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The impact of Industry Growth Centre participation on firm performance

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Abstract

This study presents a quasi-experimental impact analysis of the IGCs initiative on firm performance using a control group of similar non-participant firms. The average business performance of participating firms based on various indicators was analysed. For IGC participants, the results showed improvements on key performance indicators including turnover, wages and employment growth. The impact on export sales growth was mixed. This firm-level study establishes a robust baseline for future IGC evaluations and demonstrates the value of integrated administrative data for program evaluation in the absence of natural experiments. The results will inform IGC decisions aimed at building stronger futures for their sectors.

JEL Codes: C21, L25, O25

Keywords: Firm Performance, Public Policy, Industry Growth Centres

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Disclaimer

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Key findings

The characteristics of IGC participants

- Relative to the general Australian business population, a significantly high proportion of IGC participants are large firms.
- On average, 83 per cent of participants are mature firms (firms that are more than six years old).
- Participation in all IGCs was dominated by the service sector which encompasses industry subdivisions other than Mining, Agriculture and Manufacturing.
- A relatively high proportion of participants conducted R&D and were registered with the R&D Tax Incentive (RDTI) program.
- A significantly high proportion of participating firms are trade exposed — either exporting their goods and services or importing goods.
- Only a few ANZSIC divisions associated with IGCs show above-average management capability scores.
- ANZSICs with a high proportion of IGC participating firms had improved incidence of innovation activities and collaboration compared to other firms.

Impact analysis

- The impact of the IGCs initiative in general is associated with improved business performance in turnover, wages, and employment growth for the participating firms.
- The impact on export sales growth appears to be mixed.
- There is some evidence that point to a positive impact on R&D expenditure, albeit for small and medium sized firms only.

1. Introduction

The Industry Growth Centres (IGCs) Initiative is an industry-led approach to foster entrepreneurship, innovation, industry competitiveness and economic growth. Funding for the initiative amounts to around \$248 million over the period 2014–15 to 2021–22. A better understanding of the impact of the initiative on a range of business¹ outcomes will contribute to evidence-based policy targeting that improves Australia's competitiveness.

Six growth centres² (FIAL, AMGC, NERA, AustCyber, METS and MTPConnect) form the Industry Growth Centres (IGCs) initiative. Each growth centre is an independent not-for-profit organisation with an industry-led board in recognition that industry is best placed to drive this initiative. The growth centres developed their own sectoral plans outlining a strategic vision for securing the long term future. Accordingly, IGCs focus on activities that support Australian businesses to increase collaboration and commercialisation, to improve access to global supply chain, to enhance management and workforce skills and to optimise opportunities in regulatory environment.

The main objective of this study is to examine the impact of the IGC initiative on the performance of participating businesses relative to a carefully constructed comparison group — the counterfactual. Using matching techniques, this study estimates additionalities on key performance indicators (KPIs) for firms that participated in IGCs relative to those that did not. The key performance indicators assessed include turnover, exports, wages and employment. The matching estimation of this analysis is more definitive than a simple comparison of historical averages. In this context, this study also makes an important contribution by establishing a robust baseline of analytical content that will facilitate future evaluations of the IGC program when more data becomes available.

This analysis uses several data sources including information in the Business Longitudinal Analysis Data Environment (BLADE) and confidentialised ABNs provided by the IGCs which facilitate integration of DISER program data into BLADE and other DISER program datasets.

The findings of this analysis can help improve the IGC initiative and increase the likelihood of meeting its long-term objectives. Being complementary to qualitative aspects of the IGCs evaluation, this assessment aims to objectively validate whether firms that engaged with the IGCs were consistent with and representative of the type of engagements envisaged in their Sectoral Competitiveness Plans.

2. Data, methodology and associated issues

In this section, data sources, caveats associated with data integration and the methodological framework of this study are discussed.

2.1. Linked program and BLADE data

This analysis uses DISER's IGCs program participation data linked to firm level micro-data available from the Australian Bureau of Statistics (ABS) BLADE. Confidentialised ABNs of IGC program participants were integrated with BLADE core data files including Business Income Tax (BIT), Business Activity Statements (BAS), Pay as You Go (PAYG) data and merchandise trade data. In addition,

¹ The terms "firm" and "business" are used interchangeably in this paper and should be treated as synonyms for an economically active, employing business.

² Food Innovation Australia Ltd (FIAL); Advanced Manufacturing Growth Centre Ltd (AMGC); National Energy Resources Australia (NERA); Cyber Security Growth Centre (AustCyber); METS Ignited (Mining equipment, technology and services); Medical technologies and pharmaceuticals (MTPConnect)

business information available in the Business Characteristics Survey (BCS) and IP Australia data were also used to generate a number of higher industry level insights. The core of BLADE encompasses administrative tax data on all Australian firms registered for General Sales Tax (GST).

2.2. Establishing a counterfactual

Linked program and BLADE data sources were used to draw a sample of counterfactual firms that have similar business characteristics to IGC program participants such as business size, age, industry, turnover, export status and past performance. This enables comparison of the performance of IGC program participants in relation to similar non-participants so that the impact of the IGCs on participating firms' performance can be isolated.

2.3. Complex firms and other data limitations

Complex firms are businesses that emanate from an enterprise group. The ABS unit of identification for those enterprise groups are defined by a Type-of-Activity Unit (TAU).³ For further details on the composition of BLADE data see Hansell & Rafi (2018). Issues of attribution arise for complex firms because the confidentialised ABNs of IGC participating firms that were part of a larger enterprise group can be linked to more than one TAU. Thus, apportioning of financial information of many ABNs matching to one TAU or one ABN matching to many TAUs may under or overestimate the true performances of complex businesses that participated in IGC activities. Given current data limitations there is no definitive way to overcome this issue.

For the performance analysis, we considered the following analytical approaches (a) analyse those firms which operate under one ABN only that corresponds to one TAU in both IGCs and counterfactuals; (b) analyse those firms operate under many ABNs that corresponds to one TAU or *vice versa* ; and (c) analyse both complex and simple IGC participating firms together.

Moreover, IGC participating firms from ANZSICs related to government institutions as well as tertiary education were excluded as they could substantially bias the general business population's performance results.

In assessing the impacts, the analytical sample was also restricted by excluding the top and bottom one per cent of the distribution based on business turnover to remove extreme values that could otherwise bias the results.

For IGCs including FIAL, NERA, METS, the financial year 2015–16 was considered as the initial time period ($t=0$) that firms joined the IGCs initiative (Table 2.1). For AMGC the initial time period considered is 2016–17, and for AustCyber it is 2017–18.

The earliest year of data considered for MTPConnect is 2017–18 due to apparent discrepancies observed in the earlier data for this IGC. Due to limited numbers of persistently participating firms and the engagement timing of each IGC, small sample sizes are an issue for most of the IGCs analysed. One such example is AustCyber which commenced its operations in 2017–18 and recorded only 17 business participations at its inception. We detail these caveats in Section 5.

³ The ABS defines Type-of activity Unit as "a producing unit comprising one or more legal entities, sub-entities or branches of a legal entity that can report productive and employment activities via a minimum set of data items" (ABS Cat.No.1292.0)

Table 2.1 Number of IGC participants

Program	2015-16	2016-17	2017-18	2018-19
FIAL	728	4	16	29
AMGC	–	39	281	726
NERA	29	201	378	387
AustCyber	–	–	17	225
METS	540	1 186	1 685	2 165
MTPConnect	378	79	1 958	925

Source: Department of Industry, Science, Energy and Resources.

2.4. Methodology

In the absence of natural experiments which create a carefully selected control group at the time of an intervention such as a new policy or program, quasi-experimental matching techniques are a useful alternative to isolate and assess the impact of an intervention. Examples of such quasi-experimental techniques include Propensity Score Matching (PSM), Nearest Neighbour Matching (NNM) and Inverse Probability Weighting (IPW) techniques. This analysis primarily used IPW to assess the performance of IGC participant firms because of its computational efficiency in assessing the impacts using large datasets.

The issue of self-selection into program participation and its impact on impact analysis were addressed via an empirical matching process. Intuitively this process enables the construction of a statistical comparison group to estimate treatment-effects. What follows is the theoretical underpinnings of the treatment effect estimation.

Following Abadie et.al⁴ and Caliendo and Kopeinig,⁵ two potential outcomes of an individual firm i , $i = 1, \dots, N$, can be defined as $\{Y_i(0), Y_i(1)\}$. Where $Y_i(0)$ is the outcome when an individual firm does not participate in the program and $Y_i(1)$ is the outcome when the firm participates in the program.

Thus, the additionality or the average treatment effect (τ) of program participation (Rafi, 2017)⁶ can be defined as the average difference between the two outcomes as follows:

$$\tau = E\{Y(1) - Y(0)\} \quad (2.1)$$

However, in reality the two outcomes for the same firm cannot be observed. If a firm participated in the program then we cannot observe the same firm not participating in the program simultaneously. In other words, the two outcomes for an individual are mutually exclusive. Therefore the observed outcome can be defined as:

$$Y_i = Y_i(W_i) = \begin{cases} Y_i(0) & \text{if } W_i(\text{treatment}) = 0 \\ Y_i(1) & \text{if } W_i(\text{treatment}) = 1 \end{cases} \quad (2.2)$$

⁴ Abadie A, Drukker D, Herr JL, et al. (2004) Implementing matching estimators for average treatment effects in Stata, Stata journal, 4, pp. 290-311

⁵ Caliendo M and Kopeinig S (2008) Some practical guidance for the implementation of propensity score matching, Journal of economic surveys, 22(1), pp. 31-72

⁶ Rafi, B (2017), Participation in South Australian Innovation and Investment Funds: Impact on firm performance, Office of the Chief Economist, DESER, Staff Research Paper 2017.

Since only one of the two outcomes is observed, it is essential to estimate the other unobserved potential outcome for each individual firm in the sample.

If the decision to participate in the program is random then the average outcomes of firms with similar attributes (often referred to as pre-treatment variables or covariates) can be used to estimate the counterfactual outcomes of the treated and untreated firms.

If we define a set, X , of pre-treatment variables, the treatment W is independent of $(Y(0), Y(1))$ conditional on attributes of X . The probability of treatment, $\text{Prob}(W = 1 | X = x)$, can be estimated as:

$$\text{Prob}\{W = 1\} = \Phi\left(\frac{e^{\beta'x}}{1 + e^{\beta'x}}\right) \quad (2.3)$$

where $c < \text{Pr}(W = 1 | X = x) < 1 - c$, for some $c > 0$ and Φ depicts the cumulative distribution function of X , which can consist of firm's attributes such as turnover, head count or industry classification.

In PSM matching firms according to their predicted probabilities of treatment, or propensity scores, allows for the estimation of firms' counterfactual outcomes.

In the case of IPW, the Average Treatment Effect (ATE) is estimated as:

$$\text{ATE} = E\left[\frac{Y}{p} | W = 1\right] - E\left[\frac{Y}{1-p} | W = 0\right] \quad (2.4)$$

where p is predicted probability estimated using the cumulative distribution function $\Phi(\cdot)$.

The average difference between actual and estimated counterfactual outcomes of the sample restricted to participants is defined as average treatment effect of treated, ATT.

3. Characteristics of IGC participants

The long-term goals of the IGC initiative are to foster entrepreneurship, innovation, industry competitiveness and economic growth. In fulfilling such long-term objectives, this section provides statistical insights that help to understand the composition of firms that engaged with IGCs, in terms of their business size, industry classification, business age, exporting/importing status, geographic representation, foreign ownership status, management capabilities and participation status with other DISER programs.

Table 3.1 presents the distribution of IGC firms by business size, industry, age, foreign ownership, exporting and importing status. In general, IGCs have a higher proportion of medium and large sized firms compared to the general Australian business population. Among mature firms, IGCs including AMGC, NERA, METS and MTPConnect (MTPC) had an above-average proportion of large firms. As expected, FIAL and AMGC are mostly engaged with firms from the manufacturing sector whereas other IGCs have significant engagements with firms from the Professional, Scientific and Technical (PST) services sector. Moreover, a high proportion of mature firms are found (those which have been operating for over six years) in all six IGCs.

Table 3.1 Business characteristics of IGC participants, 2015-16 to 2018-19

Characteristics	FIAL	AMGC	NERA	AustCyber	METS	MTPC	Benchmark
Number of participants	738	1,036	943	232	5,384	3,161	873,327 [†]
Business size distribution (per cent)							
<i>Small</i>	54.5	45.2	48.5	54.9	49.3	48.6	94.0
<i>Medium</i>	31.3	33.8	26.2	34.9	28.2	25.4	5.4
<i>Large</i>	14.2	21.0	25.3	10.2	22.5	26.0	0.3
Industry distribution (per cent)							
<i>Manufacturing</i>	32.9	36.1	5.8	–	10.7	9.1	5.2
<i>PST</i>	9.5*	21.2*	44.8	68.1	40.2	36.1	16.0
<i>Other</i>	57.6	42.7	49.4	–	49.1	54.8	78.6
Age distribution (per cent)							
<i>Less than 3 years</i>	–	1.8	2.8	–	1.3	1.5	24.0
<i>3 to 6 years</i>	–	14.2	20.6	–	13.3	11.3	18.0
<i>More than 6 years</i>	92.0	84.0	76.6	73.3	85.4	87.2	58.0
Foreign ownership (per cent)							
	–	–	6.3	0.0	4.4	1.5	–

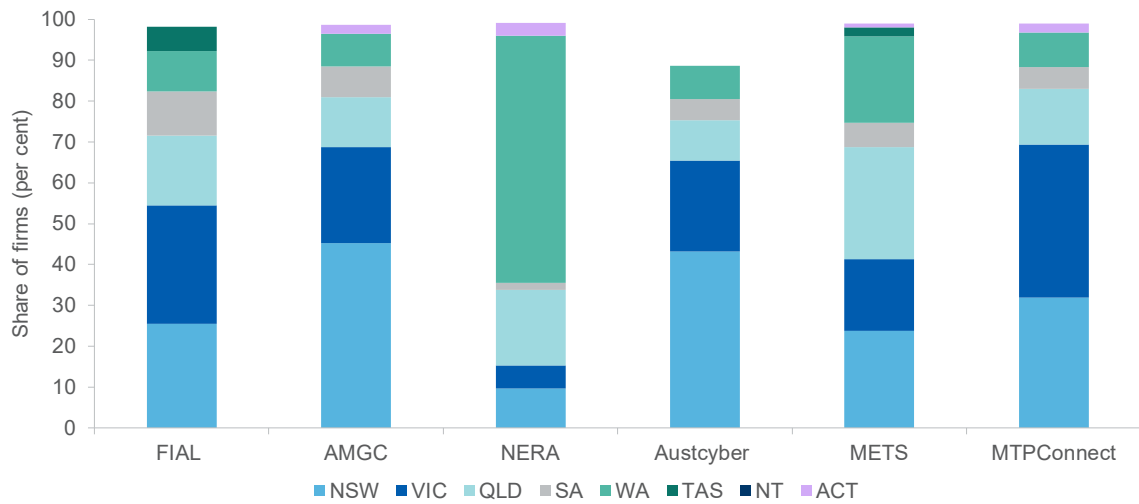
Notes: Business size categories: small (<20 employees), Medium (20<=employees<=199), Large (employees>199), - = Not available. PST – Professional, Scientific and Technical Services. Proportions are estimated based on the pooled sample of participants reported by IGCs from 2015-16 to 2018-19. * Based on the limited number of counts in comparison to other estimates. † Number of employing businesses June 2015 to June 2019. Other benchmarks represent 2016-17 financial year.

Source: Department of Industry, Science, Energy and Resources experimental estimates based on micro data from BLADE

3.1. Geographic distribution

The regional distribution of IGC firms is illustrated in Figure 3.1. Most IGCs have a significant proportion of participating firms from where their head offices are located. For example, the majority of FIAL firms are in Victoria, the majority of NERA firms are located in Western Australia. A significantly high proportion of AustCyber firms are from New South Wales.

Figure 3.1 Geographic representation of IGC participants



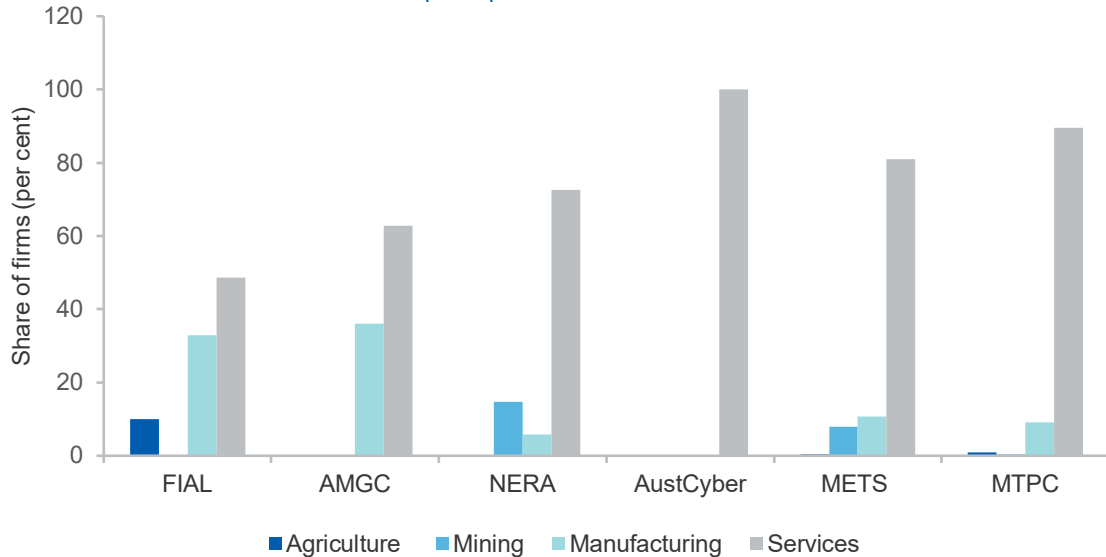
Notes: WA-Western Australia; VIC-Victoria; TAS-Tasmania; SA-South Australia; QLD- Queensland; NT- Northern Territory; NSW- New South Wales; and ACT-Australian Capital Territory.

Source: Department of Industry, Science, Energy and Resources experimental estimates

3.2. Industry composition

The industrial composition for major sectors is illustrated in Figure 3.2. Participation in all IGCs was dominated by the service sector which encompasses industry subdivisions other than Mining, Agriculture and Manufacturing. As expected, all AustCyber participating firms were from the services sector, while the highest number of manufacturing firms were engaged with AMGC (36 per cent) followed by FIAL (33 per cent).

Figure 3.2 Four-sector classification of IGC participation



Source: Department of Industry, Science, Energy and Resources experimental estimates

In general, each IGC comprises a wide range of sub industries. For example the MTPC had the highest number of subdivisions (77), followed by METS (74), AMGC (62), FIAL (57) and AustCyber (19). The distribution of two-digit ANZSICs shown in Table 3.5 indicates that IGC participation is dominated by Professional Scientific and Technical services (37 per cent), followed by Manufacturing (13 per cent).

3.3. Other program participation

Defining IGCs by means of the ANZSIC codes associated with participating firms might be too restrictive. As such we investigated the ANZSICs that are aligned with the Entrepreneurs' Programme (EP) which encompasses a much larger dataset of participating firms.

The Entrepreneurs' Programme forms links with the IGCs to improve the capability and collaborative capacity of the growth sectors. Some elements of the program such as Growth services are directly targeted to businesses that operate in one or more growth sectors. We investigated the proportion of EP program participants that were associated with the industry classes that we identified based on the collected IGC ABNs. The results confirmed that the majority of EP participants (89 per cent) are operating in industry classes that aligned with IGCs. However, there are about 86 ANZSIC codes based on EP participant data that are not found in IGC participants. Similarly, 47 ANZSIC codes based on IGC participant data that are not found in EP participants (Table A.1 at the Appendix).

Table 3.2 shows the proportion of IGC firms that participated in other DISER programs. A relatively high proportion of participants — ranging from 9.6 to 20.5 per cent depending on the IGC — were registered with the R&D Tax Incentive (RDTI) program. However, a relatively small proportion (ranging from 0.4 to 8.9 per cent) were registered with other programs including the Entrepreneurs' Programme (EP) and the Centre for Defence Industry Capability (CDIC). Interactions with other programs such as the Cooperative Research Centre Projects (60 participants), the Global Innovation Linkages Program (35 participants), the SME Exports Hub program (8 participants) are much smaller and not reflected in Table 3.2. In terms of other government programs, a small proportion of IGC participants (3 to 3.6 per cent over the period 2015-16 to 2018-19) received Austrade's Export Marketing Development Grants (EMDG). As a proportion of IGC exporter status this overlap was around 13 per cent. In addition, about 3.2 per cent of IGC participants received Australian Research Council Industrial Transformation Research Program grants (ARTP).

Table 3.2 Proportion of IGC participants in other DISER programs

Program	Year	RDTI	EPG	EPS	CDICG	CDICS
FIAL	2015-16	13.7	5.1	1.9	–	–
AMGC	2018-19	20.5	8.9	13.9	0.8	2.9
NERA	2018-19	14.5	7.2	4.1	–	0.8
AustCyber	2018-19	19.1	3.5	1.8	0.9	2.2
METS	2018-19	9.6	4.1	5.6	0.1	0.6
MTPConnect	2018-19	19.5	5.6	5.5	–	0.4

Notes: RDTI – Research and Development Tax Incentive; EPG – Entrepreneurs' Program Grants; EPS – Entrepreneurs' Program Services; CDICG – Centre for Defense Industry Capability Grants; CDICS - Centre for Defense Industry Capability Services. EPG and EPS in FIAL includes Enterprise Connect participants as well.

Source: Department of Industry, Science, Energy and Resources experimental estimates.

Earlier work by the department, based on a list of ANZSIC classes associated with IGCs used in ABS Cat. No. 8170.0, indicated that around one quarter of National Measurement Institute (NMI) clients in 2015-16 were classified as operating in a growth sector.⁷ The majority of NMI clients were represented in FIAL; and the analysis showed that the proportion of clients in this growth sector increased sharply after the introduction of the IGC initiative. In general, NMI clients are more likely to be IP-active and R&D-active than the average firm and also spend significantly more on R&D than the average firm.

3.4. Exporter and importer status

The proportion of exporting and importing firms in each IGC is reported in Table 3.3. Overall, 25 per cent of IGCs participating firms are exporters. FIAL recorded the highest proportion of exporters (33 per cent), while AustCyber recorded the smallest proportion of exporters (11 per cent). In general, IGC participants have a higher proportion of exporters relative to the overall Australian business population (6 per cent). Similar trends can also be observed with importers. Except for AustCyber, all other IGCs had at least 20 per cent import participation. On average, 50 per cent of IGC exporters were also importers with notable representation in METS (50 per cent) and MTPC (53 per cent). On the other hand, about 53 per cent IGC importers were also exporters. Overall, IGC non-exporters have a 3 per cent chance of becoming an exporter over time⁸.

The results show that a significantly higher proportion of IGC participating firms compared to the general Australian business population is either exporting their goods and services or importing goods. This indicates that IGC firms are relatively more trade exposed compared to the general Australian business population.

⁷ For more detail, see Bruno (2019).

⁸ Chance of becoming an exporter was estimated using transition probability matrix derived by xtrans procedure in STATA 16 econometric software.

Table 3.3 Proportion of IGC participant exporters and importers

Characteristics	FIAL	AMGC	NERA	AustCyber	METS	MTPC	Overall
Export status (per cent)							
<i>Exporters</i>	32.9	29.5	28.9	10.8	26.9	19.0	25.2
Merchandise import status (per cent)							
<i>Importers</i>	38.6	20.2	23.9	5.6	22.9	23.5	23.6
Importer being an exporter (per cent)							
<i>Importers/exporters</i>	–	34.6	42.9	–	49.7	53.2	49.2
Exporter being an Importer (per cent)							
<i>Exporters/importers</i>	–	50.7	52.0	–	58.3	43.1	52.6
Export Class (per cent)							
\$1 to \$10,000	7.1	6.6	7.1	14.8	8.1	13.0	8.0
\$10,001 to \$100,000	20.2	8.5	12.2	25.9	13.8	15.6	16.0
\$100,000 plus	72.7	84.9	80.1	59.3	78.1	71.4	76.0
Probability becoming an exporter	4.14	–	2.86	–	2.86	3.02	3.22

Source: Department of Industry, Science, Energy and Resources (2020)

The distribution of export intensities of IGC participation at inception, one year, two years and three years after inception and the proportion of participants' above the median (p50) is presented in Table 3.4. In general, export sales relative to turnover (i.e, export intensity) in the given percentiles range from 2 to 75 per cent. In general, export intensity range associated with each percentile grouping remained broadly unchanged over time.

Table 3.4 Distribution of export intensities and the proportion of IGC participants above the 50th percentile

	Years since inception	Percentile				Share greater than 50 th
		25 th	50 th	75 th	90 th	
FIAL	0	2.3	7.1	18	54.3	10.1
	1	1.7	8	21.8	49.6	9.2
	2	1.9	11.8	30.9	–	8.6
	3	6.1	15.6	31.4	–	10.7
AMGC	0	1.6	4.3	22.5	–	14.6
	1	–	10.6	–	–	–
NERA	0	5.2	15.4	37.9	–	12.5
	1	–	23	–	–	18.8
	2	–	14.4	–	–	–
METS	0	3.4	11.8	35.1	63.9	14.6
	1	4.4	12.7	28.4	57.3	12.9
	2	5.4	11.7	25.2	–	8.7
	3	–	12	–	–	–
MTPC	0	2.6	9.6	32.4	74.1	24.7

	Years since inception	Percentile				Share greater than 50 th
		25 th	50 th	75 th	90 th	
	1	1.8	11.6	53.2	75	27.5
Overall	0	2.6	9.4	30.9	63.5	15.1
	1	2.6	11.3	29.1	66.4	–
	2	4.8	11.9	27.7	52.5	10.6
	3	5.9	12.1	27.6	49.2	8.5

Notes: Time t=0 is the inception year of growth centre operation. t=1, t=2 and t=3 are time points one year, two years and three years after inception: Department of Industry, Science, Energy and Resources (2020)

3.5. Management capability

We used the management capability survey from the ABS to derive management capability scores for various industries associated with IGCs. Among ANZSIC divisions that encompass IGC participants, 31 per cent had above-average management capability scores (greater than 0.28). Health care and social assistance services had the highest score (0.34), followed by Accommodation and food services (0.32). Divisions including Electricity, gas, water and waste services, Finance and insurance, and Real estate services had similar management capability of 0.30. While manufacturing was just above average (0.29), construction had the average score (0.28). Note that ANZSIC-based management capabilities shows the average representation across all IGCs. Table 3.5 shows the distribution of the ANZSIC divisional groupings of firms that engaged in IGC activities and their average management capability (MC) scores.

Table 3.5 ANZSIC division/sub-division grouping of all IGC participants and average management capability score

ANZSIC division/sub division	Per cent	Management capability Score
Agriculture	1.13	0.24
Mining	5.13	0.30
Manufacturing	13.35	0.29
<i>Food beverage & tobacco</i>	2.21	0.35
<i>Basic chemical & chemical product</i>	1.60	0.34
<i>Machinery and equipment</i>	4.55	0.24
<i>Other manufacturing</i>	4.99	0.27
EGW and Waste Services	0.63	0.30
Construction	3.47	0.28
Wholesale Trade	7.45	0.27
Retail Trade	1.91	0.27
Acc. Food Services	0.74	0.32
Transport Postal and Warehousing	1.01	0.27
Information Media and Telecommunications	2.42	0.25
Finance and Insurance	5.54	0.30
Rental, Hiring and RE services	1.89	0.30
Professional Scientific and Technical Services	36.67	0.26
<i>Professional Scientific and Technical</i>	29.82	0.24

ANZSIC division/sub division	Per cent	Management capability Score
<i>Computer System Design RS</i>	6.85	0.27
Admin and Support Services	2.86	0.29
Public Admin and Safety	3.16	-
Education and Training	4.59	-
Health care and social Assistance	3.05	0.34
Arts and recreation services	0.44	0.14
Other	4.58	0.24

Source: Department of Industry, Science, Energy and Resources experimental estimates (2020)

4. Innovation, collaboration and intellectual property

This section examines the innovation, collaboration and intellectual property (IP) activities among ANZSIC classes that contain at least 100 IGC participating firms. It provides an overview of these activities in industries with a higher-than-average concentration of IGC firms. There are 18 such industries and they account for over 51 per cent of all IGC participating firms. To investigate innovation and collaboration activities, we use the BLADE microdata obtained from the 2017–18 ABS *Business Characteristics Survey* (BCS); while for IP activity, we use the 2016–17 Intellectual Property Longitudinal Research Data (latest available).

4.1. Innovation, R&D and collaboration

According to the publicly available Business Characteristics Survey (BCS) data,⁹ 49.8 per cent of all Australian businesses were innovation-active in 2017–18. We also note that five of the 18 ANZSIC divisions that account for at least 100 IGC firms are not within scope of the 2017–18 BCS. Hence, we limit our analysis to the remaining 13 ANZSIC classes. Our analysis of the relevant microdata reveals that the average proportion of innovation-active businesses in the 13 ANZSIC divisions that account for at least 100 IGC firms is 53.1 per cent (Table 4.1).¹⁰ One of the several factors that are likely to contribute to this difference is that the ABS ‘weights’ each surveyed firm to estimate the published figure for the proportion of innovation-active businesses. Since the weights used by the ABS are confidential, the same weights could not be applied to this analysis.

From the 2017–18 BCS, we also know that 17.1 per cent of all innovation-active businesses in Australia collaborated for the purpose of innovation. Among the 13 ANZSIC classes that account for at least 100 IGC firms, we find that this proportion increases to 25.8 per cent, suggesting that the average level of innovation and collaboration activity in the ANZSIC classes that account for a higher-than-average concentration of IGC firms are higher than the national average.

⁹ ABS cat. no. 8167.0 – Characteristics of Australian Business, 2017–18, released June 2019

¹⁰ Weights for each of the 13 ANZSIC classes are calculated as the number of firms (in the survey) belonging in the ANZSIC class in question over the total number of firms surveyed.

Table 4.1 Innovation and collaboration activity, 2017–18

Category	Proportion
Innovation	
All industries	49.8
Industries with at least 100 IGC participating firms	53.1
Collaboration for innovation	
Innovation-active firms in all industries	17.1
Innovation-active firms in industries with at least 100 IGC participating firms	25.8

Note: There are 18 ANZSIC classes that account for at least 100 IGC firms; they are: 6962, 6923, 7000, 6910, 8102, 1090, 9999, 6999, 6419, 9551, 6240, 1841, 6925, 2462, 6931, 7520, 2599 and 8101. However, five of them — 8102, 9999, 9551, 7520 and 8101 — had no observation in the 2017–18 BCS. See Table A.5 in the Appendix for more details.

Source Department of Industry, Science, Energy and Resources experimental estimates based on the ABS Business Characteristics Survey 2017–18 microdata in BLADE

An analysis based on R&D Tax Incentive (R&DTI) data indicates that IGC participating firms have higher average and median R&D expenditure compared to non-IGC firms in the R&DTI program (Table 4.2). While IGC participants only accounted for around 8 per cent of R&DTI participants in 2018, they accounted for a significant larger share (around 21 per cent) of overall R&D expenditure.

Table 4.2 R&D expenditure of IGC and non-IGC participating firms, 2018, current prices

	Number of firms	R&D expenditure (\$'000)		
	Count (%)	Mean	Median	Share of total (%)
FIAL	0.7	723	361	0.5
AMGC	1.5	2,455	513	3.8
NERA	0.4	3,840	634	1.7
AustCyber	0.5	1,363	550	0.7
METS	2.2	2,240	476	5.1
MTPConnect	2.8	3,208	924	9.3
<i>IGC firms</i>	<i>8.1</i>	<i>2,519</i>	<i>576</i>	<i>20.7</i>
<i>Non-IGC firms</i>	<i>91.9</i>	<i>843</i>	<i>276</i>	<i>79.3</i>

Notes: dollar values are rounded to the nearest thousands.

Source: Department of Industry, Science, Energy and Resources

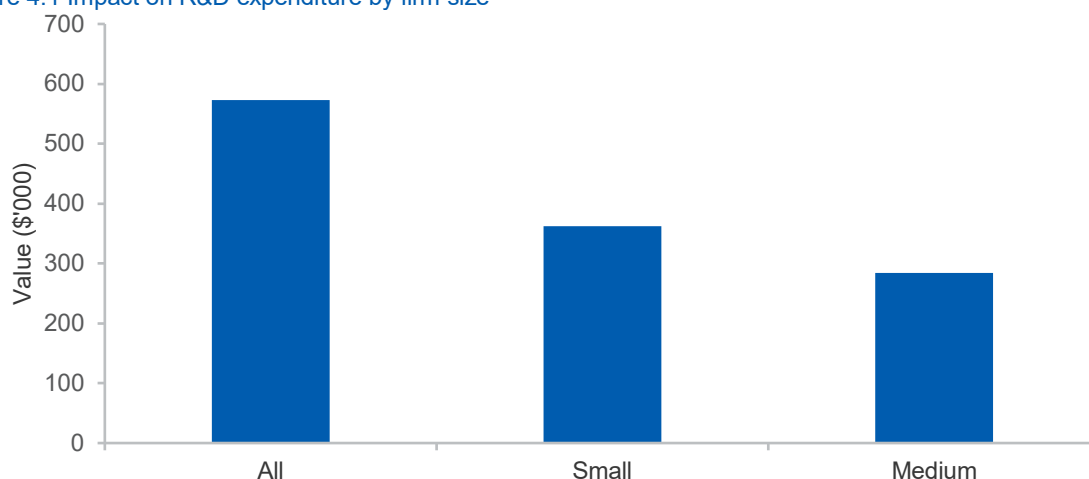
Given the overlap between participants in the IGCs and the R&DTI program, it was possible to compare the impact of the IGC initiative on the R&D expenditure of firms. Figure 4.1 presents the additionalities on R&D expenditure of IGC participating firms in comparison to that of non-IGC R&DTI participants for the period 2015-16 to 2018-19.

The ATT on R&D expenditure is based on the Nearest Neighbour Matching (NNM) technique using turnover, R&D expenditures, employment and the industry sector as matching dimensions. The control group for each IGC firm consists of six nearest neighbours. The many reported zeros and small

turnovers of some R&DTI participants can have some adverse impacts on the NNM results. Thus, the results on the impact of the IGCI on R&D expenditure have to be considered as indicative and should be used with care.

The results indicate that IGC participants, on average, outperformed similar firms in the R&DTI program that did not participate in the IGCs. The effect on smaller firms were larger than the effect on medium sized firms. However, the estimated effects for large firms were not statistically significant. For the majority of individual IGCs, the results were not statistically significant and are therefore not reported.

Figure 4.1 Impact on R&D expenditure by firm size



Source: Department of Industry, Science, Energy and Resources experimental estimates

4.2. Trademarks and Patents

In 2016-17, IGC firms had 3.94 trademarks on average compared to an average of 0.03 trademarks for non-IGC firms (Table 4.3). In addition, IGC firms had 0.47 patents on average, compared to zero patents on average for non-IGC firms over the same period.

Table 4.3 Trademarks and patents comparison, IGC and non-IGC firms, 2016-17

	Active Trademarks (mean)	Active patents (mean)
Non- IGC firms	0.03	0.00
IGC Firms	3.94	0.47

Source: Analysis based on Business Longitudinal Analysis Data Environment using intellectual property data for 2016-17

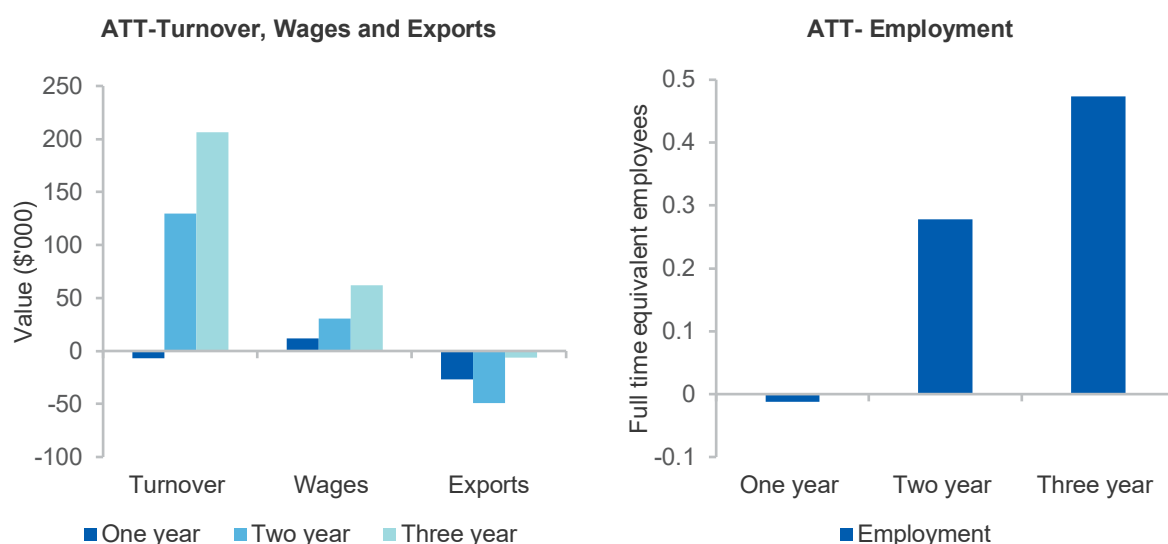
5. The impact of IGCs participation on firm performance

This section presents performance insights of IGC participating firms relative to a constructed control group¹¹ for the overall IGCs as well as for each IGC where possible. The IGCs initiative was launched in 2015–16, however, individual IGCs commenced their active business engagements at different points in time. Hence a sufficient number of observations were not available to estimate the average treatment effects of the treated¹² for all IGCs separately.

Four performance indicators are considered — three financial indicators (turnover, wages and export sales) and FTE employment — to conduct the impact analysis. As discussed in Section 2.3, we focused on simple firms (79 per cent of participants) in the impact analysis. Hence the results are more focussed on small to medium enterprises (SMEs) in this paper. Impact analysis on complex firms (21 per cent of participants) are presented in Table A.2 of the Appendix.

5.1. Impact on overall participants – simple firms

Figure 5.1 Impact on overall IGC recipients



Source: Department of Industry, Science, Energy and Resources experimental estimates

Overall, the one-year turnover, export sales and employment of all IGC participating firms was slightly lower than that of similar non-IGC participating firms. However, there was a significant improvement in additionalities in turnover, wages and employment after one year and also some improvements in export sales, though lower compared to the control group. This suggests that the IGC participating firms are reaping the benefits of the initiative in the longer run. Similar performance impacts were also observed

¹¹ Note that the constructed control group include all other non-IGC participating firms available unless otherwise specified. The composition and the size of the constructed control group can vary with the IGC analytical sample considered for the impact assessment. Each assessment is associated with a logistic estimation and predicted probabilities of IGC participation in forming the relevant control group. Since quite a number of estimations are involved, details of each estimation have not been incorporated in this report but available upon request.

¹² Average treatment effects on the treated (ATT) measures the mean difference of potential performances of firms that participated in IGCs initiative only.

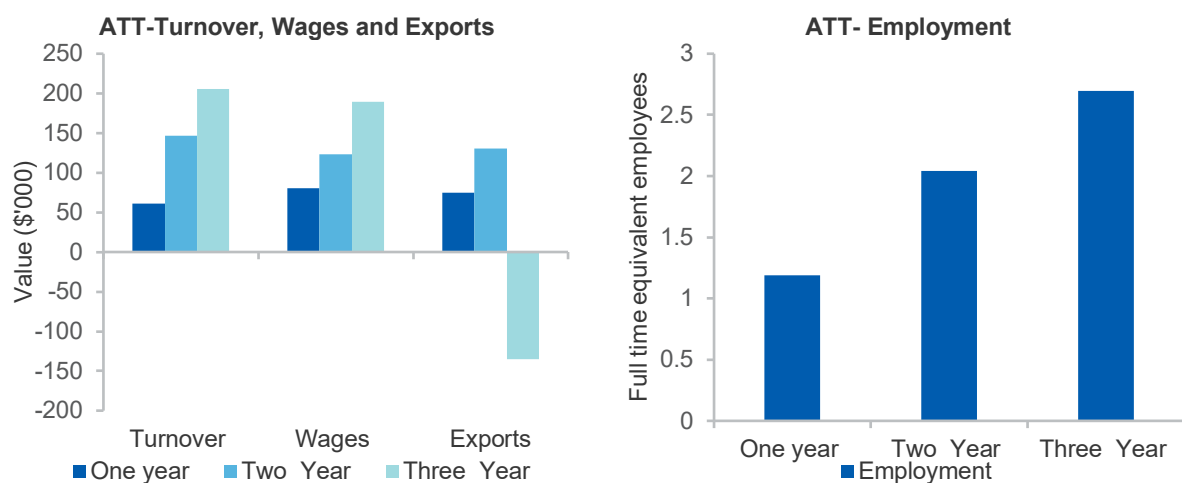
when both simple and complex firms were jointly assessed. However, the impacts on complex firms were larger in comparison to simple firms (Appendix table A.2).

5.2. Grant recipients

IGCs engaged with firms through activities such as grants, workshops, networking and trade events. Due to data limitations, it was only feasible to analyse the impact of the IGC engagement on one subset of IGC participants, namely grant participants. As such, it is not possible at this stage to estimate the effectiveness of various forms of IGC activities. Information on the number of grant recipients of IGCs participation is presented in Table A.3 of the Appendix.

One-year, two-year and three-year additionalities in key business performance indicators of IGC grant recipients relative to IGC non-grant recipients are presented in Table A.4 at the Appendix. All one-year additionalities of key performance indicators of IGC grant recipients were significantly higher than that of IGC non-grant recipients. Moreover, with the exception for export sales, performance indicators appeared to be improving significantly over time.

Figure 5.2 Impact on IGC grant recipients

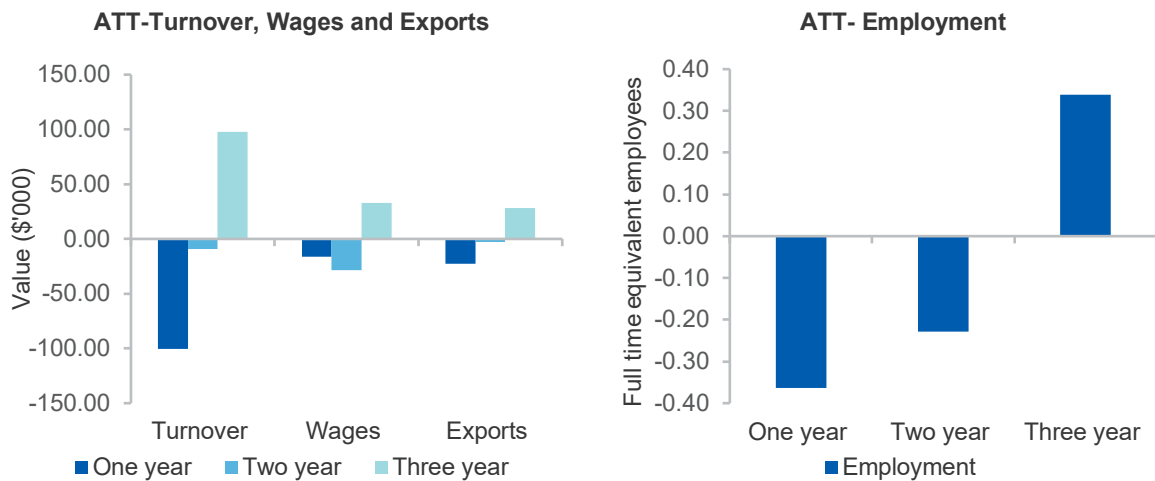


Source: Department of Industry, Science, Energy and Resources experimental estimates

5.3. Performance of FIAL participants

FIAL was established to grow the share of Australian food in the global marketplace. The other objectives of FIAL are to help businesses develop innovative, cost-effective and differentiated offerings to access and compete in international markets. Hence we expect participating firms in FIAL to be more export oriented and more innovative.

Figure 5.3 Impact on one-year, two-year and three-year changes in FIAL participants



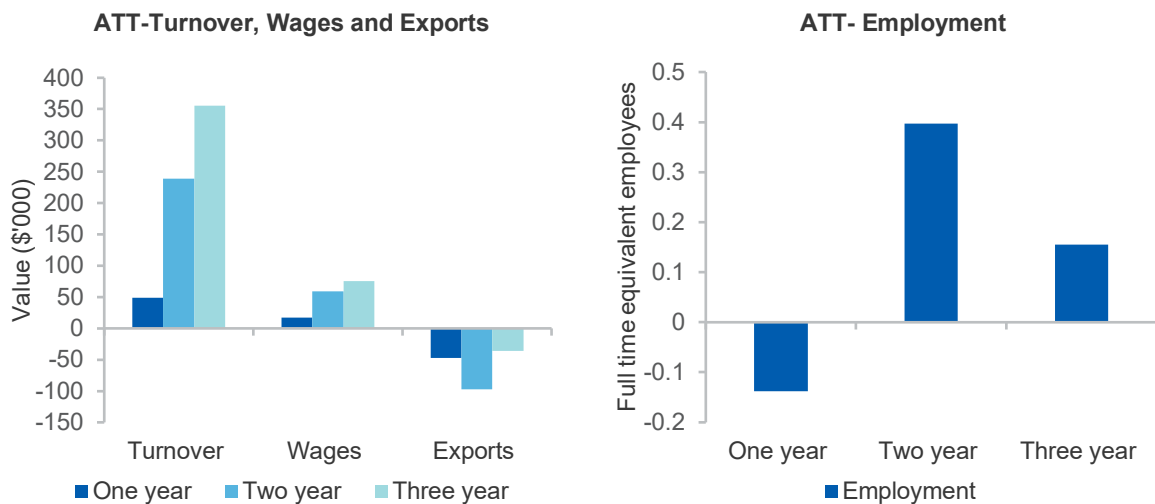
Source: Department of Industry, Science, Energy and Resources experimental estimates

The one-year and two year additionalities in turnover, wages, export sales and employment of FIAL firms were lower than that of non-IGC participating firms. However, after three years gains in all performance indicators were significantly greater than the non-IGC participating firms. This indicates that firms gain by participating in FIAL in the longer run.

5.4. Performance of METS participants

METS Ignited was established to help grow the Australian METS industry, overcome barriers and to secure a share of the growing global market. Improved processes, products and services will have a major impact on the METS sector with potential for further growth through exporting, technology development and the creation of new processes, services and products.

Figure 5.4 Impact on one-year, two-year and three-year changes in METS participants



Source: Department of Industry, Science, Energy and Resources experimental estimates

After two years, the participants of METS outperformed the constructed control group in terms of turnover, wages and employment growth. Although additionalities of export sales were lower than the constructed control group, it showed some improvement over time.

As showed in Table 3.3, a high proportion of METS Ignited participants (26.9 per cent) are exporters. In contrast, the METS growth centre reports¹³ that, on average, 66 per cent of METS companies are exporting and 25 per cent of total annual revenue comes from international jurisdictions. Note that this impact analysis considered only simple firms which are more often SMEs. Moreover, as part of this analysis, only firms with export revenue above \$2,000 per annum are classed as exporters.

¹³ METS Ignited- Industry growth centre available at <https://metsignited.org/>

5.4.1. Analysis of METS cohorts

The METS IGC had sufficient data to facilitate cohort analysis (i.e. comparing the performance of a group of new firms that participated in IGC activities in a given financial year). As such, the impact of the IGC initiative on participants is likely to vary over time given that the inherent characteristics of firms are not uniform. Moreover, IGCs are also expected to learn from experience and improve over time, which could lead to larger impacts on firms' performance in more recent years. Cohort specific, one-year, two-year and three-year changes of performance indicators are shown in Table 5.1.

Table 5.1 METS participant cohort analysis, 2015-16 to 2017-18

Cohort	Changes	Turnover (\$'000)	Wages (\$'000)	Exports (\$'000)	Employment (FTE)
2015-16	One year	34.5	7	-33	-0.3
	Two year	237.1	66.6	-71.8	0.1
	Three year	366.3	72.1	-12.7	0.4
2016-17	One year	56	17.3	-80.1	0.1
	Two year	270.2	57.7	-110.4	0.6
2017-18	One year	87.9	48.7	-12.9	-0.2

Source: Department of Industry, Science, Energy and Resources experimental estimates.

It appears that the one year impact on turnover and wages was stronger in more recent cohorts than older cohorts. The results for employment and exports over a one-year period were mixed for different yearly cohorts of participating firms. The two-year impact of the program on turnover and employment was also stronger for more recent cohorts, but results were weaker for wages and exports over this period. In general, there is some evidence that participating firms in more recent cohorts more strongly outperformed the constructed control group than the participating firms from older cohorts, suggests that the effectiveness of the METS IGC's activities improved over time.

5.5. Impact of NERA, MTPC, AMGC and AustCyber

Given data deficiencies, only one-year and two-year ATTs were estimated for NERA, MTPC, and AMGC where possible. AustCyber had insufficient data to support any ATT estimation. The participants of NERA outperformed their counterfactuals such that they recorded larger increases in turnover, wages and employment after one year. It also showed additionalities on export sales after two years (Table 5.2).

Table 5.2 Impact on NERA after one and two years

Cohort	Turnover (\$'000)	Wages (\$'000)	Exports (\$'000)	Employment (FTE)
One year	90.23	0.39	33.28	-2.59 [†]
Two year	366.26	1.81	113.78	6.86

Notes: All stats (except [†]) are significant at 5 per cent; Firms in the upper and lower one percentile of turnover growth are dropped as outliers.

Source: Department of Industry, Science, Energy and Resources experimental estimates.

The participants of MTPC and AMGC outperformed the control group only in terms of wages and employment growth as illustrated in Table 5.3.

Table 5.3 Impact on MTPC and AMGC after one year

Growth Centre	Turnover (\$'000)	Wages (\$'000)	Exports (\$'000)	Employment (FTE)
MTPC	-22.32	20.07	-14.35	0.36
AMGC	-3.25	69.94	-4.71	0.8

Notes: All stats are significant at 5 per cent; Firms in the upper and lower one percentile of turnover growth are dropped as outliers.

Source: Department of Industry, Science, Energy and Resources experimental estimates.

6. Limitations of the analysis

Given the analytical challenges associated with complex firms, the findings of this study are limited to simple firms (generally SMEs). The lack of consistent cataloguing of participation in IGC activities has caused challenges in estimating the impacts on each IGC. Even though IGCs have reported a number of interactions with their participants, observed patterns of reported data do not properly reflect their consistent interactions and participation. For future work, it is important for the IGCs to accurately track the number of participants since the time of inception, and the timing, type and frequency of interactions with the participants to facilitate a more definitive impact assessment.

7. Conclusion

The long-term goal of the IGCs initiative is to foster entrepreneurship, innovation, industry competitiveness and economic growth. Overall, our analysis suggests that the IGCs initiative generates some positive impacts on turnover, wages and employment growth for simple firms (generally SMEs). However, the program's impact on export sales growth appears to be mixed with SMEs and METS participants in general underperforming relative to the constructed control group.

There are differences in the business size, age, industry, foreign ownership and exporter status distribution of IGCs. In general, IGC participating firms appear to be mostly mature firms and concentrated in service industries. The size distribution is also mostly skewed towards larger firms compared to the overall Australian employing business population.

On average, 83 per cent of IGC participants are mature firms (firms that are more than six years old). Given the important role that small young firms play in the economy (particularly from a net jobs growth perspective)¹⁴, it would be beneficial for IGCs to focus on a larger group of younger firms over time in line with the objective to foster entrepreneurship. Moreover, small and young businesses are likely to benefit more from IGC support given that these businesses are more likely to suffer from cognitive biases and information asymmetries in whatever challenge they are facing.

Compared to the general Australian business population, it is encouraging to observe that the IGC initiative has an above-average share of exporting firms. This, combined with findings on innovation activity (R&D expenditure and patents/trademarks) illustrate that IGCs are interacting with competitive firms that can play an important role in driving broader system-level changes.

¹⁴ Office of the Chief Economist (OCE) research for example shows that around 80 per cent of net jobs growth in Australia over the decade to 2014 is attributed to entrepreneurs and small young firms (see Bakhtiari, 2019).

In terms of future work, the analysis can be extended to investigate the impacts on multifactor productivity. Moreover, we intend to investigate the export diversification of IGC participants in terms of products and destinations. Given that some IGC participating firms also participate in other DISER programs, it would also be important to control for the impact of other programs (particularly the Research and Development Tax Incentive Program and the Entrepreneurs' Programme).

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Disclaimer

The results of these studies are based, in part, on ABR data supplied by the Registrar to the ABS under A New Tax System (Australian Business Number) Act 1999 and tax data supplied by the ATO to the ABS under the Taxation Administration Act 1953. These require that such data is only used for the purpose of carrying out functions of the ABS. No individual information collected under the Census and Statistics Act 1905 is provided back to the Registrar or ATO for administrative or regulatory purposes. Any discussion of data limitations or weaknesses is in the context of using the data for statistical purposes, and is not related to the ability of the data to support the ABR or ATO's core operational requirements. Legislative requirements to ensure privacy and secrecy of this data have been followed. Only people authorised under the Australian Bureau of Statistics Act 1975 have been allowed to view data about any particular firm in conducting these analyses. In accordance with the Census and Statistics Act 1905, results have been confidentialised to ensure that they are not likely to enable identification of a particular person or organisation.

Appendix

Table A.1 Alignment of ANZSIC classes between IGCs and Entrepreneurs' Programme (EP)

ANZSIC	Description	FIAL	AMGC	NERA	METS	MTPC	AustCyber	EP
111	Nursery Production (Under Cover)	x	x	x	x	x	x	✓
112	Nursery Production (Outdoors)	x	x	x	x	x	x	✓
113	Turf Growing	x	x	x	x	x	x	✓
121	Mushroom Growing	x	x	x	x	x	x	✓
133	Berry Fruit Growing	✓	x	x	x	x	x	x
134	Apple and Pear Growing	✓	x	x	x	x	x	x
135	Stone Fruit Growing	x	x	x	x	x	x	✓
141	Sheep Farming (Specialised)	x	x	x	✓	x	x	x
151	Sugar Cane Growing	x	x	x	x	x	x	✓
160	Dairy Cattle Farming	✓	x	x	x	x	x	x
191	Horse Farming	x	x	x	✓	x	x	x
192	Pig Farming	x	x	x	x	x	x	✓
201	Offshore Longline and Rack Aquaculture	x	x	x	x	x	x	✓
202	Offshore Caged Aquaculture	x	x	x	x	x	x	✓
302	Logging	x	x	x	x	x	x	✓
412	Prawn Fishing	x	x	x	x	x	x	✓
413	Line Fishing	✓	x	x	x	x	x	x
414	Fish Trawling, Seining and Netting	✓	x	x	x	x	x	x
803	Copper Ore Mining	x	x	x	✓	x	x	x
807	Silver-Lead-Zinc Ore Mining	x	x	x	✓	x	x	x
911	Gravel and Sand Quarrying	x	x	x	x	x	x	✓
1011	Petroleum Exploration	x	x	✓	x	x	x	x
1181	Sugar Manufacturing	x	x	x	x	✓	x	x
1312	Natural Textile Manufacturing	✓	x	x	x	x	x	x
1340	Knitted Product Manufacturing	x	x	x	x	x	x	✓
1352	Footwear Manufacturing	x	x	x	x	x	x	✓
1411	Log Sawmilling	x	x	x	x	x	x	✓

ANZSIC	Description	FIAL	AMGC	NERA	METS	MTPC	AustCyber	EP
1412	Wood Chipping	x	x	x	x	x	x	✓
1491	Prefabricated Wooden Building Manufacturing	x	x	x	x	x	x	✓
1494	Reconstituted Wood Product Manufacturing	x	x	x	x	x	x	✓
1523	Paper Stationery Manufacturing	x	x	x	x	x	x	✓
1529	Other Converted Paper Product Manufacturing	x	x	x	x	x	x	✓
1612	Printing Support Services	x	x	x	x	x	x	✓
1620	Reproduction of Recorded Media	x	x	x	✓	x	x	x
1701	Petroleum Refining and Petroleum Fuel Manufacturing	✓	x	x	x	x	x	x
1811	Industrial Gas Manufacturing	x	x	x	x	x	x	✓
1832	Pesticide Manufacturing	x	x	x	x	x	x	✓
1892	Explosive Manufacturing	x	x	x	✓	x	x	x
1899	Other Basic Chemical Product Manufacturing n.e.c.	x	x	x	x	x	x	✓
1915	Adhesive Manufacturing	x	x	x	x	x	x	✓
2032	Plaster Product Manufacturing	x	x	x	x	x	x	✓
2141	Non-Ferrous Metal Casting	x	x	x	x	x	x	✓
2149	Other Basic Non-Ferrous Metal Product Manufacturing	x	x	x	x	x	x	✓
2222	Prefabricated Metal Building Manufacturing	x	x	x	x	x	x	✓
2224	Metal Roof and Guttering Manufacturing (except Aluminium)	x	x	x	x	x	x	✓
2291	Spring and Wire Product Manufacturing	x	x	x	x	x	x	✓
2292	Nut, Bolt, Screw and Rivet Manufacturing	x	x	x	x	x	x	✓
2313	Automotive Electrical Component Manufacturing	x	x	x	x	x	x	✓
2391	Shipbuilding and Repair Services	x	x	x	x	x	x	✓
2432	Electric Lighting Equipment Manufacturing	x	x	x	x	x	x	✓
2441	Whiteware Appliance Manufacturing	x	x	x	x	x	x	✓
2512	Metal Furniture Manufacturing	x	x	x	x	x	x	✓
2519	Other Furniture Manufacturing	x	x	x	x	x	x	✓
2591	Jewellery and Silverware Manufacturing	x	x	x	x	x	x	✓

ANZSIC	Description	FIAL	AMGC	NERA	METS	MTPC	AustCyber	EP
2592	Toy, Sporting and Recreational Product Manufacturing	x	x	x	x	x	x	✓
2599	Other Manufacturing n.e.c.	x	x	x	x	x	x	✓
2611	Fossil Fuel Electricity Generation	x	x	x	✓	x	x	x
2619	Other Electricity Generation	x	x	x	x	x	x	✓
2812	Sewerage and Drainage Services	x	x	x	x	x	x	✓
2911	Solid Waste Collection Services	x	x	x	x	✓	x	x
3223	Roofing Services	x	x	x	x	x	x	✓
3239	Other Building Installation Services	x	x	x	x	x	x	✓
3292	Hire of Construction Machinery with Operator	x	x	x	x	x	x	✓
3312	Cereal Grain Wholesaling	x	x	x	x	x	x	✓
3332	Plumbing Goods Wholesaling	x	x	x	x	x	x	✓
3493	Telecommunication Goods Wholesaling	x	x	x	✓	x	x	x
3501	Car Wholesaling	✓	x	x	x	x	x	x
3502	Commercial Vehicle Wholesaling	x	x	x	x	x	x	✓
3505	Motor Vehicle Dismantling and Used Parts Wholesaling	x	x	x	x	x	x	✓
3603	Dairy Produce Wholesaling	✓	x	x	x	x	x	x
3604	Fish and Seafood Wholesaling	✓	x	x	x	x	x	x
3731	Furniture and Floor Covering Wholesaling	✓	x	x	x	x	x	x
3733	Kitchen and Dining ware Wholesaling	x	x	x	✓	x	x	x
3921	Motor Vehicle Parts Retailing	x	x	x	✓	x	x	x
4000	Fuel Retailing	x	x	x	x	x	x	✓
4122	Fruit and Vegetable Retailing	✓	x	x	x	x	x	x
4123	Liquor Retailing	✓	x	x	x	x	x	x
4214	Manchester and Other Textile Goods Retailing	x	x	x	x	x	x	✓
4231	Hardware and Building Supplies Retailing	x	x	x	x	x	x	✓
4244	Newspaper and Book Retailing	✓	x	x	x	x	x	x
4245	Marine Equipment Retailing	x	x	x	x	x	x	✓
4253	Watch and Jewellery Retailing	x	x	x	x	x	x	✓
4272	Stationery Goods Retailing	x	x	x	x	x	x	✓

ANZSIC	Description	FIAL	AMGC	NERA	METS	MTPC	AustCyber	EP
4320	Retail Commission-Based Buying and/or Selling	✓	x	x	x	x	x	x
4720	Rail Passenger Transport	x	x	x	✓	x	x	x
4810	Water Freight Transport	x	x	x	x	x	x	✓
4820	Water Passenger Transport	x	x	x	x	x	x	✓
4900	Air and Space Transport	x	x	x	x	x	x	✓
5010	Scenic and Sightseeing Transport	x	x	x	x	x	x	✓
5029	Other Transport n.e.c.	x	x	x	x	x	x	✓
5220	Airport Operations and Other Air Transport Support Services	x	x	x	x	x	x	✓
5301	Grain Storage Services	x	x	x	x	x	x	✓
5309	Other Warehousing and Storage Services	x	x	x	x	x	x	✓
5411	Newspaper Publishing	x	x	x	✓	x	x	x
5412	Magazine and Other Periodical Publishing	x	x	x	✓	x	x	x
5419	Other Publishing (except Software, Music and Internet)	✓	x	x	x	x	x	x
5514	Post-production Services and Other Motion Picture and Video Activities	x	x	x	x	x	x	✓
5522	Music and Other Sound Recording Activities	x	x	x	x	x	x	✓
5809	Other Telecommunications Services	x	x	x	x	x	x	✓
6020	Other Information Services	x	x	x	x	x	x	✓
6229	Other Depository Financial Intermediation	x	x	x	✓	x	x	x
6230	Non-Depository Financing	x	x	x	✓	x	x	x
6322	General Insurance	x	x	x	✓	x	x	x
6330	Superannuation Funds	x	x	x	✓	x	x	x
6420	Auxiliary Insurance Services	✓	x	x	x	x	x	x
6611	Passenger Car Rental and Hiring	x	x	x	x	x	x	✓
6632	Video and Other Electronic Media Rental and Hiring	✓	x	x	x	x	x	x
6720	Real Estate Services	x	x	x	✓	x	x	x
6961	Corporate Head Office Management Services	x	x	x	✓	x	x	x
6970	Veterinary Services	x	x	x	x	x	x	✓
7293	Credit Reporting and Debt Collection Services	x	x	x	✓	x	x	x

ANZSIC	Description	FIAL	AMGC	NERA	METS	MTPC	AustCyber	EP
7294	Call Centre Operation	✓	x	x	x	x	x	x
7551	Domestic Government Representation	x	x	x	✓	x	x	x
7600	Defence	x	x	x	x	x	x	✓
7713	Fire Protection and Other Emergency Services	x	x	x	x	x	x	✓
7719	Other Public Order and Safety Services	x	x	x	x	x	x	✓
7720	Regulatory Services	✓	x	x	x	x	x	x
8023	Combined Primary and Secondary Education	x	x	x	x	x	x	✓
8401	Hospitals (Except Psychiatric Hospitals)	x	x	x	x	x	x	✓
8520	Pathology and Diagnostic Imaging Services	x	x	x	x	x	x	✓
8531	Dental Services	x	x	x	x	x	x	✓
8532	Optometry and Optical Dispensing	x	x	x	x	x	x	✓
8533	Physiotherapy Services	x	x	x	x	x	x	✓
8599	Other Health Care Services n.e.c.	x	x	x	x	x	x	✓
8790	Other Social Assistance Services	x	x	x	x	x	x	✓
8921	Zoological and Botanical Gardens Operation	x	x	x	x	x	x	✓
9131	Amusement Parks and Centres Operation	x	x	x	x	x	x	✓
9139	Amusement and Other Recreational Activities n.e.c.	x	x	x	x	x	x	✓
9499	Other Repair and Maintenance n.e.c.	x	x	x	x	x	x	✓
9531	Laundry and Dry-Cleaning Services	x	x	x	x	x	x	✓
9540	Religious Services	✓	x	x	x	x	x	x
9552	Labour Association Services	x	x	x	✓	x	x	x
9601	Private Households Employing Staff	✓	x	x	x	x	x	x

Notes: n.e.c.- not elsewhere classified

Source: Department of Industry, Innovation and Science

Table A.2 The average treatment effect of treated (ATT) Complex firms

		Complex Firms			
		Turnover (\$,000)	Employment FTEs	Wages (\$,000)	Exports (\$,000)
One year	Overall	3872.97	-0.02	526.63	2826.04
	FIAL	-1536.07	6.42	918.53	-2888.40
	METS	9725.86	-5.48	-1640.46	1920.37
	AMGC	-6576.44	1.30	-1657.46	1275.19
	NERA	14806.86	28.75	-2656.13	15355.68
	MTPC	3647.71	6.75	6049.79	-1543.84
Two year	Overall	17748.78	1.19	-81.76	7702.69
	FIAL	10295.32	33.95	3462.38	635.22
	METS	17312.26	-25.37	-2915.72	4936.59
	AMGC	-47831.00	61.72	-5289.73	11429.95
	NERA	89571.40	40.36	-5496.38	59220.87
	MTPC	3647.71	6.75	6049.79	-1543.84
Three year	Overall	-3756.68	18.98	2127.05	-14088.94
	FIAL	-5376.70	35.23	2653.32	-20666.64
	METS	4614.40	-14.13	-922.09	-8236.62
	NERA	241374.48	248.68	22553.38	181448.81

Notes: All stats are significant at 5 per cent; Firms in the upper and lower one percentile of turnover growth are dropped as outliers.

Source: Department of Industry, Science, Energy and Resources experimental estimates (2020)

Table A.3 Number of grant recipients

	2015-16	2016-17	2017-18	2018-19
FIAL	26	3	8	7
AMGC	na	4	56	24
NERA	8	77	65	24
AustCyber	na	na	17	na
METS	83	6	9	5
MTPC	na	72	77	
All IGCs	117	162	232	77

Source: Department of Industry, Science, Energy and Resources experimental estimates (2020)

Table A.4 The average treatment effect on the treated (ATT) of IGC grant recipients in relative to IGC non-grant recipients

	Turnover (\$, 000)	Employment FTEs	Wages (\$, 000)	Export Sales (\$, 000)
One year	61.28	1.19	80.56	74.77
Two year	146.29	2.04	123.45	130.36
Three year	205.70	2.69	189.45	-135.08

Notes: All stats are significant at 5 per cent; Firms in the upper and lower one percentile of turnover growth are dropped as outliers.

Source: Department of Industry, Science, Energy and Resources experimental estimates (2020)

Table A.5 ANZSIC codes with high proportions of IGC participating firms

ANZSIC class	Number of IGC firms	Proportion of all IGC firms	Number of firms in the 2017–18 BCS
6962	908	8.16	196
6923	825	7.41	162
7000	643	5.78	190
6910	585	5.25	57
8102	333	2.99	0
1090	310	2.78	129
9999	306	2.75	0
6999	265	2.38	11
6419	253	2.27	137
9551	229	2.06	0
6240	175	1.57	6
1841	165	1.48	17
6925	138	1.24	46
2462	132	1.19	6
6931	131	1.18	85
7520	123	1.10	0
2599	116	1.04	6
8101	102	0.92	0

Source: IGC program data and the Business Characteristics Survey microdata in BLADE