently, it is not necessarily a bad thing if there are duplications that exist in the market given that there is an unmet demand.

A significant finding of this evaluation was the high level of compartmentalisation of innovation industry stakeholders and agencies in South Africa. Improving linkages and transitions between programmes could have a significant impact on innovation activity and success in the country as synergies and complementarities can be exploited in this way – in effort to benefit the innovators.

An important development in the South African innovation landscape has been the creation of **the dti's** Technology Venture Capital fund, which was originally conceived as a sister programme to SPII. The majority of TVC-funded projects have been SPII recipients as well. However, a number of stakeholders believe the trajectory for a project from SPII to TVC could be more streamlined. The TVC should potentially be involved earlier in the innovation process, during the later stages of SPII funding, to ensure a soft handover between the two funds and to reduce the gap to commercialisation that many firms report as a major challenge. An important factor in this will be to ensure the alignment of SPII and TVC assessment criteria, as well as alignment between SPII projects' outputs and TVC's input requirements. However, it is important to retain the independence of each programme and to ensure that qualification for one incentive does not necessarily result in an uncritical assessment of its qualification for the other. A more streamlined process would have significant benefits for companies, as the delays resulting from re-doing applications can have significant repercussions on the success of a project.

⁴⁵ European Commission (2004) Management of intellectual property in publicly-funded research organisations: Towards European Guidelines

5.1.7. What factors in the South African context enable or constrain the beneficial impact of SPII, including the long term sustainability of those impacts?

A number of factors that influence the impact of SPII have been mentioned and evidenced in the report above. These include:

- Support gaps in the innovation landscape, particularly the gap to commercialisation and the need for complementary support mechanisms, including mentoring and incubation. The operation of different support agencies in isolation, and the lack of linkages between stakeholders, exacerbates this challenge.
- The lack of business skills, particularly in small companies
- The lack of vocational training or education amongst the majority of the South African population, which stifles innovation at a national level
- An undeveloped risk capital market and a lack of funding for innovation in South Africa, particularly for smaller companies. SPII does not have the scale or systems available to fund many large-scale projects.
- SPII lacks clearly defined objectives and targets and these are not aligned with Outcome 4 of the President's Delivery Agreement, which indicates a certain degree of policy confusion in relation to innovation, investment, growth and employment targets. Furthermore, without clear targets, it would be unfair to evaluate the programme against outcomes of job creation and competitiveness, when the mandate is only to stimulate innovation. Further, targets should not be "one-size-fits-all", but rather should be adapted to suit each of the three schemes.
- SPII does not need to market itself to increase uptake of its grant offering. The demand for funding from SPII already exceeds the amount it is budgeted to allocate each year.
- SPII's mandate and limited budget limits its ability to directly impact on macro-economic development indicators.
- The information feedback loops within SPII have improved in recent years, and draw on client feedback and management interactions, but these are not formalised. This is combined with limited reporting data from SPII recipients for three or less years following project completion. This results in a limited ability to measure the programme's impact and generate learnings on how the programme can be adapted and improved in order to maximise that impact.

These findings reiterate those from a 2009 report commissioned by the IDC that aimed to "ascertain if there are any gaps and weaknesses (in SPII) and, if any exist, how to address these".⁴⁶ These findings include:

- There is a need to develop support structures where inter-governmental and developmental agencies work together – enhanced complementarity;

⁴⁶ IDC, 2009, "The study on commercialisation of locally developed technologies"

- Many of the SME clients lack business and management skills to commercialise their innovations;
- The rules and guidelines are a "one-size-fits all" for multi-nationals through to SMEs, which is not always appropriate – a more nuanced approach is required in terms of focus and qualification criteria;
- Whilst the SPII management is professional they are hamstrung by onerous rules that are very rigid and cannot easily be changed, except by policy amendments
- There is a need for commercialisation funding – to take innovations beyond the conceptualization phase; and,
- There is a significant portion of PPD clients that lack the financial resources to proceed with their projects to commercialisation.

5.2. COST EFFECTIVENESS

5.2.1. Is the current model of delivering SPII cost effective in comparison to alternative models?

In 2013, out of its R54 million MTEF allocation, SPII's management fees are R13 million, including external consultants, which amounts to 24.1% of the programme's annual budget. However, it needs to be taken into account that SPII is also managing its R226 million commitment register, as well as the future MTEF budgets of R56m and R57m respectively. Thus, SPII is actually managing approximately R340 million for over 200 projects, and the IDC's management fees make up 3.8% of the total amount committed. SPII also receives a large number of applications, all of which are reviewed, including ineligible and rejected concepts. Upwards of 133 applications are reviewed each year, of which an average of 66 (49%) are funded. A table comparing the grant size and staff component of SPII with a number of other funds is given in Table 19 below.

Table 19: SPII relative to other innovation funds

	Remittances and Payments Challenge Fund (Bangladesh)	Stimulating Household Improvements Resulting in Economic Empowerment (Bangladesh)	Afghanistan Business Innovation Fund	SPII
Type	Innovation	Scale up and innovation	Innovation	Innovation
Grant pot (R million)	36	900	90	340
No. of Funded projects	20	36	30	200
No. of Project managers	3.5	9	6	6
No. of projects to PMs	5.7	4.0	5.0	33.3
Grant pot to PMs	10.3	100.0	15.0	56.7

Source: Oxford Policy Management, 2013.

Given this, and based on national and international benchmarks, SPII is relatively cost effective in comparison to other programmes in the innovation space. However, alternative funding mechanisms, such as loans or matching grants, or processes such as competitive

funding rounds, have not been explored by SPII or assessed in relation to their cost effectiveness.

5.3. PROCESSES

5.3.1. What effect do institutional mechanisms (structure, management, administration, and processes) have on the efficiency and effectiveness of delivering programme outcomes?

The majority of case studies noted that SPII's administrative processes are efficient relative to other programmes.

In 2010 the programme underwent a number of changes, from its leadership to its processes in a move to align it more with the IDC's strategy and processes. Anecdotal responses from case study respondents indicate that the impacts of these changes have been mixed. For example, many respondents feel that the programme became more compliance driven, which can be onerous, particularly in terms of meeting reporting requirements and application processes.

Respondents noted that the change from *ex post* to *ex ante* disbursement of funds has been positive, and that the SPII team has developed good skills internally. However, the internal account managers are sometimes inappropriately assigned to certain projects, and do not have the skill set or expertise required for projects in particular industries or sectors.

Respondents were mixed in their assessments of the use of consultants, with some speaking very highly of the consultants and finding them very helpful, while others have had bad experiences with consultants who have, in some cases, made mistakes in the applicants' applications. Many respondents also struggle with the way in which they themselves do not attend the presentation of their proposals to the Investment Committee, which does not allow for opportunities to directly promote, clarify and defend any issues raised by the Investment Committee. There is a rationale for this process, related to not exposing applicants and the Committee to undue pressure and increasing efficiency in a high-volume environment, but this needs to be balanced with the importance of the 'human element' of investment decisions, where the innovator plays a vital role in an innovation's chance of success.

Overall, case studies reported that SPII's processes and requirements are seen as easier for larger companies, and more arduous for smaller companies with limited resources, skills and capacity.

5.3.2. How does SPII performance compare to similar programmes nationally and internationally?

Rather than directly comparing the performance of different programmes in terms of ROI or job creation, we feel it is more beneficial to compare the mandates and processes of different schemes, as these determine how a programme promotes and encourages innovation growth.

Table 20 below compares SPII's practices to international best practices identified across a range of academic articles, evaluations and country case studies as described in section 2 above. The table highlights nine best practices for innovation programmes and compares SPII's performance against these practices. This illustrates some of SPII's weaknesses and areas for potential improvement. This table summarises Section 2 above.

Table 20: SPII's performance against international best practice

	Best practice	SPII's practice	Performance
1a	A clear vision and mission, with upfront objectives	SPII has a clear vision and mission; however, SPII does not have clear specific objectives and inadequately defines quantitative and qualitative targets.	Poor
1b	Every term used in the vision should have an unambiguous and comprehensive definition	SPII does not have a definition of what a successful innovation is, nor of the link between innovation and its successful commercialisation	Poor
2	Open to all industries and evaluate each individual project	SPII does not restrict funding to sectors, except defence	Good
3	Simple management structure	SPII management structure is simple; however, the account managers are over burdened	Good, but require more account managers
4	Simple administrative requirement processes	SPII's administrative requirements are simple but can be onerous for enterprises that lack business skill or in-house business capabilities.	Could be improved, smaller enterprises need support
5	Strong linkages with other programmes	SPII, like the innovation landscape in South Africa, lacks strong linkages with other programmes and industry initiatives, but does have some linkages with technology transfer units and is looking to build these further.	Poor
6	A budget appropriate appraisal process.	The current appraisal process does not allow for budgeting or prioritisation of projects, as funding is not allocated on a competitive basis	Should be reviewed
7	Selection of projects with impact potential.	SPII currently does not select projects based on their potential social or economic impact (or potential to commercialise), only on their 'economic merit' and level of innovation	Could be improved
8	Appropriate funding instruments to address market failures	SPII provides non-repayable grants, which address a gap where risk is perceived to be too high for the private sector	Good
9	Comprehensive monitoring and evaluation	SPII requires that projects report on financials and employment figures for three years after project completion. This does not allow for the monitoring and evaluation of projects that have not commercialised. Furthermore, SPII has difficulties in retrieving the standard reporting data from clients. In addition, SPII lacks the necessary measurement and evaluation systems for rigorous evaluation.	Poor

6. EMERGING THEMES AND RECOMMENDATIONS

Based on the findings and analysis of the evaluation, we believe that SPII should continue given the important role it plays in the innovation landscape in South Africa. Following from our analysis, we have also identified a number of emerging themes which underpin the current and potential impact of SPII. These are listed below, followed by a list of corresponding recommendations.

Emerging Themes

- SPII lacks a set of clearly defined objectives, and associated targets, against which the programme's impact can be effectively measured and managed over a defined time-scale. This makes it difficult to measure impact beyond the value of annual project commitments and numbers of projects funded. Other measures against which impact can be measured need to be incorporated, such as those that track the efficiency of the programme (e.g. time to appraise and fund applicants), technology development oriented measures such as number of patents and prototypes development, as well as whether a project reaches commercialisation or not.
- Based on its mandate, SPII occupies a specified and limited but extremely relevant space in the innovation cycle. SPII's overarching objectives include increasing the number of innovative products and processes developed in South Africa, and achieving a meaningful increase and improvement of the competitiveness and commercialisation of SPII supported technologies. SPII's direct activities are linked to increasing innovation, but not the commercialisation of funded projects. The programme itself therefore does not have a direct impact on job creation, economic growth, or competitiveness as these outcomes can only be achieved through the successful commercialisation of innovative products and processes.
- There is a misalignment in **the dti's** broad objective of job creation and SPII's objective of increased innovation. Innovation has an ambiguous direct effect on employment, particularly over the long term; it can generate jobs by creating new markets, however, innovation can lead to temporary restructuring towards methods that replace labour inputs. The challenge presented by insisting on job creation through innovation, is that this will only happen in the medium to long term, as innovation can lead to economic development and improvements to competitiveness, which will in turn lead to job creation. And should direct job creation be an indicator for project selection and success – the 'innovativeness' of particular projects may become the secondary objective – having the opposite effect in the long term due to a reduction in competitiveness in the short term.
- SPII's appraisal criteria are limited to 'economic merit' and level of innovation, which are not clearly defined and are open to interpretation and variability. These could be unpacked further into a combination of eligibility and competitiveness criteria, the most important being whether a project will commercialise or not.
- The skills, time and funding required to move from prototype (the current limit of SPII's involvement) to commercial product has resulted in a gap to commercialisation for SPII funded projects, in many instances beyond the three year window within which data is collected. This gap is further exacerbated by:
 - The innovation landscape in South Africa is fragmented and compartmentalised, and this limits the creation of linkages between institutional actors (both public and private) whose activities should be aligned around complementary objectives, but are not.

- The skills shortage in South Africa. Of particular concern is the lack of business skills amongst SMEs required to take the newly developed prototype to market.
- The experiences of participating companies differ according to their size and therefore the scheme under which they are funded. SPII's application and reporting requirements do not differ according to the size of applicant firm, which means that smaller enterprises that receive funding under the PPD scheme have to fulfil the same administrative requirements as much larger and better-capacitated organisations. This translates into an onerous administrative burden on smaller companies that lack the resources and capacity to fulfil these requirements.
- Given SPII's limited resources, the on-going (rolling) consideration of applications does not allow for a strategic approach to building a project portfolio
- The information and learning processes within SPII have improved in recent years, and draw on client feedback and management interactions, but these are not formalised. To date, the learnings have focused primarily on operational aspects of SPII, and have served to make continuous improvements, however; these learning loops should be expanded to generate lessons from successful and unsuccessful applications post their interactions with SPII in order to have a clearer picture of the determinants of success.
- There are a number of internal processes that are currently operative and that, if adapted, could improve the efficiency of the programme. These include assigning consultants or account managers with limited knowledge of a specific sector to projects in those sectors, as well as the current practice of preventing applicants from presenting their applications to the investment committee directly, or at least attending the presentation in person.
- Detailed and accurate data of SPII-funded projects is limited. SPII requires that projects report on financials and employment figures for three years after project completion and SPII has experienced difficulties in retrieving these standard reporting data from clients. It is therefore difficult to monitor projects that have not commercialised. This means that there is a lack of the necessary measurement and evaluation systems for rigorous evaluation and identification of determinants of success.

Recommendations

These themes suggest that a number of the factors that have constrained SPII's impact are at the policy and programme design level, as well as at the implementation level. Based on these themes and our belief that SPII plays a critical role in the South African innovation landscape and should continue, the following set of recommendations have been provided, each of which have cost implications:

Policy and programme design recommendations

1. **SPII should clearly define its objectives, with corresponding targets for both outcome and operational aspects.** These should include the number of firms supported, number of prototypes developed, lead times to approval and disbursement and number of projects that reach the market, and achievement of these should be measured annually. There should be clear recognition that SPII cannot be directly responsible for the short-term fulfilment of job creation, economic growth, or competitiveness targets. However, SPII plays an indirect role in contributing to the achievement of these outcomes (the logic of which is explained in the theory of change), and so a link does exist between SPII and the broader **dti** mandate. A draft logframe has been developed (Annex 2) and can be completed by the SPII team.

2. **SPII's mandate to support and enhance innovation in business/industry should not be overwhelmed by a mandate to address direct job creation.** SPII is not an enterprise development fund. Innovation can generate jobs by creating new markets or it can lead to temporary restructuring towards methods that replace labour inputs. However, the shifts in products, productivity, scale and skills requirements that typically result from successful innovation will only typically lead to job creation in the long term – and to the ultimate goal of innovation-led economic growth and improved competitiveness. This logic needs to be made explicit in SPII's theory of change, so that the focus and implementation of the programme is not confused and compromised by potentially conflicting goals. Fundamentally, growth is achieved through innovation – not through stagnation – and SPII plays an important role in driving innovation.
3. **SPII needs to continue to contribute to the stimulation of the innovation landscape by stimulating innovation in products/services and in geographical areas where opportunities are the greatest.**

Implementation recommendations

Application and funding process

4. **The application appraisal process should more rigorously assess an applicant's prospects of successful commercialisation as a key criterion.** A key component of this is market research, rather than firm level characteristics. SPII does allow for a small amount of market research to be done during the application phase, and where there is capacity, this should be enhanced. However, existing institutions, such as SEDA and other incubators should also be leveraged.
5. **SPII should adopt less of a one-size-fits-all approach to its application and funding processes, which should differ according to scheme** (and hence size of the firm being funded).
 - Consideration should be given to the creation of specialist teams of programme managers within each scheme with specific skills sets for the types of firms they assess and fund.
 - Linkages with business development support organisations, particularly for smaller less-capacitated firms should be encouraged in order to improve their ability to meet application and reporting requirements.
6. In order to strategically build SPII's project portfolio, serious consideration should be given to the following:
 - **Applications for funding should be collectively considered at a limited number of defined points in a year.** This will allow the Investment Committee to consider batches of applications on a comparative and competitive basis.
 - **Defined funding amounts (whether indicative or set as ceilings) should be allocated to each of the three schemes per funding round.** This requires strategic decision-making as to how the portfolio of SPII should be constituted across programmes (in terms of project scale, levels of risk, ROI etc). This process will ensure that funding is competitively allocated and not on a "first-come-first-served" basis. It will also ensure that SPII develops a diverse portfolio of investments which effectively tests a wide range of innovative ideas and approaches. Funding amounts should be flexible, so that

uncommitted funds for one scheme can be absorbed by other schemes where greater opportunities exist.

- **There should be a more targeted and proactive marketing approach to inform potential applicants about SPII**

7. **The programme should reconsider a number of processes in order to improve its efficiency.** These include assigning consultants or account managers with limited knowledge of a specific sector to projects in those sectors, as well as the current practice of preventing applicants from presenting their applications to the investment committee directly, or at least attending the presentation in person.

Linkages support

8. **Greater linkages with other innovation actors and programmes should be encouraged to maximise the impact of SPII.** This will reduce the risk that SPII operates in a compartmentalised fashion, and will ensure that smaller businesses exiting the programme are afforded access to alternative sources of funding, mentorship and incubation resources that are needed to reduce the barriers to commercialisation. SPII should also look to establish linkages with private partners such as commercial banks and venture capital operations that exist beyond government's mandated agencies (Seda, TIA, TVC etc.). Ideally, SPII should aim to serve as an effective pre-incubator of early stage innovation for review and adoption as much by commercial banks and investors as by other DFIs and state agencies.
9. **SPII should consider explicitly addressing the lack of business skills amongst some of its funded projects, particularly SMEs, through improved linkages.** This could include assisting with linking beneficiaries to training programmes, incubators and other competent service providers who could offer technical assistance towards the end of the funding period to review the project's successes and challenges, to hone the necessary marketing requirements, and, overall, to map a concrete path to the commercialisation of the project.

Formalise internal learnings

10. **SPII should formalise internal processes that generate lessons from applications, from successful and unsuccessful projects, and from applicants' feedback following each funding round.** This could be done through more regular Exco reports or defined time slots in each management committee meeting dedicated to discussing and documenting lessons and feedback, the minutes of which can be distributed to the whole team. This will allow on-going design and process adjustments to continue to be made which reflect the needs of the market and incorporate the cumulative learning and experience in the programme's implementation. This should include details on key success criteria for commercialisation which then serves to inform the application and selection process.

Management information system

11. **A web-based platform for applications, internal appraisals and project reporting data (during and post funding) should be established.** This would allow for a more systematic appraisal of applications. It would also allow for the efficiency of the SPII processes to be monitored, enabling bottlenecks and other sources of inefficiency to be

quickly identified and addressed and will enable improved monitoring of the programme's performance and impact.

Monitoring and evaluation

12. **Recipients of SPII funding should have greater accountability to SPII to report progress on the funded project once the funding period has ended**, which can be improved by:
 - Clearly stating reporting requirements in contracts
 - Post-funding reporting requirements should not differ heavily from the reporting requirements during funding (nothing too new or complicated should be added)
 - Reporting should happen through an easy to understand and accessible web-based platform
 - Automated email reminders should be sent periodically to grantees reminding them of their contractual agreement to report, with a link to the online reporting portal attached.
13. **A set of indicators for SPII itself should be determined**, linked to the objectives and targets (particularly the commercialisation of approved projects) highlighted in its theory of change, and benchmarked against the scheme's previous performance.

Implementing agency

14. **SPII should remain a specialised innovation fund and be located within a specialised fund management institution** that has access to the correct networks to serve its role as a player in the landscape and maintain a focused, flexible and opportunity driven approach.

Based on the challenge of limited data availability experienced during this evaluation, a broader recommendation, for further evaluations conducted by units such as the DPME, is to **conduct evaluability assessments of the projects and programmes to be evaluated prior to the finalisation of the ToRs**. This would provide insight into the type of evaluation that can be conducted (impact, implementation, formative etc.), which ultimately informs the design of the scope of work and ToR, as well as the methodologies to be used as part of the evaluation.

ANNEXES

ANNEX 1: REFERENCES

- AUBERT, J. 2010. Innovation Policy for the Developing World
- BATTELLE. 2014. Global R&D Funding Forecast
- BURTON, D and HANSEN, K. 1993. German Technology Policy: Incentive for Industrial Innovation
- DST. 2013. The Review of the Technology Innovation Agency
- EUROPEAN COMMISSION. 2004. Management of Intellectual Property in Publicly-Funded Research Organisations: Towards European Guidelines
- HSRC (2008). The South African Innovation Survey
- IDC. 2009. The study on commercialisation of locally developed technologies
- JOFFE, A., KAPLAN, D., KAPLINSKY, R., LEWIS, D. 1995. *Improving Manufacturing Performance in South Africa*.
- LEDERMAN, D. 2009. The Business of Product Innovation International Empirical Evidence
- MOSES, C., *ET AL.* 2012. The state of innovation in South Africa: Findings from the South African National Innovation Survey
- OECD. 2013. Innovation and Inclusive Development
- OECD. 2013. Reviews of Innovation Policy: South Africa
- POURIS, A. 2006. *Review and Impact assessment of THRIP and SPII for the Department of Trade and Industry*.
- SHARMA, S. 2007. Financial Development and Innovation in Small Firms
- SOUTHERN AFRICA INNOVATION SUPPORT PROGRAMME. 2013. Assessing Innovation Priorities in Partner Countries
- STENBERG, L. 2004. Government Research and Innovation Policies in Japan
- THE DTI. 2012. *A Guide to the dti Incentive Schemes 2012/13*
- THE DTI. 2012. Ministerial Review on the Science, Technology and Innovation Landscape in South Africa
- THE SCIENCE AND TECHNOLOGY COMMITTEE APPOINTED BY THE UK HOUSE OF COMMONS. 2013. Bridging the valley of death: improving the commercialisation of research.
- TRAJTENBERG, M. 2005. Innovation Policy for Development: an Overview
- UNCTAD. 2008. The role of capacity-building for supporting pro-poor science, technology and innovation policies

UNCTAD. 2010. Key components of entrepreneurship and innovation policy frameworks

UNCTAD. 2011. Pro-poor technology, innovation and entrepreneurship policies

UNCTAD. 2012. Technology and Innovation Report 2012

WORLD BANK. 2007. An Assessment of the Investment Climate in South Africa,

WORLD BANK. 2010. Innovation Policy: A Guide for Developing Countries.

ZHANG, H. 2012. National Innovation System: South Africa & China Compared

ANNEX 2: PROPOSED LOGFRAME

Narrative summary	Performance indicators				Means of Verification	Assumptions
	Indicator	Baseline 2010/11	Target 2011/12	Target 2012/13		
Impact						
I1: Taxable revenue increases	Value of South Africa's tax revenue					Excluding SPII's contribution to tax revenues, South Africa's tax revenue remains constant
I2: Economic growth	South Africa's Gross Domestic Product					Excluding SPII's contribution to GDP, South Africa's GDP remains constant
I3: Improved employment	South Africa's employment rate					Excluding SPII's contribution to employment, South Africa's employment rate remains constant
I4: South African industries become more competitive	South Africa's score on the Global Innovation Index					Excluding SPII's contribution to competitiveness, South Africa's competitiveness remains constant
Outcome						
OC1: Enterprise generates revenues from sales	Value of enterprise's revenue					The innovation is commercialised
OC2: Enterprise becomes more competitive	Value of enterprise's exports					The innovation is commercialised
OC3: Enterprise becomes more sustainable	Status of the enterprise's cash flow (positive/negative)					The innovation is commercialised
OC4: Creation/retention of permanent jobs	Number of permanent jobs created/sustained by the enterprise					The innovation is commercialised
OC5: Employees/contractors receive experience and on the job training	Number of employees/contractors that receive training					The innovation is commercialised
Outputs						
O1: Innovator develops project to pre-production prototype stage	Number of pre-production prototypes developed					Innovator has secured funding for expenses which are not covered by SPII.
O2: Innovator builds business	Number of business plans					Market research has been conducted and

plan	developed						indicates that a market exists for the innovation.
O3: Innovation receives funding from private investors	Value of private investment received by companies						Market research has been conducted and indicates that a market exists for the innovation and that a feasible business plan has been developed.
O4: Innovator employs subcontractors and opens temporary and permanent positions	Number of temporary and permanent jobs created						Market research has been conducted and indicates that a market exists for the innovation and the project requires additional staff members
O6: Innovation product is commercialised	Number of products commercialised						Market research has been conducted and indicates that a market exists for the innovation and the innovator has subsequently entered into mass-production.

SPII's activities to achieve the outputs
Activities unlinked to outputs in the logframe
A1: SPII develops application criteria
A2: SPII evaluates applications
A3: SPII draws up contracts with the applicants
O1: Innovator develops project to pre-production prototype stage
SPII disburses funds for qualifying prototype development costs
O2: Innovator builds business plan
SPII provides R 50 000 for market research