Reviewing the design, implementation and impact of South Africa's

RESEARCH AND DEVELOPMENT TAX INCENTIVE

National Treasury
Science and Innovation

Contents

List of acronyms

2019 STI White Paper	2019 White Paper on Science, Technology and Innovation
BERD	Business Sector Expenditure on Research and Development
DACST	Department of Arts Culture Science and Technology
DSI	Department of Science and Innovation
DST	Department of Science and Technology
DTIC	Department of Trade, Industry and Competition
EM	Explanatory Memorandum
GDP	Gross Domestic Product
GERD	Gross Expenditure on Research and Development
IMF	International Monetary Fund
IP	Intellectual Property
ITA	Income Tax Act 58 of 1962
M&E	Monitoring and Evaluation
MTSF	Medium Term Strategic Framework
NACI	National Advisory Council on Innovation
NPOs	Not for Profit Organisations
NRDS	National Research and Development Strategy
NT	National Treasury
OECD	Organisation for Economic Co-Operation and Development
PAJA	Promotion of Administrative Justice Act 3 of 2000
PBO	Public Benefit Organisations
R&D	Research and Development
SARS	South African Revenue Service
SBC	Small Business Corporations
SMEs	Small and Medium Enterprises
STI	Science, Technology and Innovation
TYIP	Ten-Year Innovation Plan

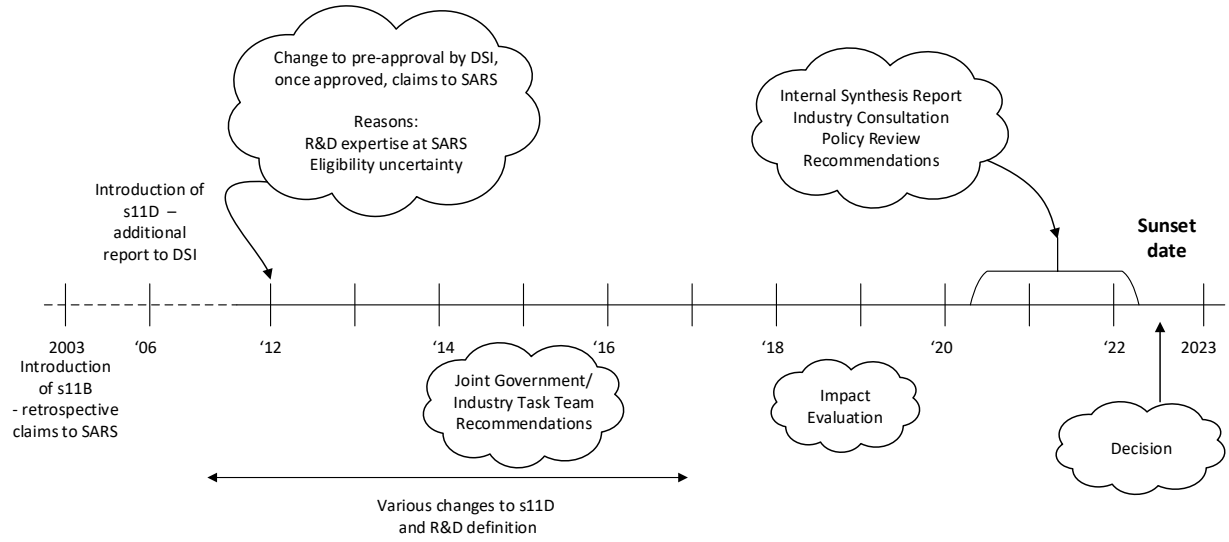
1. Introduction

Scientific research and technological advancements are crucial for innovation, productivity and economic growth. For this reason, the South African government implemented a tax incentive to encourage private-sector companies to invest in scientific or technological research and development (R&D) in the country. This incentive is implemented under Section 11D of the Income Tax Act, 1962 (the ITA) and has evolved since its introduction in 2006.

The incentive provides government support for business sector R&D and aims to reduce the cost of R&D for private sector companies.

Any company, irrespective of size or sector, that undertakes R&D within South Africa can apply for the incentive. Once an R&D project has been approved by the Minister of Higher Education, Science and Innovation, a company can deduct 150% of its qualifying R&D expenditure from its income (administered by the South African Revenue Service (SARS)). This means a saving of 14c of every rand spent on R&D, at a corporate tax rate of 28%.

A timeline of the incentive shows important dates and changes in the incentive since its inception:



The incentive has a sunset date set for 30 September 2022. To ensure policy certainty, it is important for government to indicate in advance of this deadline whether the incentive will proceed, and if so, in which form. Any decisions on the continuance or improvement of the incentive are to be made based on evidence in respect of the value and the impact made by the incentive to date. Additionally, decisions regarding the future of the incentive should consider inputs from the private sector.

With the above in mind, and in line with recommendations from the 2015 joint Government-Industry Task Team (discussed in more detail below), an Impact Evaluation of the R&D Tax Incentive was completed during 2019. The study was commissioned jointly by the National Treasury (NT) and the then Department of Science and Technology (DST). The Impact Evaluation was undertaken by an external party, the World Bank, to ensure objectivity. (Reference Document A – World Bank Impact Evaluation)[i]

The Impact Evaluation report exposed gaps in data which influenced final conclusions on the value and contribution of the South African R&D tax incentive. The report did not fully consider the new policy context introduced by the White Paper on Science, Technology and Innovation. To address

these additional requirements, an internal Synthesis Analysis report has been developed by the Department of Science and Innovation (DSI). This report draws on findings and observations from other independent studies about the workings of tax-based incentives for R&D in South Africa and internationally. (See Annexure A for a list of the independent studies.)

As custodians of the R&D tax incentive, the DSI and NT have listened to recommendations made over the years. Before any final decisions are made on the R&D tax incentive, whether regarding its continuance or revision, the DSI and NT want to consult with the stakeholders of the R&D tax incentive. With this discussion document, the public and particularly the private sector, is invited to provide answers to questions posed in an online survey. We also welcome any other inputs or comments you may have on the information provided in this document. **Any written comments in respect of the document's content should please be sent to** TaxIncentiveReviews@treasury.gov.za, Londiwe.Khoza@treasury.gov.za and Christel.Wolmarans@dst.gov.za. The closing date for written comments and answers to the online survey is **Tuesday, 25 January 2022**.

2. How to read and use this Discussion Document

Section 3 sets out the policy journey so far. The economic and fiscal context was quite different at the time the section 11D R&D tax incentive was introduced in 2006. This is described and contrasted with the current economic and fiscal context. In 2012, the administration of the incentive was changed substantially – rather than claims being audited by SARS ex-post, an adjudication committee was set up to allow people with scientific expertise to make decisions on R&D tax incentive applications. The new system faced various teething problems and that resulted in a backlog of applications. As mentioned in section 2, a task-team was set up to review the incentive in 2015, and concerted efforts were made to improve turnaround times for applicants. In terms of gathering information for the policy review, an independent party conducted an impact evaluation and the Department of Science and Innovation has drafted an Internal Synthesis Report to document all the learnings. Through this journey, which has included a number of public consultations with interested parties, government has learnt a lot and is in a better place to make informed decisions going forward.

Readers are encouraged to read the entire policy journey in section 3 to gain context for where we find ourselves today. **Section 4 outlines key policy challenges and provides a link to an online survey containing questions for the public**. All interested parties are encouraged to provide their views on the questions posed.

The sunset date for the incentive is 30 September 2022 and government wishes to provide interested parties with certainty on the future of the incentive. **Two important decisions are required**: (i) whether the incentive should continue beyond the sunset date or not, and (ii) if it continues, whether the current policy design is suitable. Besides continuing to enhance the administrative experience, government has no intention to change the administrative process now that it is functioning more smoothly than previously. Many public engagements have focused on administrative issues – this document focuses more on the policy design itself. However, two key administrative issues are included in section 4 – progress reports and transparency.

3. Background and Context

a. The rationale for supporting business R&D

There has been increased use of tax-based incentives for R&D globally over the past two decades – both in terms of the number of countries participating in such incentives, as well as the size and generosity of these incentives.[ii] This is because more countries have internalised the rationale for government support for business R&D within their policies.[iii]

The theory of change in relation to this type of incentive is well documented: R&D is crucial for innovation, productivity and economic growth.[iv] Governments provide business R&D incentives to address market failures, such as under-investment in R&D by companies compared to a socially optimum level. One of the reasons that private companies are reluctant to invest in R&D is the perception that R&D is generally expensive and its outcomes uncertain. Although R&D activity may lead to a positive result (hoped for or unforeseen), it may not. Returns may not be attained as initially intended and the payback period for investment can be quite long. However, R&D may have greater societal benefits, far higher than private returns to an investing company.[v]

R&D activities typically have both direct and indirect effects. A company that undertakes R&D may benefit directly from its resulting new or improved products, processes and production methods. In this way, a company can expand its market share and profitability. The indirect effects occur through knowledge spillovers. R&D activities have intrinsic value in that they add to the existing stock of knowledge that builds capabilities for innovation and/or the absorption of external technology across the national system of innovation. Companies can imitate and learn from technological knowledge developed by other companies that have benefited from R&D incentives. Lagging companies, regions and countries, for instance, can catch up in this way by applying new technologies developed by technological leaders, without having to bear the full costs and risks of developing those technologies.

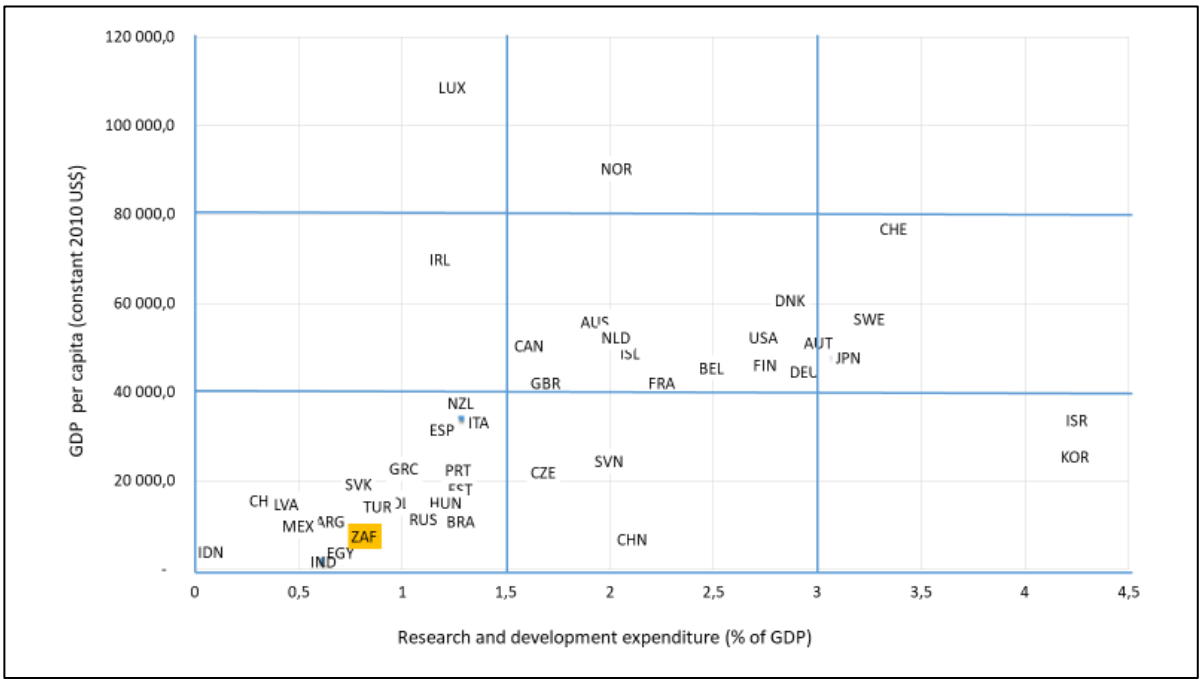
As to the economic role of R&D, evidence shows that part of the uneven progress across companies, industries and economies is explained in terms of differences in technological capabilities. There is evidence that more developed countries generally have higher national R&D intensity. Figure 1 shows the relationship between Gross Domestic Product (GDP) per capita and the Gross Expenditure on R&D (GERD) to GDP percentage, i.e. GDP per capita to GERD/GDP. Table 1 shows the leading countries for three R&D statistical indicators.

Government's role is to create a conducive environment, not only for R&D, but for productive investment in general, as well as innovation. This is a strong theme within the re-imagined industrial strategy that the Department of Trade, Industry and Competition (DTIC) leads. Government support for business R&D is therefore just one avenue, over and above direct government investment towards scientific research institutions and projects, infrastructure, human capital and other measures to facilitate technical progress.[vi] All these indirect and direct investments form part of the 'policy mix' that needs to be optimised.

It is recognised internationally that governments should do more to encourage R&D.[vii] The International Monetary Fund (IMF) notes that in emerging markets and developing economies, investment in education and infrastructure is likely to strengthen the capacity to absorb technologies from abroad. Emphasis is also placed by the IMF on the importance of institutions and government policies for technological progress. As innovation builds on a strong human capital base and institutions that foster new discoveries, it is important to invest in higher education, basic scientific research, and partnerships between higher education institutions, science councils and private companies. The IMF indicates that policies should support an enabling and conducive environment

which includes the protection of intellectual property rights, fiscal incentives (where appropriate) and broader policies related to trade, competition, labour market regulation, and insolvency laws.

Figure 1: Selected international comparisons on GDP per capita and GERD/GDP (2016 data or latest year available)



Data Source: UNESCO UIS. 2018; OECD database

Table 1: Selected international comparisons on leading countries on three key R&D statistical indicators shown against South Africa (2016 data or latest year available)

Leading countries by GERD (Million $PPP, current prices)		Leading countries by GERD/GDP ratio		Leading countries by R&D personnel/1000 total employment (HC)	
USA	443 140	Israel	4.3%	Iceland	30.4
China	410 188	Republic of Korea	4.2%	Republic of Korea	23.6
Japan	149 495	Sweden	3.3%	Japan	18.1
Germany	104 076	Japan	3.1%	Tunisia	11.2
S. Korea	77 656	Austria	3.1%	Russian Federation	10.1
France	55 780	Germany	2.9%	China, Hong Kong	8.9
United Kingdom	47 798	Denmark	2.9%	Egypt	8.8
India	41 826	Finland	2.7%	Serbia	8.5
Brazil	34 302	USA	2.7%	China	7.6
Russian Federation	37 265	Belgium	2.5%	China, Macao	6.9
South Africa	**5 823**	**South Africa**	**0.8%**	**South Africa**	**5.7**

Data Source: UNESCO UIS. 2018; OECD database. 2018.

It is important to note at the outset that a tax incentive is not the instrument that will necessarily drive investment in R&D. It should be seen as a complementary measure to policy certainty and an attractive investment environment.

b. Policy context considerations

Then:

Prior to the inception of the R&D tax incentive in 2003, the then Department of Arts Culture Science and Technology (DACST) commissioned an evaluation of the potential economic benefit of the incentive proposed at the time. With limited published material on the issue in its South African context, a discourse emerged regarding what the appropriate policy measure would be between grant-based (i.e. direct) versus tax-based (i.e. indirect) incentives. The following points capture what was the general sense at the time:

- Pursuing a policy target of 1% of GERD as percentage of GDP (GERD/GDP) by 2008, to which both the government and the private sector would have to invest significantly in R&D.
- Business sector expenditure on research and development (BERD) was low, and declining, and South Africa needed to encourage private sector R&D activities and boost innovation as catalyst for economic growth.
- There was a sense of taking-off, with the GDP growth rate averaging 3%.
- There was a primary fiscal surplus position in 1995, which provided a sense of progress in public finances compared to a fiscal deficit of 4% of GDP in 1992/93.
- Emphasis on supply-side policy measures as key government interventions in a range of areas, including investment, technological innovation and export – would boost the economy's capacity to grow. The R&D tax incentive formed part of that package.
- Industrial restructuring from resource-based exports was one of the key aims to move an economy towards a knowledge economy.

Studies at the time assessed the South African fiscal environment for R&D and found that South Africa compared poorly to Organisation for Economic Co-operation and Development (OECD) countries in terms of implied subsidy rates for R&D investment. This was due to the absence of a fiscal incentive for business R&D. Estimates showed positive net social benefits and that the social returns from R&D supported would be sufficient for an R&D tax incentive to more than pay for itself, asserting that the government's fiscal position would not be negatively affected by introducing such an incentive.

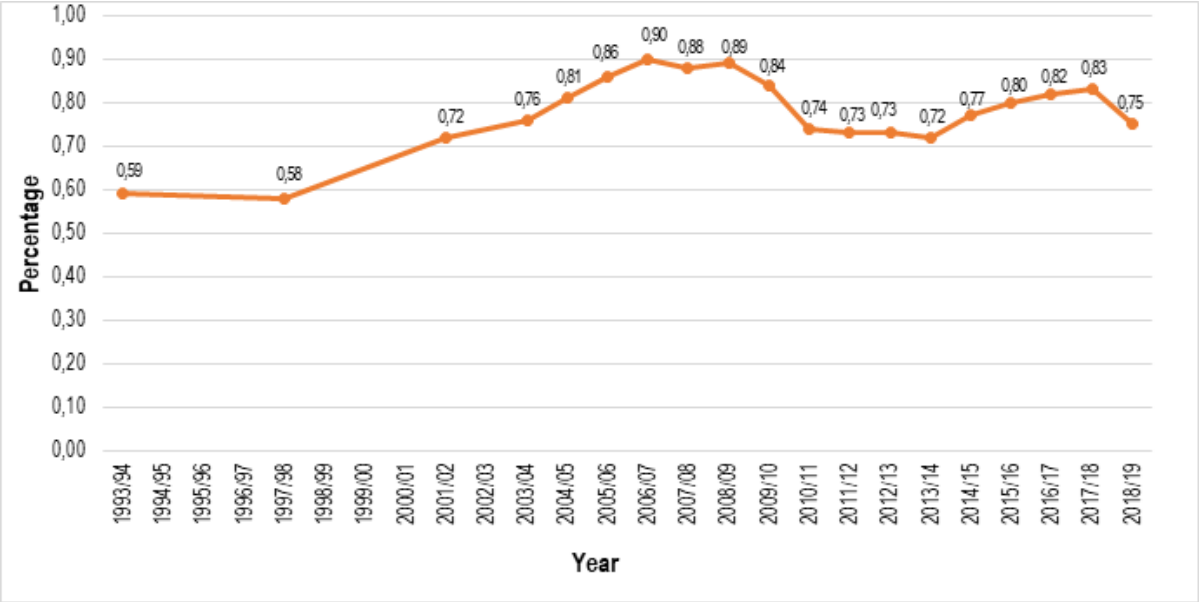
Now:

The fiscal condition and the business R&D environment have changed significantly from what they were in the mid-2000s. South Africa has experienced weak productivity growth coupled with slowing and negative GDP growth. Real GDP growth was 0.2% in 2019 and, in 2020, given the impact of the COVID19 pandemic and forced closure of many sectors in the economy, the economy contracted by 4.1% year-on year. South Africa also has a low share of domestic R&D expenditure to GDP (at below 1%). Key factors hindering growth in business sector R&D prior to the COVID19 pandemic included slow demand conditions in the economy, investor uncertainty, a lack of skilled human resources, and the general state of technological development in the country.

The DSI's analysis of trend data drawn from the South African National Survey of Research and Experimental Development, Statistical Report 2018/19[viii] (2018/19 R&D Survey)[ix] shows that the global financial crisis severely disrupted GERD in South Africa and that the recovery has been slow (see Figures 2 and 3). Businesses tend to prefer shorter-term planning horizons during periods of slow

economic growth. The rate of investment in the economy has slowed with capital spending by private business enterprises and general government contracting compared to levels in 2015.

Figure 2: GERD as percentage of GDP, 1993/94 to 2018/19



Notwithstanding the above, more ambitious policy targets for R&D, innovation and industrial development were pronounced in the 2019 White Paper on Science, Technology and Innovation (2019 STI White Paper) and the evolving industrial policy framework. (Reference Document B – 2019 White Paper on STI[x])

The 2019 STI White Paper focuses on using science, technology and innovation (STI) to accelerate inclusive economic growth, make the economy more competitive, and improve people's daily lives. It aims to help South Africa benefit from global developments such as rapid technological advancement and geopolitical and demographic shifts, as well as respond to the threats associated with some of these global trends. It has three high-level goals, namely:

- to take advantage of opportunities presented by megatrends and technological change;
- to expand policy approaches that have worked and propose new approaches where necessary; and
- to promote a more inclusive economy at all levels.

According to the 2019 STI White Paper and the 2019-2024 Medium Term Strategic Framework (MTSF), the government recommits to the target of increasing the intensity of R&D investment in the economy so that GERD reaches a revised 1.1% of GDP in 2024, and an aspirational 1.5% by 2030, from the current 0.75% as reported by the 2018/19 R&D Survey. This ambitious target requires an increase in STI investment by business. However, government also has an important role to play – by creating an investment-enabling environment and increasing its own levels of STI investment.

In recommitting to the abovementioned targets, it is important to re-emphasise that the R&D tax incentive should be seen as one of a package or policy mix of instruments aimed at increasing the ratio of GERD to GDP. Its potential impact must be seen with challenges of the last decade, including the global financial crises, and now the impact of COVID19. It is also accepted that significant

administrative teething problems existed with the R&D tax incentive after changes in 2012 introduced the pre-approval system.

Nevertheless, while government is moving towards refining the corporate tax system by removing tax incentives so that it is more efficient and equitable across different types of taxpayers, this particular incentive is one that directly addresses a market failure. As mentioned above, if genuine R&D investment can be encouraged, there are likely to be net positive societal benefits that outweigh the cost of providing the incentive.

There have been significant changes in the composition of GERD and R&D funding sources[xi]. While the business sector has remained the largest R&D performer in the economy (contributing 39.5% of GERD in 2018/19), as can be seen from Figure 3, its role has reduced in comparison to 2006/07 (where its share of GERD was 56%). As can be seen from Figure 4, since 2007/08 government is the largest contributor to GERD by source of funds.

Figure 3: R&D Expenditure by sector, 2004/05 to 2018/19

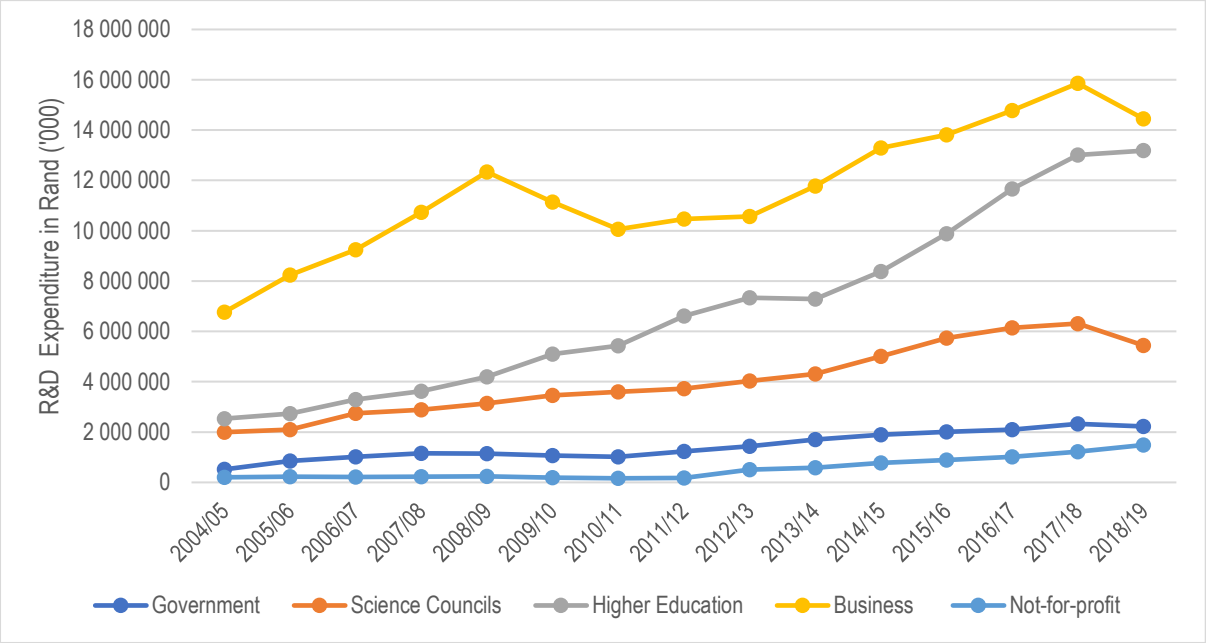
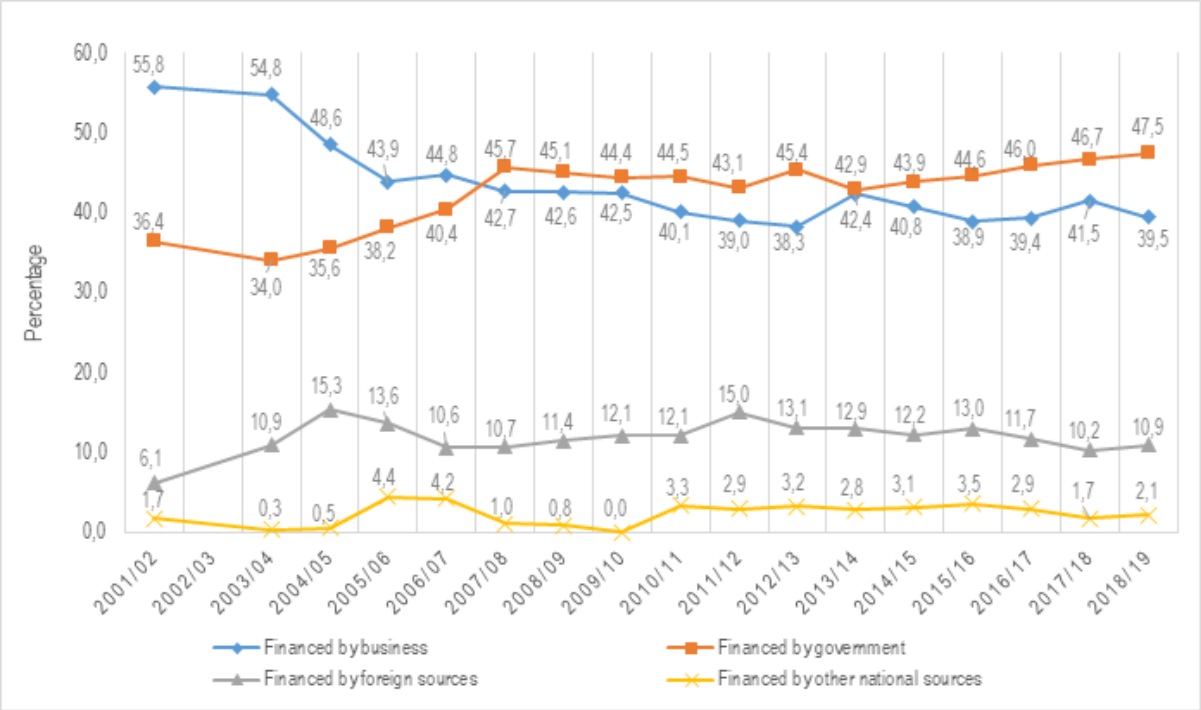


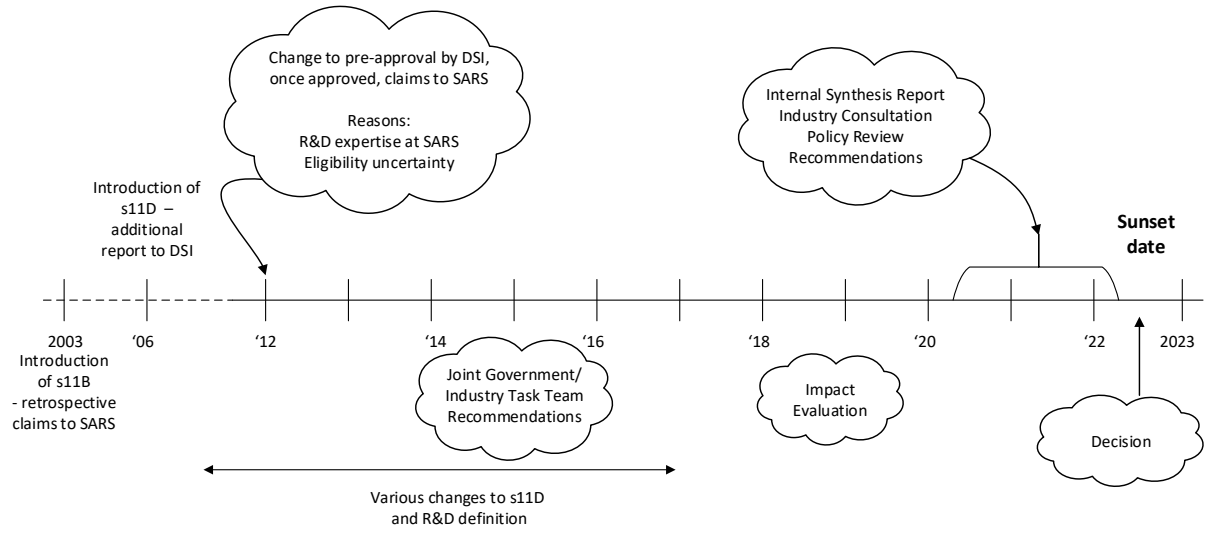
Figure 4: GERD by source of funds (%), 2001/02 to 2018/19



The combination of low growth in employment, investment, productivity, and now COVID19, continues to restrain economic growth. In the 2021 Budget Review, the economy was forecasted to contract by 7.2 % in 2020 as a result of the pandemic, but instead contracted by 6.4 %. The economy is projected to grow by 5.1% in 2021 and 1.8% in 2022. Tax revenue collections for 2021/22 are expected to be R120.3 billion higher than the 2021 Budget forecast, but remain well below the pre-pandemic estimates, with a shortfall of R284.7.2 billion compared to the 2020 Budget projections until 2023. The COVID-19 pandemic has had a severe impact on the overall economy with business confidence to remain near historic lows, while investment and employment will drop below 2019's levels. The economic outlook is therefore highly uncertain and will require a social partnership between business, labour, communities and government.

c. A brief timeline of the R&D tax incentive

South Africa's R&D tax incentive has undergone various changes with a number of key policy steps being undertaken over the years as shown in the timeline below. The R&D tax incentive was first introduced in terms of section 11B of the Income Tax Act, which was replaced by section 11D in 2006. The incentive under section 11D provides a deduction of 150 % in respect of expenditure on eligible scientific or technological R&D undertaken by companies in South Africa. From 2006, companies could also claim accelerated depreciation on assets used for the purposes of scientific or technological R&D over three years at a rate of 50:30:20, starting from the year of assessment in which the asset was first used. This was a substantial shift from section 11B where operating expenses were limited to the same 100 % deduction available for all other expenditure and the depreciation allowance for capital R&D was 40:20:20:20.



At the time, consideration was given to ensure simplicity in the design of the programme, the management of risks, and the lowest possible costs in delivering the programme. It was also important for government to create certainty regarding the long-term availability of the incentive as a policy instrument to allow effective R&D planning by the private sector. Initially, two forms were required to claim the section 11D R&D incentive – one to SARS as the standard Income Tax Return Form with relevant entries for R&D and the other to the then DST for compliance purposes. R&D activities were approved by SARS after their completion.

During the period of this retrospective system, i.e. from 2 November 2006 to 30 September 2012, 1575 submissions were received. Under the retrospective system, R&D expenditure was not reported on a project basis and submissions to DSI set out R&D expenditure of the company in such a way that R&D projects could not be tracked.

In 2012, the ITA was amended to implement an R&D tax incentive pre-approval system. The reasons for this change related to concerns that eligibility uncertainty remained on the part of applicants, even though the R&D definition was broadened to cover as many industrial R&D activities as possible. Also, legitimate R&D activities would often be subject to unnecessary audit scrutiny from SARS, due to a lack of R&D expertise among SARS auditors who did not have the relevant scientific background. The definition of R&D was also revised to better reflect government's intention to incentivise activities that constitute technical and scientific R&D in a commercial sense (rather than routine upgrades or applications).

Further amendments have been made to section 11D of the ITA since 2012, and it is notable that the definition for R&D was amended in 2013 to clarify that the incentive is targeted at R&D expenditure that was unlikely to take place in the absence of the incentive. This was to encourage R&D expenditure that yields positive externalities for the economy, and to exclude R&D expenditure that relates to business as usual. In 2014, amendments were made to the definition of R&D to introduce the "innovative" requirement for functional designs as well as include multisource pharmaceutical products and clinical trials in the definition of R&D. The last amendment to s11D was made in 2016 in which s11D (20) was added to allow companies to catch up on their deductions (given the challenges experienced with administrative backlogs).

Unfortunately, teething problems existed with the pre-approval system due to large numbers of applications being received in the first couple of months of the pre-approval regime. By its very nature, under the pre-approval system, an application could comprise one or more R&D projects, each of

which needs to be assessed individually for eligibility. Whereas submissions under the retrospective system were received for compliance requirements only, 1,591 projects forming part of 182 applications were received during the first month of operation in October 2012. This created an instant backlog, the impact of which unfortunately countered the initial intentions of a process that should have provided certainty.

d. Observations from annual reports / secretariat

As indicated in Figure 5 below, 1,211 companies have participated in the R&D tax incentive during the period November 2006 to February 2021. 628 companies participated under the retrospective system while 907 companies participated under the pre-approval system. With an overlap in companies applying under both systems, the total number of participating companies is less than their sum. 1,666 pre-approval applications comprising 7,201 projects were received since 2012. 1,580 applications had been adjudicated by February 2021, with 33 still awaiting adjudication.

Figure 5: Applications and participating companies for R&D tax incentive from November 2006 to February 2021

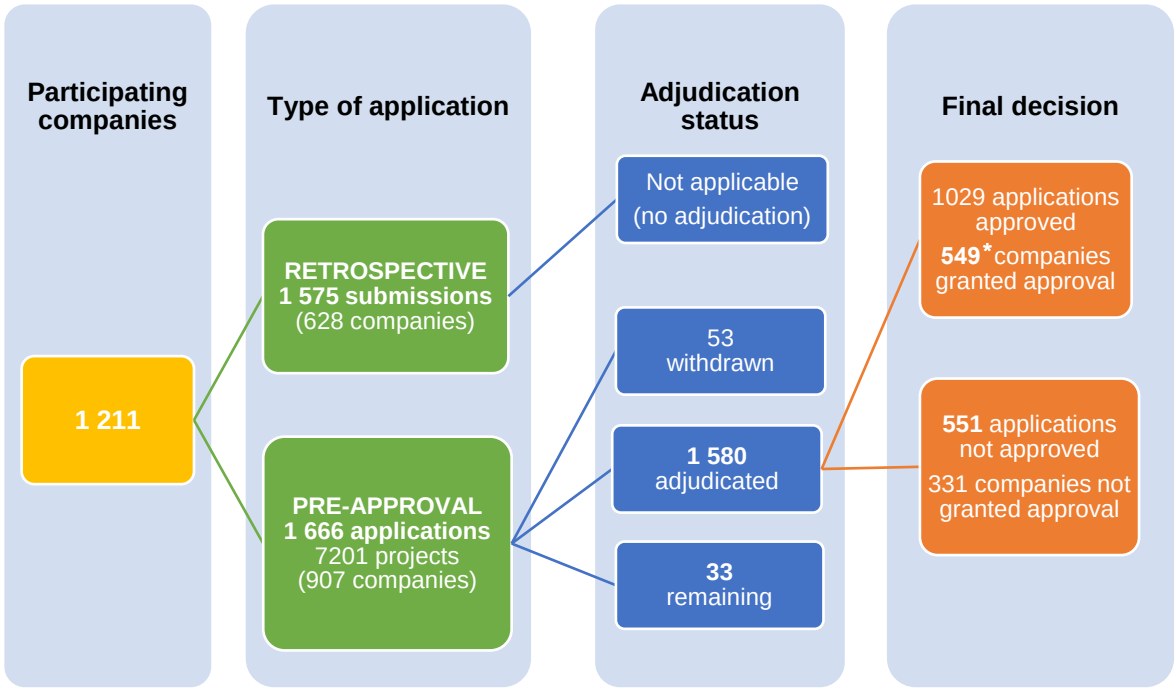
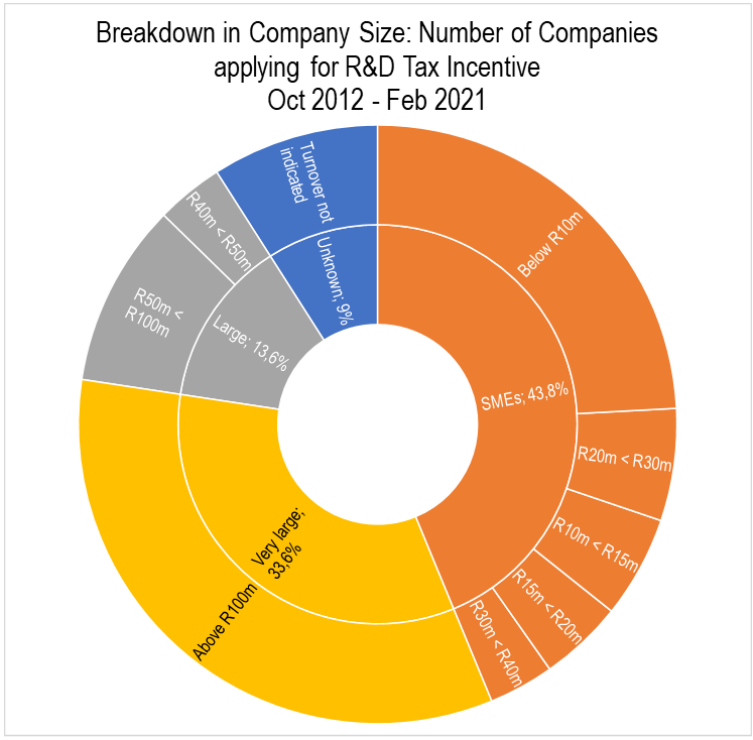
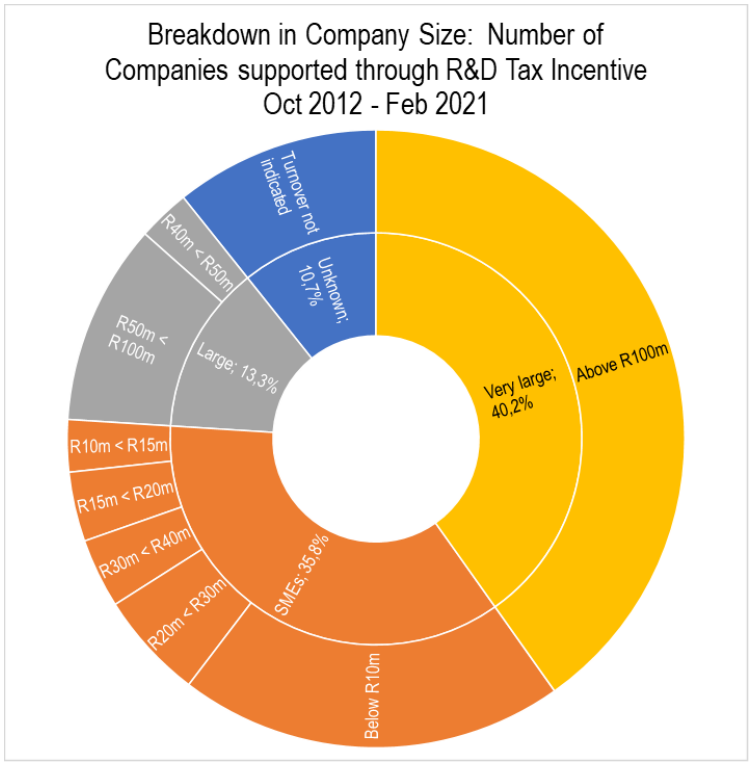


Figure 6 indicates that there are more very large companies, and less SME's, that receive support for their R&D expenditure through the incentive compared to those who have applied.

Figure 6: Uptake and support of number of companies participating in the R &D tax incentive in accordance with company size (October 2012 to February 2021)

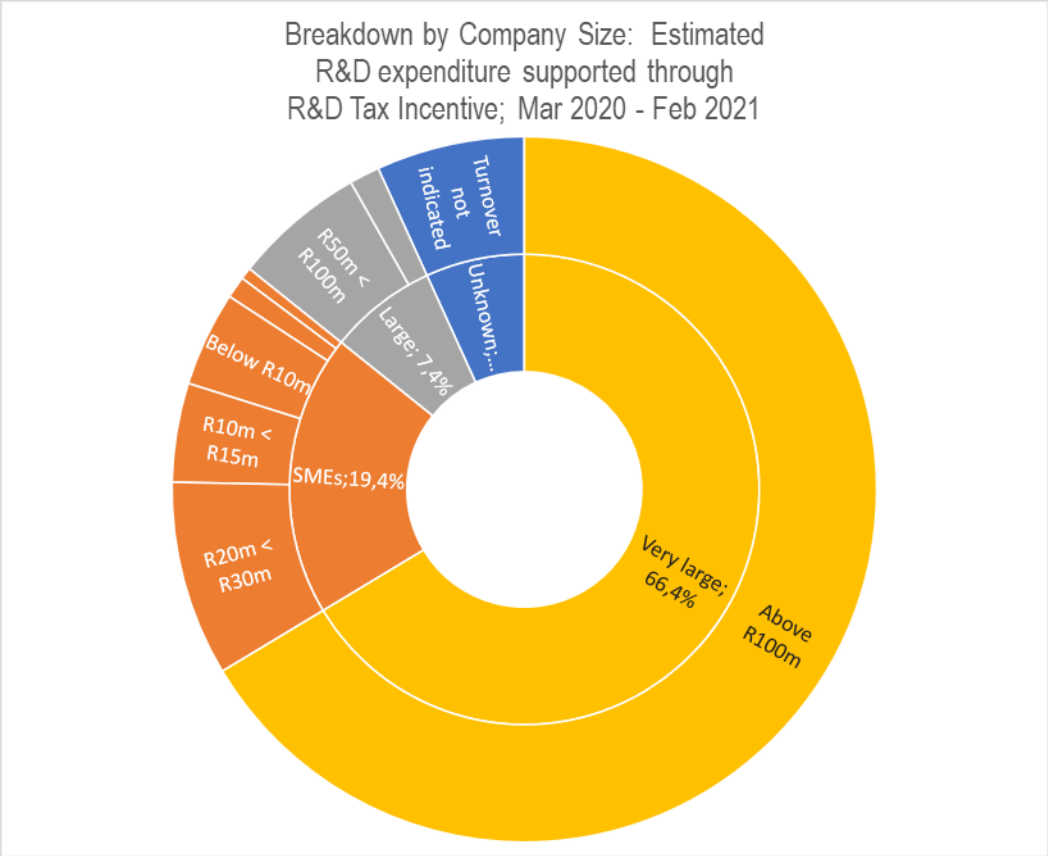




In line with international trends[xii], and trends of R&D expenditure from local studies[xiii], Figure 7 shows that the estimated R&D expenditure supported through the incentive is skewed towards very large companies. This is due to very large companies typically conducting larger and more expensive R&D projects that extend over many years. The data on estimated R&D supported shown in Figure 7 is obtained from pre-approval R&D tax applications submitted by companies. It is therefore possible that

actual tax expenditure may differ, due to differences in expenditure incurred, allowed, or status of projects.

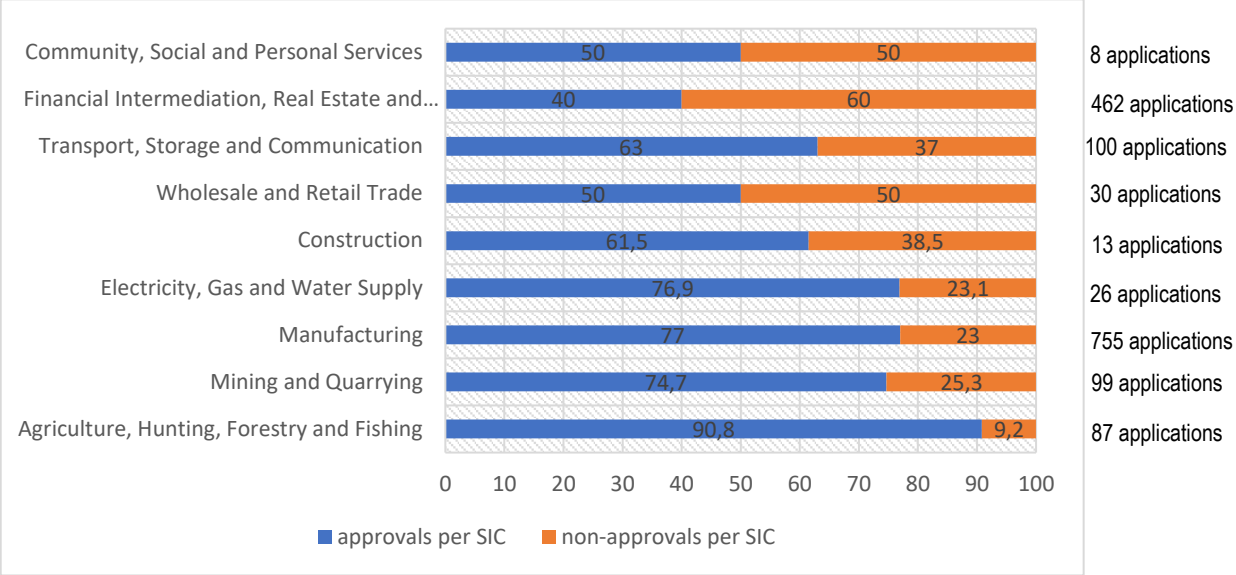
Figure 7: R&D expenditure supported through R&D tax incentive in accordance with company size (March 2020 to February 2021[1])



The National Treasury Budget Review (2021) estimated that the tax revenue foregone due to the R&D tax incentive for the period 2005/06 to 2018/19 was just below R5,7 billion. This figure represents the fiscal cost of deductions allowed by SARS on company claims for the indicated tax period and is revised annually, as companies submit their claims. The figure also includes the value of claims that have been made under section 11B of the Income Tax Act, which was used before November 2006.

[1]Complete and correct data is currently only available for the indicated period.

Figure 8: Breakdown of R&D tax incentive application approvals and non-approvals per industry sector (October 2012 to February 2021)



The breakdown between percentage approvals and non-approvals of R&D tax incentive applications per sector for the period October 2012 to February 2021 is shown in Figure 8. The two sectors i) manufacturing and ii) financial Intermediation, real estate and business services have the highest number of applications, but it is evident that far more applications in the manufacturing sector are approved than in financial Intermediation, real estate and business services.

e. Joint Government-Industry task team

In 2015, the Minister of Science and Technology established a joint Government-Industry task team to make recommendations related to the R&D tax incentive. The task team was formed by representatives of R&D-performing companies from different sectors, consulting firms, industry associations, relevant government departments and agencies, as well as academia and the policy research community. At the end of the review process 17 recommendations, mostly administrative in nature, were made by the task team, 14 of which have been implemented. (Reference Document C – Task Team Report 2016[xiv]).

Implemented recommendations related, amongst other things, simplifying the administrative process and improving turnaround times on final decision. Turnaround times were a significant teething problem of the pre-approval system as a backlog existed from its introduction. Other recommendations included the publication of a new version of guidelines to improve the information and guidance provided to applicants; and posting of updated and improved information about the R&D tax incentive on the DST website to enable taxpayers to find information and services on the website. A new and simpler application form was introduced and guidelines published, while DST officials continued to be available to meet with business and other stakeholders to raise awareness about the incentive and to provide relevant information on how the incentive works and what type of information is required when making an application. As mentioned above, an amendment was also made in 2016 to the ITA to enable eligible companies that were affected by the backlog to claim deductions in previous tax years.

A recommendation that the pre-approval system be reviewed was not accepted - the DST and NT decided to retain the pre-approval system to see how it operates when decisions are provided within 90 days of application. Section 2 of this Discussion Document includes discussions on some of the recommendations with greater policy implications, for example a refundable tax credit and ambiguities relating to "development of internal business processes" and the requirement that some R&D activities should be "innovative".

The final recommendation of the task team was for an Impact Evaluation to be conducted.

f. Findings from Impact Evaluation

An Impact Evaluation of the R&D tax incentive was completed by the World Bank during 2019. The Impact Evaluation focused on assessing the benefit or value of the R&D tax incentive in South Africa to inform policy decisions going forward. The study had four focus areas. Firstly, it was to produce descriptive statistics that provide an overview of categories of participating companies in terms of approvals and non-approvals. Secondly, the study was to assess whether the incentive has been successful in promoting R&D investment by companies (i.e. to determine additionality effects). Thirdly, the study was to assess the economic impact of the supported R&D in terms of firm-level innovation, outputs, employment, productivity and other outcomes expected of business sector R&D activities. Finally, the study was to provide recommendations, including how the monitoring of information at both the DSI and SARS could be improved.

The Impact Evaluation's descriptive analysis showed patterns similar to those presented in the R&D tax incentive programme's annual reports, but in a more consolidated format. For instance, the majority of applications (almost 80%) are for projects in manufacturing and business services (including financial intermediation) sectors. The proportion of applications that are approved or partially-approved is much lower for the business services sector. Half of all applications are from companies with a total revenue (in 2016 prices) of R50 million or more; and in the earlier years of the pre-approval system, larger companies were more likely to have approved applications than smaller companies. In later years, the share of smaller companies gaining approval has increased.

The evaluation revealed some evidence that the incentive has increased R&D spending by companies. However, it must be emphasised that this finding was based on a very limited set of data. The World Bank sought to compare companies that received approval for the incentive and companies that did not receive approval, but had roughly similar characteristics. This procedure could only match 18 treatment companies (companies that received approval for the incentive) and 14 control companies (companies that did not receive approval) in the manufacturing and business services sectors. This sample is too small to draw any definitive conclusions from. For this specific group of companies, the evaluation revealed that the incentive more than doubled R&D spending – i.e. in addition to the R1.7 million the companies would likely have spent (on average) without the incentive, it increased spending on R&D by a further approximately R1.7 million on average (in 2017). While this is promising, it cannot be assumed that the results would be the same for all companies.

The evaluation also revealed that the incentive may have increased the remuneration of R&D employees in beneficiary companies, which is an unintended outcome. This may indicate that beneficiary companies could have been outbidding their rivals for available skills in the market given that the majority of the companies that responded to the survey believed that skills were a constraint to R&D in South Africa.

Beneficiary companies were less likely to regard government, labour and other regulation as a constraint to R&D, perhaps because these regulations would be less of a financial burden/risk, taking

the financial benefit of the incentive into account. There were no statistically significant effects of the incentive for any of the other outcomes measured in the survey, namely innovation, economic growth and employment.

As part of the obligations in receiving the R&D tax incentive, applicants are required to submit annual progress reports. The evaluation highlighted that there has been poor compliance by companies with respect to submitting these progress reports – less than a third of companies had submitted progress reports. This could be due to frustrations with prior backlogs. However, the submission of progress reports is important to ensure monitoring and evaluation of the incentive. From the group of companies that did submit progress reports, the majority of these companies (95%) believed that the incentive increased their competitiveness and market share.

Specific limitations constrained the World Bank in conducting the Impact Evaluation – preventing them from making conclusive recommendations. While SARS' firm-level data pertaining to the claims made by the R&D tax incentive beneficiary companies is available, it is not currently possible to match the SARS data with the DSI data. It is therefore not possible to tell whether a company whose project(s) were approved for the R&D tax incentive by the adjudication committee was able to deduct the eligible expenditure. This is because (i) the current legislation does not allow for it, and (ii) there are confidentiality concerns. It was also not possible to assess the technology profile of the companies within sectors (i.e. high, medium and low technology) using the incentive's administrative data available at the DSI. Data gaps exist with respect to outputs of R&D, employment, and other firm-level effects, partly because of gaps in the information requested in the application and progress report forms and partly because of poor compliance among beneficiary companies to the requirement for submitting progress reports, as mentioned above.

In summary, the Impact Evaluation study recommended the following:

- Streamlining of the application process – further reducing the administrative burden for companies, particularly for start-ups and small and medium enterprises (SMEs); and allowing companies with long-term R&D programmes to make once off submissions and therefore just submit additional projects which still form part of a portfolio.
- Digitising the application process – introducing an online submission system for submitting applications and progress reports; automating status updates and notification to companies and their representatives; and automating pre-defined administrative dashboard reports.
- Introducing scoring tools into the application process focusing on additionality to complement the eligibility criteria for the incentive.
- Introducing measures to increase compliance with progress reporting – requiring companies to submit progress reports for each project prior to rolling over the incentive for multi-year projects and/or accepting new applications for other projects.
- Strengthening systems for monitoring and evaluation (M&E) – helping with undertaking future impact evaluations, by ensuring that application forms and progress reports capture key indicators relevant for future M&E and also ensuring the system is programmed to estimate the effects of the incentive at regular intervals. Ideally, this should be done together with other government departments responsible for administering business incentives in order to have a holistic picture on the role of incentives.
- Introducing data sharing mechanism with SARS - facilitating sharing anonymised data at firm level that would enable better estimates of the impact of the programme (including spillovers).

The DSI is currently in the process of developing a new online tax incentive system. This system would address the recommendations of streamlining and digitising the application process. The system should provide easier help functionality and should be easier to use. It will also assist companies in providing project progress information, and assist the DSI to introduce measures to increase compliance with such reporting. Ultimately, this will strengthen the ability to monitor and evaluate the incentive system and hopefully make data sharing with SARS more of a reality.

At this stage, as the current policy review has taken preference, scoring tools have not been investigated in sufficient detail.

g. Findings from Synthesis Report

As mentioned, an internal Synthesis Analysis was initiated by DSI (with oversight by NT) to address additional questions about the value and contribution of the South African R&D tax incentive, as well as in consideration of the new policy context. It was conducted by the DSI and considered South African research and studies with empirical analysis of direct implication to the South African R&D tax incentive and also international studies on tax incentive regimes.

Local:

Three recent studies using the NT-SARS panel dataset of about 200,000 South African companies concluded that the South African R&D tax incentive has a positive impact on R&D spending by companies.

James S. (2017)[xv], in a paper commissioned by the Davis Tax Commission, estimated that companies benefiting from the incentive spend an additional R4 million on R&D compared to those who conducted R&D but did not benefit from the incentive. This study also found that for every one rand of tax revenue foregone, companies spent an additional R1.83 on R&D. The impact was found to vary by sectors, with a higher positive impact found in sectors such as Aircraft and Ships, Pharmaceutical, Computers and Services.

Tregenna et.al (2020)[xvi] focused on the South African manufacturing sector for the period 2010 to 2017 and found positive and significant effects associated with the R&D tax incentive, in that companies that received the R&D tax allowance increased in-house R&D investment in terms of expenditure and intensity. R&D tax allowances for companies also reduced technology in-licensing.

Kreuser and Newman (2018)[xvii], using the NT-SARS panel dataset for the period2010 – 2013, found a positive and significant correlation between R&D expenditure and productivity, as well as a positive correlation between R&D tax allowances and total factor productivity, even after controlling for actual R&D expenditure. This implies companies which have received the R&D tax incentive are more productive.

Apart from additional R&D spending, on average, large companies dominate the R&D space and companies which invest in R&D employ nearly nine times as much labour compared to non-R&D active companies.[xviii]

Assessing the true impact of R&D tax incentive is complicated as it is but one instrument used for incentivising and stimulating R&D within South Africa. In general, studies tend not to look at the impact of R&D tax incentives on innovation, *per se*. This is as it is methodologically more difficult to assess innovation: both due to data gaps and the fact that R&D output takes longer to materialise.

There are some important points about the structure of business R&D spending in South Africa drawn from studies the DSI reviewed:

- A small number of large companies are the biggest contributors to BERD in South Africa. Only a small number of companies (about 1 885 companies in 2011 and 1 670 in 2012) reported positive values of R&D expenditure in their income statements over the period 2009 to 2014.[xix] A large number of companies reported R&D expenditure of less than R1 million. Companies spending more than R40 million on R&D drive business R&D spending in South Africa. This type of concentration of BERD is not unique to South Africa. Large companies in R&D driven industries perform most of the R&D in several other economies.[xx]

- The bulk of the R&D-active companies are older and larger (in terms of gross sales and/or the number of employees) and are more likely to be in the business services and manufacturing subsectors.[xxi]

- Most R&D-active companies in South Africa allocate a relatively small share of resources to R&D expenditure (i.e. their R&D intensity is very low), compared to companies in OECD countries.[xxii]

- Persistence of regular R&D expenditure is weak. The SARS-NT data reveals that nearly a third of R&D-active companies reported positive R&D expenditure values in only one financial year over the period 2009 to 2014. The R&D Survey data shows that of the 1 437 companies in the sample, only 10% (144) of companies persistently conducted R&D throughout the 10-year period and 61 out of 144 (42%) are the largest contributors of BERD (exceeding R20 million for 10 or more consecutive years.[xxiii]

- There is considerable attrition in R&D active companies. About 74% of the companies that appeared in the 2006 R&D Survey had left the R&D system by 2016. The number of exits showed an average loss of 60% across all BERD investment with the period.

- The proportion of BERD contribution to GERD has been declining over the years. This is partly due to an increased contribution of the higher education sector to R&D. Data on BERD also shows a weak recovery of BERD since the slack in 2009-2011 period of the global economic crisis. The impact of COVID19 on BERD is yet to be known, but is expected to be severe. (See Figures 2 to 4 above.)

- Low prevalence, persistence and intensity of R&D expenditure among South African manufacturing companies confirm that developing countries generally invest much less in R&D as a share of GDP than developed countries.

The high number of exits from the R&D system justifies the need for continued public support for R&D to help retain companies in the R&D system. Modifications in the design of public R&D support instruments like the R&D tax incentive may also be necessary to attract and encourage companies to invest in R&D for longer periods. However, as stated at the outset, a tax incentive cannot be effective on its own. A strong policy "eco-system" is required that provides support (monetary and otherwise) from the R&D phase through to commercialisation. This is necessary as SMEs often struggle to finance their R&D projects externally because of uncertain outcomes and long-time spans attached to R&D projects which make them farther away from commercialisation. Lack of adequate support from government forces companies to decide between risking the limited funds by conducting R&D at a lower scale or suspend or abandon R&D projects that they would have invested in if sufficient funds were available. This results in SMEs investing less in R&D or even struggling to survive beyond the first year, which in turn results in low investment in R&D in the economy.

The National Advisory Council on Innovation (NACI) published a Review of the National Research and Development Strategy (NRDS) and Ten-Year Innovation Plan (TYIP) in May 2020. This review included

an assessment of the R&D tax incentive, with the reviewers recommending the DSI **not** to relinquish the R&D tax incentive, but rather to work much harder to improve the impact of the incentive over the next period. This is particularly due to an assessment by the particular reviewers that raising new revenue from a highly constrained fiscus will not be easy when funds for many socio-economic programmes are being reduced.

h. International

In general, the results of South African studies are in line with those of international study outcomes[xxiv], which show a positive effect of R&D tax incentives. Country-specific studies confirm that R&D tax incentives have led to increased R&D spending for companies.

Appelt et al. (2020)[xxv], using firm-level data covering 20 OECD countries, found that, overall, R&D tax incentives are effective in boosting business R&D. The report focused on R&D input additionality, i.e. the effectiveness of R&D tax incentives in encouraging additional business R&D investment compared to a counterfactual scenario in which no support is provided. The study covered the period 2000-2017 and found that one extra unit of R&D tax support translates into 1.4 additional units of R&D (gross incrementality ratio of 1.4). It is interesting to note that the study also found lower input additionality (incrementality ratio of 0.3) for firms in highly R&D intensive industries such as pharmaceuticals, computer manufacturing and basic R&D. In addition, the study findings suggest that R&D tax incentives also encourage additional business R&D both at the intensive and extensive margin (i.e. existing firms increased their R&D expenditure and other firms also started doing R&D). The findings also suggest tax incentives are effective in encouraging R&D projects that will immediately result in new goods or services while government grants are better suited for basic research.

Guceri and Liu (2019)[xxvi], used the UK corporation tax returns data and a difference-in-differences strategy to study the effectiveness of the UK tax incentive. To estimate the effect of R&D tax incentives the study took advantage of the 2008 UK policy reform which changed the composition of companies that became eligible for an R&D tax credit. The definition of SMEs was expanded resulting in a number of previously large companies qualifying as SMEs and thus eligible for more generous deduction rates. The study found that a 10 % reduction in the user cost of R&D induced medium sized firms to increase R&D spending by 20 % relative to the group of larger companies without the additional benefits. In addition, the study estimated that for each pound revenue foregone due to R&D tax incentive would generate between £1.30 (company paying at the main rate of 28 percent) and £0.8 (company paying lower rate of 21 percent) of additional qualifying R&D.

Rao (2016)[xxvii], using administrative tax data, looked at the impact of US tax credits on R&D (but not other firm outcomes). The study found that a 10 percent drop in the user cost of R&D resulted in firms increasing their R&D intensity signified by a short-run increase of around 19.8 % measured as a ratio of R&D spending to sales. In terms of the value for money, they estimate that $1(US dollar) of tax credit generates around $1.80 (US dollar) of R&D.

International studies, especially those of the OECD, provide a useful overview of the different design criteria of tax incentive. Although we discuss some of the design criteria in more detail in Section 2, the following paragraphs set out main categories of design and their impact:

Volume-based incentives provide a tax allowance that is based on the volume of R&D undertaken. In contrast, incremental tax incentives make use of a threshold, i.e. companies need to spend a certain minimum amount on R&D before the incentive kicks in. Hybrid systems are a combination of the volume-based and incremental systems. Korea, Portugal and Spain offer hybrid systems comprising both a volume and incremental tax credit while the Czech Republic and Slovak Republic have hybrid

systems comprising a volume tax credit and allowance. In Korea, for example, its R&D tax credit generally equals the greater of either 1) the volume-based tax off-set, or the 2) incremental tax off-set. Having regard to this, there is evidence that a hybrid design approach provides the strongest positive effect for incentives[xxviii], followed by volume-based incentives (such as South Africa). Incremental incentives have been found to be costlier to apply for and to administer as they encourage companies to introduce a cycle into R&D spending to maximize benefits of credit.

Carla (2019)[xxix] indicated that enhanced allowances (which reduces taxable income of a company, such as the South African tax incentive) seem to have on average lower incentive effects in comparison to tax credits (which directly reduce the amount of tax to be paid, i.e. a tax credit is deducted from tax payable by a company). Also, higher incentive effects are seen for immediate cash refunds compared to carry-over or no refundability provisions.

Ultimately, the design and implementation of R&D tax incentive schemes are crucial to ensure their effectiveness, as companies are likely to respond differently to varying aspects of R&D tax policy. It is evident that several factors have implications on the measured effect of any incentive. For instance, in terms of implementation, the following questions may be relevant. How long has the programme been in place? What is the structure of the business R&D in an economy? What are the factors enabling or hampering business R&D? Is there appropriate firm-level data to evaluate the programme? How effective is the programme administration?

Age and duration of an incentive programme also influences the level of uptake (or participation rates) by companies. More years of operation of an incentive programme could make it easier to draw on experiences of programme administrative officials and participating companies with respect to what is working and what is not working.

4. Reviewing the current policy design

Any government programme that makes use of taxpayer funds should be reviewed periodically and improved, if necessary. This is pertinent for the R&D tax incentive programme and the associated processes and systems that support it. In considering whether the R&D tax incentive programme should be extended beyond October 2022, the DSI and NT should consider whether improvements are required, and reflect on previous recommendations made by our stakeholders. Our stakeholders' inputs are always needed and welcomed.

In considering future policy decisions regarding the South African R&D tax incentive programme, the design characteristics should be reviewed against best practice internationally and in light of the South African economic context. The following two sections provide an overview of various design aspects of the incentive. In this section, there is a focus on key design characteristics which may need amendment in the short term, the characteristics relating to both policy design and administrative issues.

At a minimum, we request business and any other interested parties to provide their thoughts and comments in response to the specific questions posed in an **online survey consisting of 16 questions covering both policy and administrative issues. The online survey is available here.**

In section 5, other design characteristics are discussed in relation to government's present stance.

Policy Issues

a. Definition of R&D

Section 11D(1) of the ITA sets out a definition for "research and development" in order for activities to be eligible in terms of the R&D tax incentive. R&D in terms of this section is defined as follows:

"research and development" means systematic investigative or systematic experimental activities of which the result is uncertain for the purpose of—

(a) discovering non-obvious scientific or technological knowledge;
(b) creating or developing—
  (i) an invention as defined in section 2 of the Patents Act;
  (ii) a functional design—
    (*aa*) as defined in section 1 of the Designs Act, capable of qualifying for registration under section 14 of that Act; and
    (bb) that is innovative in respect of the functional characteristics or intended uses of that functional design;
  (iii) a computer program as defined in section 1 of the Copyright Act which is of an innovative nature; or
  (iv) knowledge essential to the use of the abovementioned invention, functional design or computer program (but not including creating or developing operating manuals or instruction manuals or documents of a similar nature intended to be utilised in respect of the mentioned invention, functional design or computer program after the R&D has been completed); or
(c) making a significant and innovative improvement to any invention, functional design, computer program or knowledge mentioned above for the purposes of—
  (i) new or improved function;

(ii) improvement of performance;
(iii) improvement of reliability; or
(iv) improvement of quality,

of that invention, functional design, computer program or knowledge;

(d) creating or developing a multisource pharmaceutical product (as defined in the World Health Organisation Technical Report Series, No. 937, 2006 Annex 7 Multisource (generic) pharmaceutical products: guidelines on registration requirements to establish interchangeability issued by the World Health Organisation, conforming to such requirements as must be prescribed by regulations made by the Minister after consultation with the Minister for Science and Technology; or

(e) conducting a clinical trial as defined in Appendix F of the Guidelines for good practice in the conduct of clinical trials with human participants in South Africa issued by the Department of Health (2006), conforming to such requirements as must be prescribed by regulations made by the Minister after consultation with the Minister for Science and Technology.

Provided that for the purposes of this definition, research and development does not include activities for the purpose of—

(a) routine testing, analysis, collection of information or quality control in the normal course of business;

(b) development of internal business processes unless those internal business processes are mainly intended for sale or for granting the use or right of use or permission to use thereof to persons who are not connected persons in relation to the person carrying on that research and development;

(c) market research, market testing or sales promotion;

(d) social science research, including the arts and humanities;

(e) oil and gas or mineral exploration or prospecting except research and development carried on to develop technology used for that exploration or prospecting;

(f) the creation or development of financial instruments or financial products;

(g) the creation or enhancement of trademarks or goodwill; or

(h) any expenditure contemplated in section 11 (gB) or (gC).

It is to be accepted that the R&D that qualifies under section 11D relates to scientific or technological R&D.

The incentive aims to increase the knowledge base of companies, enabling them to develop new products and processes, and improve on them, which potentially results in spillovers that assist in growing the economy. It is important to acknowledge that it is not the objective of this incentive to support innovations not based on scientific or technological R&D, nor is the incentive to help with the incubation of new start-ups *per se*. Other government programs aim to address these aspects and related funding gaps. Rather, the R&D tax incentive aims to incentivise companies to conduct R&D themselves, and particularly, to conduct R&D in addition to the R&D that they are currently doing or would have done.

When evaluating R&D for application or adjudication purposes, it has to be considered (in simplified form) whether the R&D activity is:

- systematic investigative or systematic experimental;
- has an uncertain outcome;

- for the purpose of:
    - generating non-obvious knowledge,
    - creating or developing an invention (which is new and inventive and has industrial applicability), a functional design (which is new and not-commonplace and has an innovative character), computer program (innovative in nature), or improving on such creations/knowledge, all or some of which that can be patented, licensed or sold to others, used to create a new or improved product or service for sale to consumers, or other businesses
    - clinical trial
    - multipurpose pharmaceutical.

This various purpose test in the definition requires not only an understanding of R&D but also an understanding of various forms of IP, and associated IP characteristics, such as novelty, non-obviousness and innovativeness.

According to the Frascati Manual (2015) – which provides an internationally recognised methodology for collecting and using R&D statistics – R&D covers three (3) types of activity: basic research, applied research and experimental development[xxx].

R&D activity can be distinguished from a non-R&D activity when five core criteria are met; i.e. the activity must be novel, creative, uncertain, systematic and transferable and/or reproducible[xxxi].

Annexure B shows a comparison table between the R&D definitions for R&D tax incentives of a number of countries (including the United States of America, the United Kingdom, New Zealand, Germany, Canada, Ireland and Australia, to name but a few). Most countries' definitions require that R&D should relate to science and technology, whether activities should be in the field of science or technology or whether there should be a scientific or technological uncertainty. Most of these countries also specify that activities should be systematic (Frascati systematic requirement), have uncertainty as to the result (Frascati uncertainty requirement) and produce new knowledge or new or improved processes, services or goods (Frascati novelty requirement and transferability/reproducibility).

b. Innovation

The introduction of an "innovative" requirement in the definition of R&D – whether that a functional design should be innovative in respect of the functional characteristics or intended uses, or that a computer program should have an innovative nature, or that improvements should be significant and innovative – was intended to raise the bar in terms of the type of R&D activities to be incentivised. However, it has led to unintended consequences and complexity for all parties. This is due to the interpretation and implementation of the innovative criteria alongside intellectual property (IP) statutes, i.e. the Designs Act and Copyright Act. It is notable that the concept of novelty (i.e. newness), which is embedded in the standard definition of innovation[xxxii], is also a requirement of IP law. Imposing an innovative requirement on a functional design, in addition to its statutory definition, which is that it must be new, not commonplace and be intended to be multiplied by an industrial process, appears to be unnecessary, difficult to interpret and possibly confusing. Without additional direction through a definition or regulations, the requirement of "innovative" could also be too subjective.

Government recognises that while R&D can be part of an innovative activity, innovation can happen without R&D. For example, innovation can be conducting activities to develop something new without resolving any scientific or technological uncertainty, or without there being a scientific or

technological advancement. For example, adding wheels to a suitcase is considered an innovation, but it required no research and development to achieve. Government is seeking to incentivise activities aimed at resolving a scientific or technological uncertainty, through a systematic investigative or systematic experimental process, and not innovation on its own, even though the two are often linked. Removing the innovative requirement from the definition of R&D will not water it down. Only R&D activities that result in new knowledge or (new) inventions (processes or products) will pass a strict novelty requirement, while scientific or technological uncertainty in respect of a result would further ensure that the definition of R&D for the purpose of the incentive keeps the bar high enough.

c. Internal business processes exclusion

It is common for countries to exclude certain activities from an R&D tax incentive. These excluded activities are either considered "business as usual" and do not address any scientific or technological uncertainty, or may relate to activities with scientific or technological uncertainty that are excluded from the incentive by design.

South Africa's R&D tax incentive includes a list of activities that are ineligible for the tax incentive as set out above under s11(D)(1) "Definition of R&D". The ineligible activities extend to internal business processes that could be relevant to a range of sectors: from software development to manufacturing.

Business processes refers to an array of business activities, from the transformation of inputs into goods or services, to management or administrative activities. Business processes are considered internal if they are for internal use only and external if there is a product intended for sale or licence to other companies.

The Explanatory Memorandum (EM) on the Revenue Laws Amendment Bill, 2006[xxxiii] clarified that routine learning associated with the management or enhancement of internal business processes will not be eligible for the incentive. SARS Interpretation Note 50 (28 August 2009)[xxxiv] further clarified that this exclusion was especially relevant to computer programs. The Note states that "*software packages developed for administration, human resources or accounting purposes are similarly excluded from the tax-incentive scheme as they constitute management or internal business processes".*

The Explanatory Memorandum (EM) on the Taxation Laws Amendment Bill, 2011[xxxv] made it clear that this exclusion applies to all business processes developed solely for internal use.

Based on the adjudication of multiple applications and on feedback previously received, it is apparent that activities considered to be internal business processes that are directed towards resolving scientific or technological uncertainty may be excluded, and that such exclusions can have unintended consequences in terms of the incentive.

The following examples reflect how the current interpretation of internal business process exclusion can disqualify certain activities:

Example: Telecommunications

A telecoms company would like to determine if evolutionary algorithms, such as genetic algorithms (GA), may improve its ability to design cost effective networks, extend existing networks, and optimise the routing of call traffic. The company is the first to explore the use of evolutionary and new algorithms for call routing. It develops and tests new genetic algorithms and develops a pilot system that it can test on its existing networks.

These activities will fall within the current internal business process exclusion as the pilot system is not intended for sale, lease or license, and will therefore not be deemed legitimate R&D. However,

the pilot system will have a direct impact on the services provided by the telecommunication company.

Example: Encryption Software

A company wants to protect sensitive client information and internal documents without building a public key infrastructure. The company wants to implement a new, highly secure encryption algorithm, known as the Randel algorithm, using its bitwise function to achieve stronger encryption. While security professionals estimate that such encryption may work for 128 bit key size, the company aims to make it work for 256 bit key size.

These activities will not be considered R&D as it is an internal business process not for sale, lease or license. Again, these activities will have a direct impact on the services provided by the company.

Example: Mining Conveyor Belt

A coal mining company uses conveyor belts to transfer mined coal from dump trucks to the coal processing plant. The company routinely experiences unscheduled disruptions in mining operations due to the conveyor belt malfunction, causing severe production losses. The company decides to develop X-Ray diffraction technology (typically used in health care industries) in the detection of wear and tear on a conveyor. Given the speed at which the belt runs, new diffraction techniques would be required.

Again, these activities will not be considered R&D as it would be deemed an internal business process not for sale, lease or license, even though the X-Ray machine would have an impact on the company operations.

An international comparison shows that a broad exclusion for internal business processes is not standard for countries. Those countries with a restriction tend to limit the exclusion to software. Although the USA allows internal-use software, it has a more stringent R&D eligibility test for such internal-use software than the test for external-use software[xxxvi]. Australia has an excluded activity for developing, modifying or customising computer software for internal *administration*, where the computer software is for the dominant purpose of use by such developer, an entity connected to the developer or an affiliate of the developer. New Zealand excludes internal software development undertaken for the purpose of *internal administration* from its R&D tax credit while other internal software development cost is capped. Internal administration is identified as systems for payroll, accounting, executive or management information, human resources, enterprise resource planning, purchasing, invoicing, and inventory.

d. Software development and computer programmes

Research indicates that many countries struggle to draw the line between R&D and other innovation activities. This is specifically true insofar as a delineation is to be made between R&D and “non-R&D” activities in the software development industry. To address this difficulty, countries often publish detailed guidelines and examples to assist applicants with better understanding the particular country’s interpretation on the subject. Ultimately, it should be appreciated that clarity is more likely to be found in explanations and examples, rather than a few words in a definition in the Act.

Software development is the process of understanding and enumerating requirements for a particular program into a specification, translating those specifications into instructions for the computer, testing to make sure that specifications and their translations are correct, and documenting and maintaining this "program" as people using it request modifications.

It is important to note that, in general, not all software development activities are deemed R&D activities. Instead, only some software development activities that culminate in computer programs will qualify as R&D. In the South African context, only those software development activities that are systematic investigative or systematic experimental of which the result is uncertain may be eligible. These types of systematic investigative/experimental development activities that exist under the R&D umbrella should not be confused with high-level product development and pre-production development. Both of these types of development may have stages, such as experimental development, that could form part of R&D if it is systematic and the result is uncertain, but product development *per se* is not by definition the same as experimental development, and therefore not R&D.

As alluded to above, the question is often whether a professional in the field (i.e. a software developer) with appropriate knowledge and skills, and having access to publicly available information, would conclude that software development can successfully be done. If the answer is yes and no systematic investigative or systematic experimental activities with scientific or technological uncertain results are required, it is unlikely that developing this computer program would be deemed R&D. Use of existing software for a new application or purpose does not, by itself, constitute a technological or scientific advance, and is therefore generally excluded. Also excluded is the creation of a computer program using known methods of existing software tools.

The OECD Frascati Manual states that "for software development to be classified as R&D, its completion must be dependent on the development of a scientific and/or technological advance, and the *aim* of the project must be the *systematic resolution of a scientific and/or technological uncertainty*".

The degree of technological uncertainty associated with bridging knowledge gaps, tends to differ from one software project to another. As mentioned above, some countries such as the US, New Zealand and Australia impose limitations on software development activities, specifically internal-use software or internal software for internal administration.

Administrative Issues

e. Progress reports

Any evaluation of a tax incentive is only as good as the available data. DSI does not possess all of the requisite data for the R&D tax incentive. Where data is available, it is housed at both DSI and SARS (NT has access to anonymised SARS records). Databases cannot be matched and secrecy provisions may restrict access to such data. Given these challenges, progress reports form an integral part of the evaluation process. The ITA requires that progress reports be submitted annually. These reports document the progress of the approved R&D project considering that approval is granted at the start of the project. Progress reports also provide relevant data to measure the impact of the incentive. To address the poor compliance with respect to submitting progress reports, DSI intends in future to withdraw approval for those companies that have failed to comply with the reporting requirements set out under section 11D. DSI is also considering introducing interim progress reports to be completed on an annual basis, and a final comprehensive progress report at the end of the project.

f. Transparency

A transparent tax system supports good governance and ensures that the integrity of the tax incentive scheme is maintained. The methods to achieve greater transparency of tax incentives include reporting on tax expenditures and publishing a list of tax incentive beneficiaries. NT currently

publishes tax expenditure reports in its annual Budget Review. In future, NT aims to expand this report by breaking tax expenditure down by sectors. This could be extended further by listing the names of the companies that benefit from these tax expenditures. Currently, taxpayer-specific information is protected by secrecy provisions, which limits the publication of R&D tax incentive beneficiaries. Certain government departments already publish a list of beneficiaries, for example DTIC under the Section 12I Tax Allowance Incentive. Extending the publication of beneficiaries to other tax incentives would promote greater transparency and accountability on how government funds are being allocated.

5. Other issues

As mentioned, this section provides an overview of government's present stance on certain design characteristics. These design characteristics have not been identified as key, and associated amendments are unlikely at this stage.

Policy issues

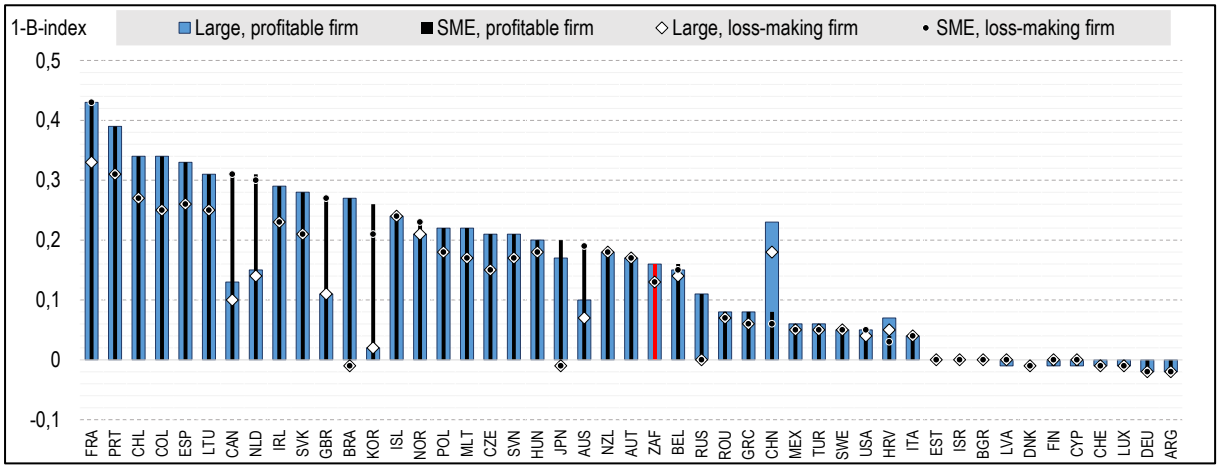
a. R&D tax incentive subsidy rate & percentage

Figure 9 below shows South Africa's tax subsidy rate (as the 1-B-Index) in comparison with OECD countries. The 1-B Index shows the relative generosity of tax systems for R&D investment. Differences in design account for the variation in the expected generosity of tax relief per additional unit of R&D investment.

Prior to introducing the R&D tax incentive in 2006, South Africa had a negative marginal tax subsidy rate for any R&D investing companies. This improved to a positive marginal tax subsidy rate following the introduction of the incentive. Since 2006, the rate has been stable with 1-B Index of between 0.10 and 0.15, with the current rate being 0.15. Research dating to 2017 shows that on average, the European subsidy rate is 0.12, which is lower than South Africa's. One study also indicates that subsidy rates in excess of 25% should give rise to concerns around excessive subsidisation - at these rates the costs of intervention could easily exceed the benefits.

The South African R&D tax incentive rate is 150% - which applies across all eligible companies, irrespective of their corporate tax rate. At a corporate tax rate of 28%, a saving of 14c of every rand spent on R&D can occur. However, as small business corporations (SBC) in terms of tax legislation have lower corporate tax rates, the benefit accruing to them through the incentive is therefore less.

Figure 9: 1-B-Index: Tax subsidy rates on R&D expenditures, 2019



Source: OECD

As can be seen from Figure 9, a number of countries provides more generous tax systems for R&D investments to SMEs – notably Canada (CAN), the Netherlands (NLD), Great Britain (GBR), Korea (KOR), Norway (NOR) and Australia (AUS). This is in line with various measures (more discussed below) used by countries to provide more support to SMEs, young companies or start-ups. In contract, the tax systems for R&D investments of China (CHN) and Croatia (HRV) appear to favour large companies. Loss-making firms, both SME's and large, of many countries typically do not get the same benefit from R&D investment tax systems as profitable firms (see here PRT, CHL, COL, ESP, POL, MLT CZE to name but a few).

Research indicates that targeting young innovative companies (even more than SMEs in general) for R&D tax incentive programmes is good practice, resulting in a stronger impact. Globally, smaller companies tend to be more responsive to R&D tax incentives than larger companies. Although South Africa provides no preferential treatment to SMEs, young companies or start-ups, this has been debated at length in government. There are a few considerations in the South African context. The first is the wider policy context and whether a tax incentive of this nature would be the driving factor for SMEs to increase their spending on R&D. The most commonly stated rationale for lack of R&D spending and activity in the SME space is a lack of access to credit or cash availability. Introducing a preferential rate for SMEs is unlikely to solve this problem as it will not increase upfront access to cash or credit. For this reason, many advocate for refundable tax credits.

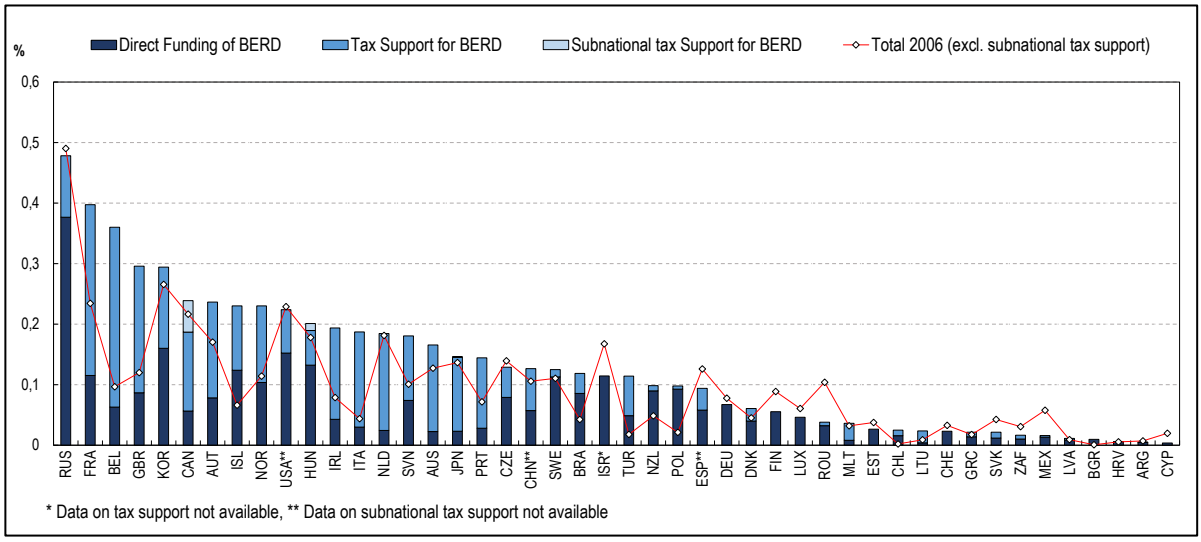
Various reasons exist why South Africa has not followed the route of providing refundable tax credits to SMEs. In addition to the wider policy context playing a role, the first is fiscal affordability – many basic service and infrastructure budgets have recently been cut in light of fiscal constraints. It would be difficult to find a compelling argument to extend the fiscal envelope for this type of incentive. The second is that a refundable tax credit is akin to a government grant – government would rather make use of a government grant, which has a budgetary ceiling, than a refundable tax credit. The third is that targeting is a notoriously difficult objective to achieve in tax policy design. For example, if you try to encourage young firms to participate in R&D, there is a risk that companies will restart just to be eligible for this type of incentive.

Notwithstanding the rate of support, it can be seen from Figure 10 that aggregated South African government support (including incentives and grants) for business R&D is very low. Many of the countries that spend more have more fiscal means to do so. This also emphasizes the importance of

non-monetary government support and how important it is for government to focus efforts on education, skills and training, ease of starting a business, etc.

Aggregated government support could be raised in terms of the R&D tax incentive, if more companies conduct R&D in South Africa, and if more companies that conduct R&D in South Africa participate in the R&D tax incentive. Government is keen to see more R&D activities happening in South Africa and understands that there may be prohibiting factors. The following questions seek to understand the primary drivers behind business' hesitance to invest in R&D. It is understood that a tax incentive is unlikely to drive investment behaviour in isolation and that a package of measures and support is often required. In this context, government would like to encourage business to elaborate on key hindrances as per the questions below.

Figure 10: Aggregated government support for business R&D



Source: OECD

b. Who can apply?

A company (as defined in the ITA) that is tax resident may apply for the R&D tax incentive. Foreign firms are eligible if they meet the definition of a permanent establishment. Companies and foreign firms or their subsidiaries are eligible for the R&D tax incentive only if they are conducting eligible R&D within the boundaries of South Africa.

c. Threshold

The South African R&D tax incentive is a volume-based incentive, i.e. an allowance that is based on the volume of R&D undertaken. Companies can qualify for a 150% R&D tax deduction on all eligible R&D activities without any threshold of expenditure. This is in contrast to systems that are incremental (i.e. systems that make use of a threshold, i.e. a minimum amount of expenditure is necessary before the incentive applies), or hybrid systems, that are a combination of the volume-based and incremental systems.

Incremental incentives have been found to be costly to apply for and to administer. This would even be more so for hybrid systems. Incremental incentives may further encourage companies to introduce a cycle into R&D spending to maximize benefits of incentive, which is not ideal. It has been shown that volume-based incentives, such as South Africa's, perform better if the objective is to increase the overall level of R&D in a country, rather than to maintain the level of R&D and reward high R&D growth

rate. As increasing the overall level of R&D That is one of the aims of the South African R&D tax incentive, government does not consider it necessary to change this approach.

d. Ceilings

Many countries apply some type of ceiling to their R&D tax incentives. Although South Africa does not apply a ceiling, a ceiling could potentially ensure that tax benefits are not predominantly distributed to a large number or expensive projects of large, well-established firms.

Ceilings may apply to all eligible R&D or may apply only to subcontracted or jointly conducted R&D. They may be fixed in terms of monetary value or could be relative (e.g. as a percentage), and may be determined per year or on a project basis. With all variations, it is evident that ceilings could easily become quite complex, both to understand and to administer. Also, applications for the incentive may come from across a group of companies to ensure maximum benefit from the incentive for such group. Countries therefore look to aggregation and independence rules in applying ceilings to limit unintended behaviours and consequences. As the government would like to further increase participation in the R&D tax incentive, government is of the view that this is not the time to introduce such a design feature for the incentive.

e. Sector bias

In line with international practice, South Africa's tax incentive is neutral in terms of its support, i.e. it does not favour any sector or industry. One of the guiding principles of good tax policy design is neutrality. Neutrality implies that the R&D tax incentive does not distort a company's behaviour as to which sector or industry they should carry out a particular R&D activity in. Allowing all sectors to participate enables a wider range of businesses to access the R&D tax incentive and ensures that the incentive will have a broader reach across the economy.

Irrespective, research indicates that sectors matter when it comes to R&D tax incentives. There are clear indications of the existence of cross-industry differences in effects of R&D tax incentive. It is easier for companies in low-technology sectors to increase their R&D expenditures in response to a tax incentive scheme as these companies have on average a lower R&D intensity. In high-technology sectors, it is more demanding and difficult to have additional R&D as such companies may already have a high level of R&D commitment.

At this stage the aim of the government is to encourage participation in the R&D tax incentive across all sectors and industries – maintaining neutrality.

Administrative issues

f. Pre-approval

In terms of policy certainty and the use of the R&D tax incentives, it has been suggested that the responsiveness of investment in R&D to the cost of R&D is larger in the long run. This can be ascribed to adjustment costs to be incurred when increasing investment in R&D. Any change to a process or system is likely to face teething challenges. This was evident after the change to a pre-approval system in 2012. It is important to appreciate that any significant changes to the administration of the incentive could have negative, unintended (and unexpected) consequences. Hence, DSI and NT are reluctant to discontinue the pre-approval system at this stage. The aim is rather to invest in refining the processing of applications, amongst other things, through a fully functional online application system, while simultaneously improving on the current monitoring and evaluation processes.

g. Review / Appeal

The Minister of Science and Innovation (the Minister) makes the final decision regarding any pre-approval application received for the R&D tax incentive. Where an application is not approved or approval is withdrawn, the Minister is required by Section 5 of the Promotion of Administrative Justice Act 3 of 2000 (PAJA) to provide adequate reasons. Where an applicant is not satisfied with the decision of the Minister under section 11D the applicant may approach the High court to take the matter under review in terms of PAJA. This approach is aligned with how taxpayer disputes are handled under the provisions of the Income Tax Act where the Minister is the final decision maker.

To ensure consistency in how these matters are dealt with in terms of the Income Tax Act, an appeal process is not favoured by government. Irrespective, the DSI is constantly working on improving supportive documentation, providing better reasons and ensuring good communication with applicants.

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[i] Reference Document A – World Bank, *Impact Evaluation of the R&D Tax Incentive in South Africa*, Sept 2019

[ii] OECD – Appelt S, Galindo-Rueda F, Cinta González Cabral A, *Measuring R&D tax support: Findings from the new OECD R&D Tax Incentives Database*, (2019): About 30 of the 36 Organisation for Economic Co-operation and Development (OECD) member countries give preferential tax treatment for business R&D expenditure. This is an increase from 19 in 2000. In the EU, the number of countries offering R&D tax relief increased from 12 in 2000 to 21 in 2018. All the BRICS countries, Brazil, the Russian Federation, India, China and South Africa and other developing countries such as Argentina, Chile, Mexico, Singapore, Malaysia and Turkey also offer tax based R&D incentives.

[iii] Ibid: "Over the 2006-16 period, tax support for business R&D expenditure as a percentage of GDP increased in 26 out of 44 countries for which data are available. New Zealand reintroduced R&D tax support in the form of an R&D tax credit for deficit-related R&D tax expenditure in 2015. Mexico, which converted its previous R&D tax credit into direct funding in 2009, reintroduced R&D tax incentive support with effect from 2017."

[iv] Hall B, Mairesse J, and Mohnen P, *Measuring the Returns to R&D. NBER Working Paper No. 15622,* (2009)

[v] Clark J, and Arnold E, *The Evaluation of Fiscal R&D Incentives* (2005:4)

[vi] Reference Document B – *White Paper on Science, Technology and Innovation, The Department of Science and Innovation* (2019), https://www.dst.gov.za/images/2019/WHITE_PAPER_ON_SCIENCE_AND_TECHNOLOGY_web.pdf

[vii] *Acting Now, Acting Together; Chapter 2. Fiscal Policies for Innovation and Growth*, Fiscal Monitor, April 2016

[viii] *South African National Survey of Research and Experimental Development, Statistical Report 2018/19*, https://www.dst.gov.za/images/2021/RD_StatisticalReport2018-19_WEBV01.pdf

[ix] Ibid.

[x] Ibid., vi

[xi] Ibid., x

[xii] Tax Incentives for Research and Development: Trends and Issues, OECD, https://www.oecd.org/science/inno/2498389.pdf

[xiii] Steenkamp

[xiv] Reference Document C – *Report on the Joint Government Industry Task Team on the Research and Development Tax Incentive¸* April 2016

[xv] James S.S, *Effectiveness of the Research and Development Incentive in encouraging Research in South Africa. The World Bank Working Paper commissioned by the Davis Tax Committee (South Africa),* 2017

[xvi] Tregenna, Kraemer-Mbula & Bengoa, *Study on Effectiveness of the R&D Tax Incentive: Evidence from South African Manufacturing Firms, undertaken at the University of Johannesburg*, 2020

[xvii] Kreuser C.F. and Newman C, *Total Factor Productivity in South African Manufacturing Firms* - South African Journal of Economics Vol. 86:S1 January 2018, page 40

[xviii] Ibid., xvii

[xix] Steenkamp A, Schaffer M, Flowerday W and Godard JG, 2018. Innovation activity in South Africa: Measuring the returns to R&D. WIDER Working Paper 2018/42

[xx] Molotja N, Parker S & Mudavanhu P, 2019. *Patterns of investing into business R&D in South Africa*, Foresight and STI Governance, [online] *13*(3), pp.51-60.

[xxi] Ibid., xxi

[xxii] Ibid., xxi

[xxiii] Ibid., xxii
[xxiv] Ibid., ii
[xxv] Appelt S, Bajgar M, Criscuolo C and Galindo-Rueda F (2020), *The effects of R&D tax incentives and their role in the innovation policy mix: Findings from the OECD microBeRD project, 2016-19*, OECD Science, Technology and Industry Policy Papers, No. 92, OECD Publishing, Paris.
[xxvi] Guceri, Irem, & Liu, Li. 2019. *Effectiveness of Fiscal Incentives for R&D: Quasi-experimental Evidence.*
[xxvii] Rao, Nirupama. 2016. *Do tax credits stimulate R&D spending? The effect of the R&D tax credit in its first decade.* Journal of Public Economics, 140(Aug.)
[xxviii] Blandinieres, F., Steinbrenner, D. and Weiß, B., 2020. *Which design works? A meta-regression analysis of the impacts of R&D tax incentives. A Meta-Regression Analysis of the Impacts of R&D Tax Incentives*, pp.20-010
[xxix] Carla P, 2019. *Incentive Effects of R&D Tax Incentives – A Meta-Regression Analysis Focusing on R&D Tax Policy Designs*, ARQUS Discussion Paper, No. 243, Arbeitskreis Quantitative Steuerlehre (ARQUS), Berlin.
[xxx] *Frascati Manual 2015*, p45, https://www.oecd.org/sti/frascati-manual-2015-9789264239012-en.htm
[xxxi] Ibid.
[xxxii] Oxford Online Dictionary definition for innovation: the introduction of new things, ideas or ways of doing something, https://www.oxfordlearnersdictionaries.com/definition/english/innovation; Cambridge Online Dictorionary definition of innovation: a new idea or method, https://dictionary.cambridge.org/dictionary/english/innovation
[xxxiii] https://www.sars.gov.za/legal-counsel/preparation-of-legislation/explanatory-memoranda/
[xxxiv] https://www.sars.gov.za/legal-counsel/legal-advisory/interpretation-notes/in-41-60/
[xxxv] Ibid., xxxv
[xxxvi] https://www.thetaxadviser.com/issues/2017/apr/reasonable-internal-use-software-regulations-research-tax-credit.html; https://www2.deloitte.com/content/dam/Deloitte/us/Documents/Tax/us-tax-internal-use-software-regulations-release-111116.pdf

Annexure A - List of 3rd Party Studies used for Internal Synthesis Analysis 2020
Annexure B - Comparison table between the R&D definitions for R&D tax incentives of a number of countries
Annexure C - Table of internal business activities and applicable exclusions

Reviewing the design, implementation and impact of South Africa's

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