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BUSINESS EXPOSURE INFORMATION FRAMEWORK

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CONTENTS

EXECUTIVE SUMMARY

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Bushfire and Natural Hazards are features of the Australian climate and landscape and the threats will continue (COAG, 2011). These hazards can have profound personal, social, economic and environmental impacts. The impacts of these disasters demand the need to advance the efforts of planning, preparation, response and recovery to improve community resilience. Disaster management is a collective responsibility of all levels of government, society, businesses and individuals. For disaster resilience, emergency management planning should consider risk and risk treatments across the built, economic, social and environmental assets (COAG, 2011). Exposure "what is at risk" information is fundamental for assessing risk from natural hazards and therefore nationally consistent information is required for evidence based prioritising and targeting interventions. To address this, consistent methodologies and frameworks are required to enable information sharing and accurate interpretation.

In natural hazards and disasters decision making *Exposure* is a key component and constitutes people, buildings, infrastructure (transport, energy, communications and water), businesses, hazardous substances, primary and major industries. This report is an outcome of research funded by Bushfire and Natural Hazards CRC to develop an "Australian Natural Hazards Business Exposure Information Framework". The framework is aimed at supporting the development of nationally consistent and centralised business and economic exposure information to enable the decision making in disaster management to the evidence based. This research has reviewed the current literature and information providers; engaged end users and researchers for future requirements, and conducted a gap analysis.

The literature review has helped to understand the relevant practices and future trends at international, national, regional and local levels. In particular, the review highlighted the business and economic exposure data requirements to enable researchers to develop models for better impact analysis.

The project has conducted an on-line survey of existing exposure information capabilities in Australia to ascertain existing data and information capabilities for disaster response and recovery. Overall a lack of national consistency in existing data and information capabilities is a limiting factor in evidence based decision making.

The project also conducted a Stakeholder Engagement Workshop with an aim to identify the exposure information needs of researchers and other end users in Australia. The workshop provided an opportunity for thirty six participants representing decision makers, emergency managers, planners, researchers, asset managers and the insurance sector to outline their future requirements. The collective views of data managers, researchers and end users have informed the basis for exposure information requirements to develop a consistent, standardised exposure information framework that will support vulnerability assessments for disaster risk reduction and socio-economic impact analysis.

Information on some exposure elements is critical for some end users and may not be of interest for others. To reduce the complexity, the framework categorises the information provision into three levels depending on user requirements such as policy and planning; response and recovery; and research and analysis. Australian Natural Hazards Exposure Framework (ANHEF) levels and their aims, description and boundaries are outlined in Built Environment Exposure Information Framework Report. There is some fundamental information and common elements that underpins the entire exposure framework such as spatial enablement; land use categorisation; insurance status and metadata outlined in Built Environment Exposure Information Framework Report.

The business exposure information framework presents the exposure elements required to develop information systems to support the impact analysis of both micro-economic (business sectors) and macro-economic (regional) for disaster risk reduction from a variety of natural hazards. The micro-economic variables considered in the framework include business entity, type, size, operations, space usage, workforce and input requirements. Whereas the macro-economic variables include the size and performance of the economy, industry sectors and labour force characteristics to assess the local economy.

The document outlines a generic framework to underpin the utilisation and is focused on end user requirements. The report identifies a list of exposure elements across different components of the business and economic activity that are presented in the summary tables.

END USER STATEMENT

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Natural disasters disrupt business, affecting not only the economy of a region but the community. Businesses with an understanding of their risk from natural hazards are able to develop disaster management plans. Reliable and consistent information on natural hazard exposure is important for disaster management and decision making.

This is the first attempted at developing a national consistent framework for business and economic exposure information and identifying the complex exposure data requirements that are important for enabling a better understanding of business vulnerability to natural disasters.

The framework has identified the business and economic exposure elements through a comprehensive review of literature and engaging with stakeholders. The report highlights the relevant data that exists and identifies the gaps and overlaps in data.

A critical element for the utilisation road map is communicating strategy to a range of stakeholders the importance of the framework, how the framework will assist them in impact assessments.

1 INTRODUCTION

1.1 Why do we need the Business Information Framework?

Australia has witnessed many disastrous 'natural disasters' including floods, bushfires, droughts, storms, earthquakes and landslides. These events not only cause significant financial difficulties for individuals and communities but, are accompanied with loss of life, and ultimately, they are a great source of disruption to the business communities affecting the economy (Australian Government, 2016). Generally, the severities of the natural disasters are felt in the region that they occur and impact on the regional economy. However, depending on the size of the event, the impact can be felt at the national level. There are a number of such events listed under Australian government website. Millennium drought, Ash Wednesday bush fires, recent floods in Queensland are some of the Australian natural disasters to name a few. There are also reports that climate change will cause more frequent and severe natural events in the country (IPCC, 2013).

Natural disasters randomly threaten lives and damage private and public property as well as disrupt public services such as water, power, transport, and communication facilities. They reduce the pace of capital accumulation by destroying existing productive and social capital (including standing crops) and diverting scarce resources away from new investment. They result in deaths, long-term health problems and withdrawal of children from education, reducing existing human capital stock. The disastrous consequences have been reported in various published literatures (e.g., Tierney and Nigg, 1995a; Tierney and Nigg, 1995b; Tierney et al., 1996; Boarnet, 1995; Gordon et al., 1995): business and network interruptions, supply chains coming to grinding halt, commodity price fluctuations, physical damage to asset, impacts on economic output and constrained GDP growth. The disruption and damage have often led to population relocation and cascading unemployment post disasters. The modern and interdependent economy might be more productive but growing exposures and interconnectivity also makes it more vulnerable to natural hazards. Our ability to build resilience has not kept pace with our ability to grow (Governments, 2011). The Emergency Management Australia (EMA) reports that there have been 265 natural disasters costing more than $10 million each during the period 1967 to 1999 with an average annual cost of $1.14 billion for the same period (Gentle et al, 2001). Consequently, the natural disasters management such as planning, preparedness and recovery acquires significant importance at the national, state and local government level.

Constitutional responsibility for disaster prevention, preparedness, response and recovery rests primarily with the states and territories in Australia. However, due to the scale of the impacts of certain events across all sections of the population, including the significant damage to infrastructure, additional support from the Federal Government is often required (AAGD, 2013). Through the Natural Disaster Relief and Recovery Arrangements (NDRRA) the Federal Government provides funding to help pay for natural disaster relief and recovery costs. The Attorney-General's Department administers the NDRRA on behalf of the Federal Government. Under the NDRRA the Commonwealth reimburses up to 75 per cent of reconstruction costs. For events in Queensland between late 2010 and June 2013, the Australian Government will contribute approximately $7.5 billion towards reconstruction and recovery projects (AAGD, 2013). So, while disaster management through planning, response and recovery is important it is equally important

to assess the economic impact of disasters and its recovery and reconstruction after the event.

Consistent and reliable information on natural hazard exposure is crucial for disaster management and evidence-based decision making. Exposure is referred to as the elements that have been, or could be, subject to the impact of natural hazards within an area (Middelmann et al, 2005, p.1). The elements that are at risk include buildings, assets, population, economic activities, services, utilities and infrastructure (EMA, 2004, p.48). However, there are few capabilities in Australia that provides exposure information for example Geoscience Australia's (GA) National Exposure Information System (NEXIS) and a database developed by Emergency Information Coordination Unit (EICU) in New South Wales. This project aims to develop a comprehensive Business Exposure Information Framework (BEIF) which is part of a broader project to develop an Australian Natural Hazards Exposure Information framework (ANHEF) incorporating other components of the exposure such as buildings, infrastructure and population. ANHEF will identify the fundamental data requirements and modelling to derive exposure information to enable better understanding of the vulnerability of these components. The framework is to enable a user, researcher or end-user to prepare the exposure database. The Business Exposure Information Framework (BEIF) will specifically enable end-users to access the relevant data more readily which will in turn help in planning, response, recovery and economic impact assessment of the exposed business community in Australia. The information can also be used to estimate the capital at risk and establish the need for disaster resilient approach to enable the business entities to prepare for potential disasters and to respond effectively and cope with the event. Since disasters are local events, it becomes important to identify the types of industries present in the affected region and the scale of damage suffered.

The project aims to achieve the following objectives:

1. To establish the information needs of the end-users such as emergency managers, policy makers and researchers.
2. To establish the source and the extent of the existing information required for economic analysis.
3. To identify the information gaps based on objectives 1 and 2 listed above.
4. To make recommendations to overcome the gaps in information.

The Business Exposure Information Framework consists of business definition and activities information which are deemed necessary for disaster management. The framework identifies information requirement on business exposure that addresses issues on business continuity, disruption, resilience and recovery in disaster management. It is a precursor to the four widely recognised critical areas for intervention in disaster management namely, prevention preparedness response and recovery (PPRR).

The framework identifies different elements of business and economics exposure by different economic activity levels such as micro and macro-economic levels, through a process of extensive literature review, subject area expert and stakeholders consultations. Inclusion of these components in a nationally consistent exposure information framework will provide a consistent base to inform decision making for natural disaster risk reduction and management.

1.2 SCOPE OF THE PROJECT

This research project to develop a Business Exposure Information framework is part of a broader project to develop an Australian Natural Hazards Exposure Information framework (ANHEF) funded by Bushfire and Natural Hazards CRC (BNHCRC). The scope of the project is to develop an exposure information framework through review of existing literature/reports and international best practice; in collaboration with researchers, end users and international experts. The project covers the information needs on exposure of the built environment (buildings, infrastructure and residential population) and, business and proposes national standards for exposure database and a reliability assessment framework. The research has reviewed the current literature and information providers; engaged end users and researchers for future requirements; and conducted a gap analysis to make suggestions. The project is not scoped to collect, collate, model, maintain and distribute any exposure data.

This Milestone Report Business Exposure Information Framework outlines the broad requirements of business and economic activity exposure elements only. The Business Exposure Information Framework identifies different aspects of business and economic activity exposure information requirements, existing capabilities and gaps that would improve information for disaster risk mitigation capabilities. The exposure components identified in the framework have been developed using generic terminology to provide an ability to translate between multi-hazard risk assessment modelling capabilities and also for the non-technical users. The framework identifies the exposure elements required to develop information systems to support various phases of disaster risk reduction for a variety of natural hazards. The document outlines a generic framework to underpin the above mentioned diverse utilisation and focused on end user requirements.

The criticality of exposure elements and the level of details required to inform decisions on disaster management at different levels of geographies for respective federal, state and local governments varies. In Australia, for example for the federal government or state level decision making the individual asset level exposure information may not be required as it would result in information overloading. While they require asset level exposure information they require those to be aggregated to their required level of geography such as national and state. On the contrary at the local government level where the intervention would be undertaken by the end users, they need asset level information. To reduce the complexity, the framework categorises the information provision into three levels depending on user requirements as outlined in the Nadimpalli and Mohanty, 2015, they are:

1. policy and planning – recognised as ANHEF Level 1,
2. implementation – recognised as ANHEF Level 2,
3. research and analysis – recognised as ANHEF Level 3.

1.3 STRUCTURE OF THIS REPORT

This report has been prepared following an extensive literature review and stakeholder's engagement workshop on business exposure and international best practice; in collaboration with researchers, end users and subject matter experts. The review examined data requirements from previous experience on modelling economic impact of

disaster internationally as well as the key factors established from research as key to be included in economic modelling.

The framework draws information together from a range of sources. It attempts to define the relevant elements of business exposure and discusses how the data can be relevant for disaster reduction and recovery. References are made mostly to well established sources which are also experienced in keeping statistical records. It is important to have a consistent classification to enable valid comparison and aggregation of data sets. Where information has been identified as relevant and important but not found, a statement indicating gap is listed.

The framework also provides an overview of the currently available data. This includes information from Government and non-Government sources. Preference has been given to data sets that provide comprehensive coverage of businesses across Australia and that can be broken down to some form of local level data. As this type of information is limited, a range of other detailed data sets that are limited either in their geographical coverage or business type has also been included.

1.4 EXPOSURE FRAMEWORK FUNDAMENTALS

Built Environment Exposure Information Framework was completed as a milestone report and available for download from http://bnhcrc.com.au/publications/biblio/bnh-2701. The framework is a simple and clear way of presenting built environment exposure components and elements required to develop information systems to support various phases of disaster risk reduction from a variety of natural hazards at different levels of governance. The report outlines a generic framework that is focused on end user requirements and underpins better utilisation. Information on some exposure elements is critical for some end users and may not be of interest for others. To reduce the complexity, the framework categorises into three levels depending on user information requirements targeted for policy and planning, response and recovery, research and analysis.

Spatial enablement is an ability to add location to all information that allows the users are able to collect, update, analyse and dissemination for the data geographical governance. This is to represent the exposure information in certain geometry. Further the framework outlines required geographic areas for governance perspective. This also outlines the metadata requirements to understand the data provenance and quality.

2 BUSINESS EXPOSURE FRAMEWORK

In presenting the Business Exposure Information framework the first step is to define the concepts such as business and economic activity.

What is a business?

The ABS defines a business as 'a legal entity engaging in productive activity and/or other forms of economic activity in the market sector. Such entities accumulate assets on their own account and/or hold assets on behalf of others, and may incur liabilities. Excluded are the economic activities of individuals (except where individuals engage in productive activity either as sole traders or in partnership) and entities mainly engaged in hobby activities'.

What is Economic Activity?

Economic Activity is defined as 'actions that involve the production, distribution and consumption of goods and services at all levels within a society. Gross domestic product or GDP is one way of assessing economic activity, and the degree of current economic activity and forecasts for its future level can significantly impact business activity and profits, as well as inflation and interest rates' (BusinessDictionary, 2016: http://www.businessdictionary.com/).

The framework identifies and presents different components of business and economics activity exposure information requirements for disaster management. The business and economic activity exposure elements have been broadly classified into different economic activity levels such as micro and macro-economic levels for information standardisation and easier interpretability. Also, irrespective of whether the business exposure element is a requirement at the micro or macro-economic level, there are certain elements that are identified in this framework as the information requirement at the foundational level that are generic to both the economic activity levels.

All the information needs to be spatially enabled that means the location of the business needs to be captured. The location may be represented as a point or polygon. In business exposure information, the location of corporate office and also the operational sites to be maintained to reduce the complexity. The spatial enablement and foundational information is presented in detail in the milestone report: "Built Environment Exposure Information Framework" (Nadimpalli and Mohanty, 2015), while this report presents the framework for micro and macro-economic activity levels.

Microeconomics focuses on micro or small segment of economy and it studies the decision making process and economic problems of individuals (household, firm, industry etc) in an economy with respect to that how they use scarce means or resources at their disposal for satisfying their unlimited ends. On the other hand Macroeconomics looks at a larger picture and is study of economy as a whole.

Microeconomics is the study of an individual, household, business firm or an individual industry etc with respect to how they use/divide their given scarce means among the possible alternative uses/ends in order to maximise their gain or well-being. Microeconomic theory does not study the economy as a whole and instead studies the individuals and their gain maximising behaviour in any economy. Microeconomics studies and analyses individual behaviour with respect to issues like production, consumption, distribution, price determination etc. The framework presents business exposure information elements broadly at microeconomic and macroeconomic activity levels.

2.1 BUSINESS TYPE

There is evidence suggesting that the business type or the industry classification to which the business belongs has influence on their level of disaster preparedness for example businesses in the finance, insurance and real estate sector were generally better prepared than business in other sectors of economy (Dalhamer and D'Souza, 1995). This relationship may be due to certain mandates and regulations required for the industry. For example, loss-reduction requirements are relatively strong for businesses in the finance, insurance, and real estate sectors, and there is some evidence suggesting that businesses in these sectors tend to do more to prepare for disasters. Generally speaking, there are few outright mandates governing business disaster mitigation, preparedness, response, and recovery.

Most industry classification in Australia uses the Australian and New Zealand Standard Industrial Classification (ANZSIC) 2006 (1292.0) (Australian Bureau of Statistics, 2006) that have been jointly devised by the Australian Bureau of Statistics and Statistics NZ. This classification is a hierarchical classification with four levels, namely:

1. Divisions (the broadest level);
2. Subdivisions;
3. Groups; and
4. Classes (the finest level).

At the 'Divisional' level, the main purpose is to provide a limited number of categories which provide a broad overall picture of the economy and are suitable for the publication of summary tables in official statistics. The Subdivision, Group and Class levels provide increasingly detailed dissections of these categories for the compilation of more specific and detailed statistics. The numbering system adopted in the ANZSIC is alphanumeric and has a hierarchical structure (see example below), where the leading alpha character denotes the industry division. The ANZSIC subdivision, group and class levels are denoted by numeric codes.

Where an individual business entity can be classified by more than one ANZSIC code, the ANZSIC identifier must reflect the primary (or most significant) industry that best describes the individual business entity's main economic activity.

In total, there are 19 divisions, 86 sub-divisions, 195 groups and 506 classes specified under ANZSIC.

Level Example

Division C Manufacturing

Subdivision 11 Food Product Manufacturing

Group 111 Meat and Meat Product Manufacturing

Class 1111 Meat Processing

2.1.1 INDUSTRY DIVISION

The main purpose of the industry division level is to provide a limited number of categories which give a broad overall picture of the economy. There are 19 divisions

within ANZSIC06 each identified by an alphabetical letter, that is, 'A' for Agriculture, Forestry and Fishing, 'B' for Mining, 'C' for Manufacturing, etc.

2.1.2 INDUSTRY SUBDIVISION

This is the broadest level category within an industry division of ANZSIC and is recognised by a two digit code, e.g. Industry Subdivision 39 for Motor Vehicle and Motor Vehicle Parts Retailing. Industry subdivisions are built up from industry groups which, in turn, are built up from industry classes.

2.1.3 INDUSTRY GROUP

This is the intermediate level within an industry division of ANZSIC and is recognised by a three digit code, e.g. Industry Group 391 for Motor Vehicle Retailing. It gives more detail than the industry subdivision and is created in a way that keeps industry classes together.

2.1.4 INDUSTRY CLASS

At the industry class level, the activities of businesses are narrowly defined and recognised by a four digit code, e.g. Industry Class 3911 for Car Retailing.

In the example above, the Manufacturing Division is denoted by the alpha character C. The 'Food Product Manufacturing' Subdivision is represented by the numeric code 11. The 'Meat and Meat Product Manufacturing' Group is represented by the numeric code 111, and the 'Meat Processing' Class is represented by the numeric code 1111.

This framework identifies the business exposure elements required for exposure data collection, collation and provision may include the above four standard ANZSIC classifications.

Existing Capabilities

Information on the industry classification is available through a range of data sources (Australian Bureau of Statistics, Australian Business Register, COMPANY360, IBISWORLD).

Gaps & Suggestions

There are currently no consistencies in the industry classification adopted by the data sources. For example, the ABS Count of Business Entry and Exit, the Australian Business Register and state based WorkCover information all utilise ANZSIC codes, however, COMPANY360 uses the Standard Industrial Classification (SIC) codes. Further, the information may not be publicly available at the local area level.

2.2 BUSINESS ORGANISATION

2.2.1 BUSINESS STRUCTURE

Different legal requirements apply to the various business structures. The business structure may also affect the type and amount of government assistance available following a disaster.

The four main business structures commonly used by small businesses in Australia are:

1. Sole trader: an individual trading on their own.

2. Partnership: an association of people or entities running a business together, but not as a company.
3. Trust: an entity that holds property or income for the benefit of others.
4. Company: a legal entity separate from its shareholders.

Existing Capabilities and Gaps in Data Requirements

Information on business structure can be obtained from the Australian Business Register. Access to the information is limited to individual search through the web interface.

2.2.2 TYPE OF LEGAL ORGANISATION

The Type of Legal Organisation (TOLO) classification is applied to business entities and subdivides them into classes on the basis of their legal organisation. This classification provides structures for presenting information on the characteristics of businesses in Australia and for the analysis employing units.

Statistical units are businesses, government entities, households or other entities about which statistics are compiled. They are defined in a consistent way to enable users of ABS statistics to make valid comparisons of information compiled from different statistical sources and to enable composite pictures of the economy to be drawn.

The basic statistical unit that is classified by a sector is the institutional unit. An institutional unit is one that is able to:

- own or exchange goods and assets in its own right;
- make economic decisions and engage in economic activities for which it is held directly responsible and accountable at law;
- enter into contracts and incur liabilities on its own behalf; and
- compile a complete set of accounts, including a statement of financial position.

In some instances it is statistically advantageous to recognise as separate institutional units some entities which do not meet the above criteria. Although these do not exist as separate institutional units from their owners, and therefore are not institutional units in their own right, where they operate autonomously and keep a full set of accounts, notional institutional units are created to enable their separate collection.

There are four types of institutional units:

1. Corporations;
2. Government units;
3. Non-profit institutions; and
4. Households.

Corporations

A corporation is 'a legal entity, created for the purpose of producing goods and services for the market, that may be a source of profit or other financial gain to its owner(s); it is collectively owned by shareholders who have the authority to appoint directors responsible for its general management' (Australian Bureau of Statistics, 2008).

Corporations are typically:

- created by processes of law that establish their existence as independent from their shareholders, including other institutional units (i.e. other corporations, household unincorporated enterprises, government units and NPIs that may own shares or other equity in the corporations;
- created for the purpose of market production;
- owned by shareholders who receive a distribution of profits in proportion to their shareholdings; and
- fully accountable at law for their actions, obligations and contracts and are liable to pay taxes (i.e. they are a legal entity).

The company structure of corporations enables profits to be distributed to their shareholders. Examples of corporations are proprietary companies, limited liability companies and no liability companies.

Some incorporated entities are prohibited from distributing profits to their shareholders or members. Most companies limited by guarantee and all incorporated associations fall into this category. These types of institutional units are NPIs and are discussed later in this chapter.

Government Units

Government units are 'legal entities established by political processes that have legislative, judicial or executive authority over other institutional units within a given area' (Australian Bureau of Statistics, 2008).

The principal functions of government units are:

- to provide goods and services to individuals or the community at large;
- to redistribute income and wealth; and
- to engage in non-market production.

The majority of government units are readily identifiable as their operations are mainly financed from taxation and they redistribute income by means of transfers (e.g. subsidies, grants, welfare payments) or engage in other forms of non-market production, such as the provision of government services (e.g. defence, education, health services, economic advice) free of charge or at nominal prices.

To qualify as a separate legal entity, a government unit must:

- have funds of its own, raised by taxing other institutional units or received as transfers from other government units;
- have authority to disburse some, or all, of such funds in the pursuit of its policy objectives; and
- have authority to borrow funds on its own account.

Units that do not meet all of these criteria are treated as part of a larger government unit, i.e. the collective legal entity comprising all government units included in the public accounts. Included in this collective legal entity are departments and agencies operating from the public accounts of the parent government.

Non-profit Institutions (NPIs)

Non-profit institutions (NPIs) are defined as 'legal or social entities created for the purpose of producing goods and services whose status does not permit them to be a source of income, profit or other financial gain for the units that establish, control or finance them' (Australian Bureau of Statistics, 2008).

NPIs must have an enabling instrument which includes a clause that prohibits the NPI from distributing income, profit or other financial gain to its establishing, controlling or financing unit. This includes benefitting from the sale of assets in the event of the dissolution of the unit.

The productive activities of NPIs may generate either surpluses or deficits but any surpluses they make cannot be appropriated by the establishing, controlling or financing institutional unit. For this reason, they are frequently exempted from various kinds of taxes.

The main characteristics of NPIs are that they:

- are created by processes of law that establish the NPI's separate existence from the units that establish, finance, control or manage them;
- have purpose statements set out in articles of association;
- are associations with members who have equal voting rights and limited liability with respect to the NPI's operations;
- cannot distribute profits to members (the term 'non-profit institution' reflects the embargo on distribution of financial gains and is not intended to imply that NPIs cannot make a profit); and
- are self-governing, with their direction usually vested in a group of officers, an executive committee or a similar body elected by a majority of members.

A unit that is 'self-governing' is in charge of its own destiny. It is able to 'dissolve itself, set and change its by-laws and alter its mission or internal structure without having to secure permission from any other authority than the normal registration officials' (United Nations, 2003).

Households

A household is 'a group of persons who share the same living accommodation, who pool some, or all, of their income and wealth and who consume certain types of goods and services collectively, mainly housing and food' (Australian Bureau of Statistics, 2008).

Individual members of households are not treated as institutional units because many assets are owned (and liabilities incurred) jointly by two or more members of a household. Income can be pooled, and expenditure decisions are often made for the household as a whole. As a result, the household as a whole, including all individual members, is considered to be an institutional unit.

Where an unincorporated enterprise is entirely owned by a household, it is treated as an integral part of that household. Some members of households engage in market production through unincorporated enterprises such as sole proprietorships, partnerships and trusts.

Partnerships can be comprised of partners belonging to different households.

The liability of the owners of unincorporated businesses is unlimited. As a result, these businesses are treated as household units since all the assets of the household, including the dwelling itself, are at risk if the enterprise goes bankrupt. The institutional unit of each household involved in the partnership therefore represents the individual members of the household as well as the share of the unincorporated partnership owned by each household.

This framework recommends that identifying businesses as a TOLO will enable users of the database to make valid comparisons of information compiled from different statistical sources. It will enable them to identify the business as legally viable to receive a certain type of subsidies.

Existing Capabilities and Gaps in Data Requirements

Information on type of legal organisation of businesses can be obtained from Australian Bureau of Statistics, counts of Australian Businesses including Entries and Exits (CABEE) (Australian Bureau of Statistics, 2014).

The statistical information is only available at the national level.

2.2.3 BUSINESS NAME

A business name is a name or title under which a person or entity conducts a business. In Australia, all businesses must register a business name unless you fall within one of the following exemptions:

- if the business is operating as an individual and the operating name is the same as the individual's first name and surname
- if the business is in a partnership and the operating name is the same as all of the partners' names, or
- if the business is an already registered Australian company and the business operating name is the same as the company's name.
- Franchise or brand name

The recorded business name should be the full name and not be an acronym. The business name is recorded to enable matching to other local data sets and to assist in the local delivery of programs or further data collection. This framework identifies that business name is an important information requirement for disaster management.

Existing Capabilities and Gaps in Data Requirements

Comprehensive information regarding business names is available through the Australian Business Register. Access to data including the individual business name is limited to individual search through the web interface.

2.2.4 BUSINESS AGE

Research outcomes on the relationship between business age and post disaster recovery have been contradictory. Despite older businesses being expected to be more likely to recover from disasters as they are more established and have more resources upon which to draw in responding to a disaster, a study on the impacts of the Hurricane Andrew has shown otherwise (Webb et al., 2014). The vulnerability of older businesses could be due to

older businesses having more plant and stock to lose and therefore taking longer to fully recover from the hurricane.

It is likely that the age of the business will be important to consider amongst other data to determine likely models of impact and recovery.

Existing Capabilities and Gaps in Data Requirements

Some limited data sets such as The Census of Land Use and Employment (CLUE) in Melbourne have commenced the collection of data of how long a business has been operating at a location. Publicly listed companies will provide information on the commencement of the current business structure. Australian Business Register also provides information on when the current trading name was entered on to the system, however the information is limited to individual searches through web interface. None of these data sources have been found to provide consistent information on the age of the business.

2.3 BUSINESS SIZE

Studies have identified that size and financial conditions of businesses have been identified to be an important predictor of recovery (Dahlhamer and Reshaur, 1996; Dahlhamer and S'Souza, 1998; Dahlhamer and Tierney, 1998). Larger firms have been found to be more likely to have recovered than smaller ones. Larger firms are generally in much sounder financial condition and more likely to engage in disaster preparedness activities.

There are a variety of definitions for business size in Australia with both number of employees and the turnover regularly being used.

2.3.1 EMPLOYEES

The ABS defines an employed person as including all persons aged 15 years and over who, during the reference week: worked for one hour or more for pay, profit, commission or payment in kind in a job or business, or on a farm (comprising employees, employers and own account workers); or worked for one hour or more without pay in a family business or on a farm (i.e. contributing family workers); or were employees who had a job but were not at work and were away from work for fewer than four weeks up to the end of the reference week; or away from work for more than four weeks up to the end of the reference week and received pay for some or all of the four week period to the end of the reference week; or away from work as a standard work or shift arrangement; or on strike or locked out; or on workers' compensation and expected to return to their job; or were employers or own account workers, who had a job, business or farm, but were not at work.

Based on Number of Employees the business size is determined as:

1. Sole Trader (No Employees);
2. Small (<20 Employees);
3. Medium (20-200 Employees); and
4. Large (> 200 Employees).

ABS defines a small business as employing less than 20 people. Categories of small businesses include:

- non-employing businesses - sole proprietorships and partnerships without employees;
- micro businesses - businesses employing less than 5 people, including non-employing businesses;
- other small businesses - businesses employing 5 or more people, but less than 20 people;
- Other businesses are classified as:
- medium businesses - businesses employing 20 or more people, but less than 200 people; and
- large businesses - businesses employing 200 or more people.

Existing Capabilities and Gaps in Data Requirements

The Census of Land Use and Employment (CLUE) in Melbourne as well as the City of Sydney Floor Space and Employment survey (FES) has detailed information on the number of employees but this level of detail is not publicly available.

WorkCover Authorities in each of the States also maintain employee numbers for businesses but this information is not publicly available. Territory governments do not maintain this information.

Counts of Australian Businesses including Entries and Exits (CABEE) (Australian Business Statistics, 2014) provides the counts of businesses based on employment size. The information is available at statistical area 2 level.

There is currently no comprehensive data on the number of employees within Australian businesses although a number of more localise

2.3.2 TURNOVER/REVENUE

The business turnover/revenue refers to the value of total sales generated by a business from the provision of goods and/or services for a given accounting period without paying attention to expenses or any liabilities the company may have. This may include income derived by the business of any entity wholly or partly owned by the business.

The City of Melbourne surveys of business impacts from the 2014 heatwave indicated that businesses with a lower turnover typically suffered larger a decline in sales over this period. Although the mean decline in sales in turnover across all businesses was 9.7%, the 95 businesses which responded with less than $500,000 in annual turnover reported an average sales decline of 17.3% (City of Melbourne, 2014).

Based on Turnover the business size can be defined as

1. Small (<2 Millions)
2. Medium (2-20 Millions)
3. Large (> 20 Millions)

Existing Capabilities and Gaps in Data Requirements

Information is available on the annual turnover of publicly listed companies through the ASX and other business monitoring.

The ATO and state based WorkCover authorities also maintain information on turnover obtained through annual Business Activity Statements but this data may not be publicly available.

2.3.3 ASSETS

Under the Australian Accounting Standards, assets are divided into current and non-current. Further they are classified as tangible and non-tangible.

Tangible assets which have a physical form include both fixed assets, such as machinery, buildings and land, and current assets, such as inventory.

Nontangible assets are nonphysical assets, such as patents, trademarks, copyrights, goodwill and brand recognition, are all examples of intangible assets.

Current Assets are those that are expected to be realised within twelve months from the reporting date or within one operating cycle, whichever is the shorter. Current assets include:

- Cash and cash equivalents: cash and cash equivalents can be split into restricted (allocated for a specific purpose) and unrestricted funds and if in a negative position may be referred to as a bank overdraft.
- Cash includes cash at bank and cash on hand e.g. petty cash, cash floats and un-deposited funds. Cash equivalents are highly liquid investments which are readily convertible to known amounts of cash and which are subject to an insignificant risk of change in value.
- Trade and other receivables: the amount of receivables still owing by customers (debtors) to the organisation at the end of the operating cycle which are expected to be collected in the next twelve months.
- Inventory: items held for sale or expected to be consumed in the process of delivery of services in the next twelve months. Includes fundraising stock, trading stock, publications for sale and emergency response stocks. Inventories may be purchased or received by way of donation.
- Assets held for sale: other current assets which are not inventory items but may be due to be sold in the next twelve months.
- Other financial assets: includes investments, deposits and bonds for services and non-cash exchanged credits, which are expected to be redeemed in the next twelve months.

Non-current assets are those that are not expected to be realised within twelve months from the reporting date or within one operating cycle, whichever is the shorter. Non-current assets include:

- Trade and other receivables: the amount of receivables still owing by customers (debtors) to the organisation at the end of the operating cycle which are not expected to be collected in the next twelve months.

- Other financial assets: includes long-term investments, deposits and bonds for services and non-cash exchanged credits which are not expected to be redeemed in the next twelve months.
- Property, plant and equipment: tangible items that are held for use in the production or supply of goods or services, for rental to others, or for administrative purposes and are expected to have a life beyond the next twelve months. Includes freehold and leasehold land (the land is shown at either cost or at its re-valued amount), buildings and building improvements. Includes value of movable plant and equipment owned or leased recorded at cost. In the case of donated assets, these are recorded at the time of acquisition at fair value.
- Intangibles: this amount represents intangibles purchased (not internally generated) e.g. goodwill, distribution rights, intellectual property, licences, patents, trademarks.

Fixed Assets (Refer to buildings and infrastructure)

Damage modelling and recovery timeframe prediction would also require an estimate of the capital in the form of buildings and assets that may be damaged or destroyed in an area. Although some data may be available from when buildings are first completed or insurance details, this information is likely to be out of date and incomplete.

One of the main reasons for providing data on fixed capital by framework is to measure the community impact of damage or loss of fixed assets. Furthermore, it assists in evaluating the impacts of loss or damage on employees. It could help in estimating the damage or loss associated with the fixed capital for the industry, sub-sectors, also enable users to measure the impact of loss of fixed assets to whole economy. Last but not least users could estimate effect the loss or damage of fixed capital to private or public sector.

The following lists provide some ideas of the data that may be useful in regard to fixed capital:

- Value of fixed capital of whole Industry
- Value of fixed capital of each sub-sector
- Value of fixed capital of each businesses
- Interdependency of fixed assets
- Ownership of each fixed Capital
- Role of fixed assets in recovery of business
- Impact of loss or damage of fixed assets on business continuity
- What hazards affect fixed capital
- Location of fixed capital
- Insured value (including contents)
- Effect of loss or damage fixed capital on turnover/revenue
- Critical outage period

"Natural hazard exposure information modelling framework" identifies the data requirements and modelling exposure information regarding the buildings and infrastructure. It is out of the scope of this report.

Existing Capabilities and Gaps in Data Requirements

Information on assets will be available or publicly listed through the business annual report where detailed financial analysis has been undertaken such as those for large businesses listed on websites such as Company360.

Some information on capital assets obtained within the past twelve months is recorded in ATO's Business Activity Statements and ASX reports, but this information is unlikely to be publicly available.

2.3.4 OWNERSHIP OF PREMISES

Firms that owned their business properties, as opposed to leasing them, were found to be more likely to engage in preparedness activities (Dahlhamer and Reshaur, 1996; Dahlhamer and S'Souza, 1997). Businesses that rent space typically have fewer options with respect to the loss-reduction measures they can undertake. They cannot, for example, decide to make their buildings more flood, wind, or seismically resistant through structural upgrades (although they can take steps to protect inventory and equipment). Instead of being able to act independently, renters are often subject to the mitigation choices made by building owners.

Existing Capabilities and Gaps in Data Requirements

There is limited data available on the ownership of business premises. It is possible that this information could be derived from local government records.

2.3.5 LIABILITIES

Knowledge of the liabilities of a business is critical towards understanding the overall financial position of the business. Governmental and non-governmental assistance for businesses may be provided in the form of loans and therefore this will add to the pre-existing burden of liabilities faced by the business.

According to The Australian Accounting Standards Board "a liability of an entity is a present economic burden for which the entity is obligated". Typically liabilities only include obligations that are considered legally enforceable.

Current liabilities are those that are due to be settled within twelve months from the reporting date, or within one operating cycle, whichever is the shorter, or the entity does not have an unconditional right to defer settlement for at least twelve months from the reporting date.

Current liabilities include:

- Trade and other payables: this item shows the total payable owing to creditors at the end of the operating cycle within the next twelve months (not including bank loans).
- Borrowings: all loans owed by the organisation to banks and other sources that are payable within the next twelve months.

- Current tax liabilities: amount of taxes payable to taxation authorities for Goods and Services Tax, Pay As You Go tax, Income Tax, Fringe Benefits Tax and Australian Business Number withholding tax.
- Other financial liabilities: includes other amounts payable to external parties due and payable within the next twelve months.
- Provisions: liabilities of uncertain timing or amount. Can include provisions for employee entitlements like annual leave and provisions for maintenance, etc.
- Other: other current liabilities not specifically included in previous accounts.

Non-current liabilities are defined as any liabilities that are not defined as current. Typically these include:

- Borrowings: all loans owed by the organisation to banks and other sources that are not payable within the next twelve months.
- Other financial liabilities: includes other amounts payable to external parties that are not payable within the next twelve months.
- Provisions: liabilities of uncertain timing or amount that are not payable within the next twelve months. Can include provisions for employee entitlements like long-service leave.
- Other: other non-current liabilities those are not specifically included in previous accounts.

Existing Capabilities and Gaps in Data Requirement:

Information on liabilities will be available for publicly listed through the annual report or large businesses where detailed financial analysis has been undertaken such as those businesses listed on websites such as Company360. Data is not available for smaller business in regard to liabilities.

2.3.6 COVERAGE

The business coverage refers to the multinational or national or local nature of the business.

A multinational corporation is an enterprise operating in several countries but managed from one (home) country. Generally, any company or group that derives a quarter of its revenue from operations outside of its home country is considered a multinational corporation. There are four categories of multinational corporations: (1) a multinational, decentralised corporation with strong home country presence, (2) a global, centralized corporation that acquires cost advantage through centralised production wherever cheaper resources are available, (3) an international company that builds on the parent corporation's technology or R&D, or (4) a transnational enterprise that combines the previous three approaches.

A local business is a company which provides goods or services to a local population. Though most often used when referring to a locally-owned business, the term may also be used to describe a franchise or corporate branch operating within a local area.

This information is important for disaster management, while a disaster in a local area can affect all three types of business equally the recovery and resilience response will vary significantly. The multinational and national level businesses are expected to be more

prepared and well placed with contingency actions. They can mobilise resources easily and quickly. Also, they can temporarily transfer the operation of the locally affected unit to some other neighbouring locality where they also operate with minimum effect on their turn over.

Existing Capabilities and Gaps in Data Requirements:

Information on the multinational, national or local nature of the business can be obtained from the Australian Business Register. Access to the information is limited to individual search through the web interface.

2.4 BUSINESS OPERATIONS

2.4.1 MULTI-LOCATION/SINGLE LOCATION

Australian Business Registry (ABR) reports that business locations are the permanent physical premises operated by a business or organization. This is covered as Foundational Information requirement in the milestone report Built Environment Exposure Information Framework (Nadimpalli and Mohanty, 2015). However, ABR reports it is equally important to provide additional business locations on all premises operated by the business or organization, except in cases where there is a risk to the safety of individuals as a result of disclosure, e.g. women's refuge centers. For each location the business needs to provide: the street address, the business activity details and the phone and email contacts. The definition of which premises are considered to be a business location and what is considered to be a business location are very clearly specified in ABR.

For disaster response and recovery purposes the information on single location, multi-location, individual's home or mobile situation of the business are considered important information requirement. Following are the ABR identified categories:

1. If a business operates from an individual's home, the home is considered a business location. For example, an internet-based business managed from an individual home address or a tradesman who keeps their records and garages a business vehicle at home.
2. On the contrary if a business operates a shopfront and a warehouse at different premises, the premises are considered as separate business locations.
3. Adjoining premises used for related activities, or premises used for multiple activities by the same business or organisation should be considered as one business location.
4. If a business is mobile, the permanent base for its operations is considered a business location. For example, a courier business that does its accounting from a commercial office.
5. If a business has no permanent base for its operations, the business' office, home address or home port in the case of maritime vessels, can be considered as a business location.

Existing Capabilities and Gaps in Data Requirements

Information on the Multi-location/Single Location/Mobile of the business can be obtained from the Australian Business Register. Access to the information is limited to individual search through the web interface.

2.4.2 OPERATIONAL HOURS/SHIFT OPERATIONS

Business hours are the hours during the day in which business is commonly conducted. Typical business hours may vary widely by the industry type, state and the local area. The purpose of maintaining common informal standards for business hours is to make workers communicate with each other more easily and to find a convenient divide between work life and home life. However, in manufacturing sector it may be mandatory to maintain common operational hours because of the interdependencies between workers of different skills to produce output.

In Australia, the hours between 9 am and 5 pm (the traditional "9 to 5") are typically considered to be standard business hours. However, as already mentioned it may vary between the industries in different states also depending on whether it is a week day/weekend day/public holiday.

This framework identifies that the operational or trading hours at individual business level is important information requirement for disaster management as it gives the information on whether the business is in operation or not at the time of disaster. Also, if the business operates in different shifts, then it makes sense to obtain information on the number and type of employees in different shifts. This is crucial to assess the impact of disaster on business.

Existing Capabilities and Gaps in Data Requirements

Generally, it is possible to accumulate information on the business operational hours by classifying the business into the industry sector, state and the legislation mandatory to the particular industry in the particular state. However, there is no individual level access to such information, business shift operational hours and operational hours at local area level if there is any variation in the standard.

2.4.3 BUSINESS TRACK RECORD

The business track record gives some indication of the long term trend of the business. A range of studies have found that those businesses that have been struggling for many years recover considerable slower compared to businesses that have performed well.

Existing Capabilities and Gaps in Data Requirements

Business track record can be deduced from longitudinal tax data or other financial information. This data may be available through ATO's Business Activity Statements (BAS) or publicly reported information.

2.4.4 CASH FLOW (IMPORTANT FOR BUSINESS RESILIENCE)

Cash flow is typically defined as the difference between cash or cash like equivalents at the start of a period to that available at the end of a period. This includes all income and expenditure related to business operations.

Cash flow is a critical factor in business survival and is likely to be significantly impacted by disaster. Significant impact on cash flow of the business is likely through a loss of trade, loss of utilities, inability to obtain stock, or reduced workforce

Government policy may aim to ease cash flow through the use of low interest loans and so information regarding cash flow is useful in assessing policy outcomes.

Existing Capabilities and Gaps in Data Requirements

Although some information regarding cash flow would be available for publicly listed companies, it is unlikely that there would be information on cash flow at the local level.

2.4.5 CASH RESERVES (IMPORTANT FOR BUSINESS RESILIENCE)

A reserve is essentially any amount of money specifically set aside by the governing body for future purposes. Any reserve established by the organisation (such as the capital profits reserve, building maintenance reserve, IT reserve, etc.) is included as part of the cash reserve.

Cash reserves have been seen as critical for assisting a business to quickly respond to circumstances arising from a disaster. Adequate cash reserves enable a business to undertake mitigation and repair activities, cover temporary shortfalls in income and act as required without having to wait for insurance adjustment or organising loans.

Reserves should include any restatements of assets as recorded by an asset revaluation reserve. An asset revaluation reserve is generated when an organisation decides to revalue certain non-current assets such as land and buildings.

Reserves may also include retained earnings which represent the accumulated surpluses or deficits of the organisation over the years it has been operating.

Existing Capabilities and Gaps in Data Requirements

Cash and cash equivalent reserves are reported as part of the business current assets within the balance sheet. It is likely that this information is only available for publicly listed companies through the annual report or large businesses where detailed financial analysis has been undertaken such as those businesses listed on websites such as Company360.

Data is not available for smaller business in regard to cash reserves.

2.5 SPACE USE

2.5.1 OFFICE SPACE USE/OPERATIONAL /OTHER

Information detailing the impact of a disaster on buildings and geographic areas is complemented by details on the use of that space. Detailed information on space utilisation can assist in determining whether there are disproportionate impacts on certain spaces and to help in modelling the specific impacts of the disaster.

An example might be the significant loss of manufacturing space in one event in comparison to the loss of retail and office space in another.

The Census of Land and Employment for Melbourne provides the following classification (Table 1) for the use of space within a building (City of Melbourne, 2012).

Table 1. Space Classification according to The Victorian Census of Land and Employment

Space use code	Description	Relates to how parts of floors are used by individual businesses
A	Office	Conduct of clerical/white collar work. Professional services such as law, accounting etc. are usually coded here.
B1	Retail – shop	The general retail sale of a wide range of goods or services in an enclosed structure.

B2	Retail – stall	The general retail sale of a wide range of goods or services from a structure that may be relocatable or not self enclosed (e.g. Flower stall, new kiosk, key cutter). These must be a separate establishment and not part of a larger business
B3	Retail – showroom	Space used for the display of goods for sale, excluding cars. Does not include exhibition space (Y)
B4	Retails – cars	Space used for the display of cars for sale
C	Wholesale	Wholesaling involves the purchase and resale of goods/services to another organisation. Wholesalers are involved in minimal sales directly to the public.
D1	Manufacturing	Manufacturing involves the physical or chemical transformation of materials or components into new products. In the CLUE areas, space used for manufacturing is largely occupied establishments involved in jewellery making, scientific equipment making
D2	Workshop/studio	This space use will most likely be encountered in design studios (e.g. architectural, graphics, advertising) or in workshops undertaking such activities as repairs (e.g. Watchmaking, appliances, cars etc)
E	Equipment installation	Salon exclusively used to house bulky plant and equipment such as printing plant, mainframe computers, air conditioning systems, electricity substations etc.
F	Transport	Space used to conduct freight or passenger transport (e.g. Railway stations, bus/tram/coach depots)
G	Storage	Space used to store goods, either as a business (e.g. Furniture storage, grain storage) or in the course of conducting other business (e.g. File storage)
H	Education / research	Space used for the conduct of training, educational, or research activities (e.g. Schools, colleges, research laboratories)/ Space will be used as classrooms, training rooms or laboratories for training purposes.
I	Hospital / clinic	Space used for the conduct of medical or surgical treatment. Characterised by consulting rooms and medical wards. Laboratories used in conduct of commercial activities (e.g. Pathology laboratories) are included here. Commonly located in Office type space
J1	Entertainment/Recreation - Indoor	Space used for a range of indoor entertainment and recreational pursuits (e.g. restaurants, cinemas, theatres, clubs, taverns, brothels, bowling alleys, gymnasiums)
J2	Park/Reserve	Public open space set aside as parks or reserves
J3	Sports & Recreation - Outdoor	Outdoor Sports facilities
J4	Square/Promenade	Public open space with paved or other hard surface
K1	Community use	Public libraries, jails and public toilets
L1	House/Townhouse	Detached, semi-detached, townhouse or terrace style residential accommodation
L2	Residential apartment	Medium to high-density residential accommodation
L3	Commercial accommodation	Short to medium term commercial accommodation, including hotels. Hostels/backpacker hotels, private hotels/boarding houses and serviced accommodation
L4	Institutional accommodation	Accommodation providing various lengths of stay but usually provided as community services e.g. Shelters, supported accommodation, correctional facilities etc.
L5	Student accommodation	Medium to long term accommodation for students; may have shared facilities or be self-contained (does not include Student Apartments, which are coded as L2 Residential Apartment)
M1	Parking - private covered	Covered parking devoted to residential or commercial establishments, not for hire or lease to the public
M2	Parking - private uncovered	Open-air parking devoted to residential or commercial establishments, not for hire or lease to the public
M3	Parking - commercial covered	Covered parking devoted to hire or lease to the public
M4	Parking - commercial uncovered	Open-air parking devoted to hire or lease to the public
N1	Common area	Indoor open space, such as circulation areas, toilets, foyers, stairwells, lift shafts, rooftops etc.
N2	Open space - outdoor	Private outdoor open space, such as courtyards etc. Also includes unbuilt space around buildings.

P1	Unoccupied - under construction	Space being constructed at time of survey
P2	Unoccupied - under renovation	Space being renovated at time of survey
P3	Unoccupied - under demolition/condemned	Space under demolition/condemned at time of survey
P4	Unoccupied - unused	Vacant or leased but not used
P5	Unoccupied - undeveloped site	Vacant land
TS	Transport/ Storage - Uncovered	Space use to apply to a property that is a majority of unbuilt land used for storage (for example transport containers). These land parcels may contain some built/covered storage structures but are predominantly unbuilt.
X	Performances, conferences, ceremonies	Space used for public presentations, generally with seating and a performance area such as a stage. Includes theatres, churches, cinemas, concert halls, courts, parliamentary chambers and conference facilities
Y	Public display area	Space used for (non-retail) displays, including museums, non-retail galleries, and exhibition space. Note that retail galleries and showrooms are included under space use B3

Existing Capabilities and Gaps in Data Requirements:

Data is available for Melbourne and Sydney through CLUE and FES surveys that include information on space use.

The data is not available for other cities, states and territory.

2.6 WORKFORCE CHARACTERISTICS

It is critical to understand both the number of employees and the full time and part time nature of employment provided by a business in an area to adequately understand the impact on income with significant business disruption. The loss of employment following disasters has significant impacts on individuals and local economies. It is necessary to have a good understanding of the number of employees in areas, the number of hours worked and the type of employment to accurately predict the impact of business loss and disruption on the local economy and household incomes.

This report has covered the framework and information requirement of number of employees in a business in the Business Size sub section 2.3.3.

2.6.1 EMPLOYMENT TYPE

There can be some difficulty in defining whether a person is an employee of a business or a contractor. The framework should enable the both the gross number of employees as well as the Full Time Equivalent employment provided through the business.

Following are the exposure information requirements for decision makers:

1. Number of Full Time
2. Number of Part-time
3. Number of Casual
4. Number of Permanent
5. Number of Non-permanent

6. Number of Contractors
7. Number of Consultants

The employment tenure is additionally important in understanding both the liabilities of business and the assistance that may be available for employees who are no longer able to work.

Both the total number of employees (ie. total persons) as well as the number of hours should be recorded.

It is important the employees are allocated to the location at which they are physically working, except for workers on construction sites who or similar varying locations.

Fulltime - A full-time employee has ongoing employment and works, on average, more than 35 hours each week. The actual hours of work for an employee in a particular job or industry are agreed between the employer and the employee and/or set by an award or registered agreement.

Part time - A part-time employee:

- works, on average, less than 35 hours per week
- usually works regular hours each week
- is entitled to the same benefits as a full-time employee, but on a pro rata basis
- is a permanent employee or on a fixed-term contract.

Casual - A casual employee:

- has no guaranteed hours of work
- usually works irregular hours
- doesn't get paid sick or annual leave
- can end employment without notice, unless notice is required by a registered agreement, award or employment contract.

Contractors - Contractors run their own business and provide services to your business. Although the definition of a contractor can vary depending on relevant legislation or regulation, contractors usually:

- has established his or her own business
- is usually paid to achieve an agreed result
- usually provides skilled services
- generally controls how those services are provided
- may be free to subcontract the work to others
- is free to refuse additional work
- often supplies the material or special tools to complete the job
- usually bears the risk and cost of fixing their faulty work
- can advertise to the general public
- usually has no right to employee entitlements such as paid leave.

Employment tenure

Employees can be hired as permanent employees or on a fixed term contract.

- Permanent - Permanent employees are employed on an ongoing basis until the employer or employee ends the employment relationship.
- Fixed term - Fixed term means that the employee is employed for a specific period of time or task, for example a 6 or 12 month period, and employment ends on the date specified in the contract.

Existing Capabilities and Gaps in Data Requirements:

Data is available for Melbourne and Sydney through CLUE and FES surveys that include detailed information on employees. Limited information is available for public companies that may provide an insight to the number employees and type of employment.

ABS data through the Working Population Profile (Australian Bureau of Statistics, 2011) can be used to derive information on the location and type of employment for other businesses but this is limited to census years.

States that collect WorkCover data may have additional information available on the number and type of employees and the location of workplaces.

2.6.2 WORKFORCE BY AGE AND GENDER

This framework identifies individual business level information on workforce by age and gender composition as important requirement for disaster management. Largely, there is evidence that disasters affect women and older people disproportionately (Donner and Rodriguez, 2008; Martine and Guzman, 2002). Also, there is a range of literature in economics that relate age and gender composition of the workforce with firm performance (Pfeifer and Wagner, 2012; Göbel and Zwick, 2011; van Ours and Stoeldraijer, 2011). Consequently, this information is important not only for the sheer reason of job loss, casualty or fatality of employees count by age and gender but also, for post disaster productivity loss estimation models, business resilience and vulnerability studies at individual business, local area, jurisdictional or national level.

Existing Capabilities and Gaps in Data Requirements:

Information on workforce by age and gender at national, state and local area level is available through Australian Bureau of Statistics, Census of Population and Housing. However, the information access and availability at the individual business level is also an important requirement.

2.6.3 WORKFORCE BY OCCUPATION

Occupational status of the workforce at individual business level is identified as required information for disaster management. Broadly, it is important to know the nature of job such as the manual or administrative categories that employees are involved with in a particular business. However, depending on the nature of business it can be more useful to note the individual occupational categories available with ABS. This information is also important for post disaster productivity loss estimation models, business resilience and vulnerability studies at individual business, local area, jurisdictional or national level.

The ABS and Statistics New Zealand (SNZ) have completed a review of the Australian and New Zealand Standard Classification of Occupations (ANZSCO). The resulting classification

(ANZSCO Version 1.2) builds on a review conducted in 2009 (ANZSCO First Edition, Revision 1) following the classification's introduction in 2006. The number of occupations identified in ANZSCO Version 1.2 represents a net increase of nine compared to ANZSCO First Edition, Revision 1. Of the new occupations created, one was in Major Group 1 (Managers), six in Major Group 2 (Professionals), two in Major Group 3 (Technicians and Trades Workers) and one in Major Group 4 (Community and Personal Service Workers). One occupation was deleted from Major Group 2.

Existing Capabilities and Gaps in Data Requirements:

Information on the occupational status of the workforce at national, state and local area level is available through Australian Bureau of Statistics, in ANZSCO Version 1.2 (ABS, 2013). However, the information access and availability at the individual business level is also an important requirement.

2.6.4 WORKFORCE DAILY TURN OVER

The actual number of employees that turn up on a particular day at individual business level is an important information requirement for disaster management compared to the actual number of recorded employees in that business. This number may vary depending on the employee attrition rate and number of employees on leave on a particular day. This is an important information requirement for the time-space dynamic disaster modelling, as this will give the exact number of employees in operation at the specific time of disaster event.

Existing Capabilities and Gaps in Data Requirements:

It is unlikely that there is information available on workforce daily turnover at the individual business or the local area level. This information gap needs to be fill in through appropriate bookkeeping practices, disaster management knowledge and awareness campaigning.

2.7 INPUT REQUIREMENT

2.7.1 INPUT COMPOSITION, OUTPUT AND SECTORAL DEPENDENCY

Business input composition, output and sectoral dependency are the core elements of a firm's operation that defines its business model. The International Integrated Reporting Council (IIRC) identifies that there is a need for organisations to disclose their business model using a consistent definition that reveals the inputs, outputs, outcomes and business activities. The IIRC background paper defines the term business model as "the chosen system of inputs, business activities, outputs and outcomes that aims to create value over the short, medium and long term." They highlighted that the Current business model reporting is inconsistent, both in terms of uptake and scope. For disaster management purpose in Australia this framework identifies that there is a need at the individual business level to report their business model including the input composition, outputs and sectoral dependency using a consistent definition. Further, this information may be collected and collated at local area level. As this would be crucial input for post disaster business recovery, resilience and economic loss estimation modelling at individual business level.

Existing Capabilities and Gaps in Data Requirements:

At an individual business level and small area level in Australia there is a need to consolidate Input composition, output and sectoral dependency information. This information gap needs to fill with regulation or legislative practice.

2.8 EXPOSURE ELEMENTS AT MACRO-ECONOMIC LEVEL

At national, state or local area level natural disasters adversely impact macroeconomic indicators such as Gross Domestic Product (GDP) growth, balance of trade, the public deficit and indebtedness (Hochrainer, 2009; Mechler, 2004; Murlidharan et al, 2003). The macroeconomic impacts comprise the aggregate impacts on economic variables like GDP, consumption and inflation due to the effects of disasters, as well as the reallocation of government resources for relief and reconstruction efforts. Because macroeconomic effects reflect indirect damage as well as relief and restoration efforts, these effects cannot simply be added up without causing duplication (Mechler, 2004:36; Otero and Marti 1995: 16-18).

Noy (2009) finds that developing countries, and smaller economies, face much larger output declines following a disaster of relatively similar magnitude than do developed countries or bigger economies. Countries with a higher literacy rate, better institutions, higher per capita income, higher degree of openness to trade, and higher levels of government spending are better able to withstand the initial disaster shock and prevent further spill over into the macro-economy. These all suggest an increased ability to mobilise resources for reconstruction. Financial conditions also seem to be of importance; countries with more foreign exchange reserves, and higher levels of domestic credit, but with less-open capital accounts appear more robust and better able to endure natural disasters, with less adverse spill over into domestic production.

In that logic, collecting, collating and managing macroeconomic indicators are important information requirement for disaster management even within a country at state and local area levels. The effect of disaster is highly correlated with the level of economic development of the state or the region affected. In practice we see the natural disasters are more localised for example affecting an area within a state economy or affecting a regional economy - area covering a part of two or more adjacent states. It also spills over to affect the entire country's economy. Therefore, it is important to be able to implement economic analysis and policy interventions at regional level.

Census of Land Use and Employment (CLUE) provides comprehensive information about land use, employment and economic activity across the City of Melbourne. CLUE assists the City of Melbourne's business planning, policy development and strategic decision making. The City of Melbourne Economic Profile in CLUE presents an appropriate range of economic indicators for the City of Melbourne. These are standard measures used to present an area's economic performance.

In line with the CLUE economic profiling of the City of Melbourne, this framework identifies the local area level macroeconomic indicators that would support in planning and policy making for disaster management would consists of indicators that can broadly be categorised into the following domains:

- Size of the local economy
- Performance of the local economy performing
- Share of each industry sector to the local economy

- labour force characteristics of the local economy
- the local commercial and residential property market characteristics

2.8.1 SIZE AND PERFORMANCE OF THE LOCAL ECONOMY

The size and performance of the local economy can be evaluated through quarterly or annual time series on Gross Domestic Product (GDP) at the Australian national and different states' level and Gross Local Product (GLP) at local area level.

2.8.2 GROSS DOMESTIC PRODUCT (GDP)

Gross domestic product (GDP) is the monetary value of all the finished goods and services produced within a country's borders in a specific time period. Though GDP is usually calculated on an annual basis, it can be calculated on a quarterly basis. There is a standard of monitoring GDP at national and state level as part of the national accounts in every country. However, the data should be structured to enable localised information to be amalgamated providing the ability to move between localised microeconomic impacts at a firm level to macroeconomic impacts at local area or state level.

Existing Capabilities and Gaps in Data Requirements:

The macro-economic statistics (available through ABS) are classified by business sector, including National Accounts Balance of Payments (BOP) and International Investment Position (IIP) statistics, Government Finance Statistics (GFS), and other financial statistics.

2.8.3 GROSS LOCAL PRODUCT (GLP)

Gross Local Product (GLP), also referred to as Gross Regional Product (GRP), is conceptually the same as Gross Domestic Product (GDP). This measures the market value of all final goods produced in a specified region and over a given time period (typically one year). It comprises the sum of compensation of employees, gross operating surpluses of business (profits) plus taxes less subsidies on products and production.

Although data is derived primarily from Australian Bureau of Statistics data, the ABS does not provide this information. There are a number of companies that provide a measure of Gross Local Product based on a range of models.

Economy.id (http://economy.id.com.au/) use data and modelling from National Institute of Economic and Industry Research (NIEIR). This model is based on replicating the outputs of the National Accounts framework for local areas such as LGAs, using a range of data sources to model the accounts to show local trends.

An example for the City of Adelaide is provided here - http://economy.id.com.au/adelaide

Geografica (http://www.geografia.com.au/) uses the SCRIO model which is a regional economic modelling system developed by Saturn Corporate Resources. The SCRIO model is a 20-sector industry model that seeks to minimise the use of data with potentially high statistical errors.

An example of this model for the City of Melbourne is provided here - http://melbourne.geografia.com.au/

The Remplan Economy (https://www.remplan.com.au/) model produces an estimate based on ABS place of work by industry sector employment data provides the basis upon

which the size and characteristics of a region's economy. This model uses 114 industry sectors and estimates the contributions to the local economy through employment, output, wages and salaries, regional exports and imports, and other value-added by the industries.

An example of the Shire of Ararat is provided here - http://www.economicprofile.com.au/ararat

Existing Capabilities and Gaps in Data Requirements:

As all of these models are heavily reliant on ABS census data, there are significant limitations to the model showing changes during intra-census periods. The models do typically provide for modelling based on periods from 5 years (census) down to quarterly.

NIEIR, in particular, comments that general equilibrium and top-down models of economy can work at national and potentially state level, but do not deal with the high level of local integration of businesses when used at a local level. Instead NIEIR promote the necessity of using a bottom up model to better explain the Gross Local Product.

The Centre of Public Studies at Victoria University uses the TERM-Australia model. Typically this model is used to provide economic modelling at up to 205 regions across 190 sectors but it does also allow a top-down details that are based on statistical local areas (1300+).

2.8.4 SHARE OF EACH INDUSTRY SECTOR TO THE LOCAL ECONOMY

World Bank identifies that the strength and structure of a country's economy, is one of the important factors that affects vulnerability to natural disasters. In a globalised economy, the structure of the economy and the interdependence between the sectors, are important players to determine how the world's finances will be affected (World Bank, 2004). However, between the countries and at regional or local level the economy's vulnerability to natural hazards have also been changing over time due to globalisation and use of modern infrastructure that has increased the inter dependence between regions. Also, with time, there have been changes in the sectoral composition of GDP with the declining and more diversifies share of agricultural sector and increasing share of manufacturing, tourism, and financial services. The services sectors are less sensitive to anything short of a catastrophic event, and so their growth implies a reduction in the vulnerability of the economy as a whole.

This framework identifies that following information at the local area level, on share of each industry sector in economy, would be useful for end users for disaster management:

- Type of major industries in the region;
- Number of establishments in each industry;
- Sectoral dependencies and input-output modelling;
- Contribution of each industry to the GLP; and
- Annual Productivity by Industry.

2.8.5 TYPE OF MAJOR INDUSTRIES IN THE REGION

Identifying the type and composition of major industries at local area level within Australia, is important information requirement for disaster management. This presents the composition of primary, secondary and tertiary industries in the region, which

primarily defines the economic activities of the area. However, this information provisioning is not a straight forward data collection exercise. The share of major industries can be identified through estimating the share of employment in different industries or through the contribution of each industry sector to the GLP in the area that are individually recorded as information requirements in their own right in this framework.

Existing Capabilities and Gaps in Data Requirements

The information on share of employment in different industries at small area level needs to be estimated from Australian Bureau of Statistics Census of Population and Housing using TableBuilder software.

The information on share of each industry to the GLP at local area level needs to be modelled and estimated from Australian Bureau of Statistics' Input–Output (I–O) tables (ABS, 2016) and CGE Modelling capability from the Centre of Policy Studies (CoPS), Victoria University.

2.8.6 NUMBER OF ESTABLISHMENTS IN EACH INDUSTRY

Number of establishments in each industry in a local area is important information not only for bookkeeping requirement, it is also, an important indicator of the industry size. The United Nations Statistics Division in its Industrial Statistics Yearbook 1991 - Volume I: General Industrial Statistics (The historical dataset of General Industrial Statistics covering 1953-1993) publication - for most countries presented the data related to the activity of "establishments" in the specified industries rather than any other type of industrial unit.

Existing Capabilities and Gaps in Data Requirements:

Information on count of establishments in each industry can be estimated from the Australian Business Register and Australian Bureau of Statistics, counts of Australian Businesses including Entries and Exits (CABEE) (Australian Bureau of Statistics, 2014). Access to data including the individual business name in ABR is limited to individual search through the web interface. ABS CABEE statistical information is only available at the national level. Census of Land Use and Employment (CLUE) in their City of Melbourne Economic Profile presents this information however, the information for all Australia at local area level needs to o estimated.

2.8.7 SECTORAL DEPENDENCIES AND INPUT-OUTPUT MODELLING

The business sectoral dependency at national, regional level and/or at different industry sector level have been identified as important information requirement for business interruption loss modelling for disaster management (Chang-Richards et al, 2014). This is critical information requirement to determine the extent of inter-dependencies between sectors that affect economic recovery and business resilience. Also, this is critical to determine - what can be done to reduce sectoral vulnerability and improve business DRR activity or awareness?

There is a standard practice in economics to use input-output (I-O) models to study business sectoral dependencies and disaster impact analysis at national and regional level. Input–output analysis is a quantitative economic technique that represents the interdependencies between different branches of a national economy or different regional economies. It is a matrix of raw economic data collected by companies and governments

to study the relationships between suppliers and producers and the economic impact of the import or export producer goods to meet consumer demand. Of particular interest, is the extent that the outputs of one industry become the inputs to another? Rose et al (2011) highlighted that I-O analysis is the most widely used tool of regional impact analysis in the United States and throughout the world. Moreover, it has been used extensively to analyse the economic impacts of earthquakes and other natural hazards (e.g., ATC 1991, Shinozuka et al. 1998, Rose and Lim 2002, and Gordon et al 2007). It is especially adept at estimating ripple, or multiplier, effects. Practically every country in the world has constructed an input-output table, usually through an exhaustive census or at least an extensive survey, and there is a rich literature on ways to use non-survey data-reduction, or "downscaling" methods to generate tables for political jurisdictions at various subnational levels (Rose et al, 2011).

Pan et al (2015) highlighted that there are alternatives to input-output analysis, for example, the CGE (computable general equilibrium) models that are very popular. These can accommodate important price-substitution effects. Input-output models, on the other hand, assume fixed reduction coefficients.

This framework identifies that information provisioning at the small area level on sectoral dependencies and input-output modelling are important requirement for disaster management and post disaster economic cost analysis.

Existing Capabilities and Gaps in Data Requirements

In Australia, Australian Bureau of Statistics' Input–Output (I–O) tables (ABS, 2016) are part of the national accounts, complementing the quarterly and annual series of national income, expenditure and product aggregates. They provide detailed information about the supply and use of products in the Australian economy, and the structure of and inter–relationships between Australian industries.

This publication contains the Input–output tables for 2013–14 and includes input by industry and output by product group; use of domestic production and imports by industry and final demand categories, taxes and margins on supply by product, and product and industry concordances (Tables 1–10, 17, 19, 21, 23–40).

The Centre of Policy Studies (CoPS), Victoria University provides two broad types of Computable General Equilibrium (CGE) model sale service:

1. Customised CGE models for governments and other organisations around the world. Services of this kind have been provided for central government agencies in Australia, the USA, China, and many other countries. For more information on customised model development services, please contact us.
2. Standardised user-friendly multi-regional CGE models, with some tailoring of regional and sectoral disaggregation to individual user requirements. This service is offered for:
    a. Australia with the TERM-Australia model
    b. the United States with the TERM-USA model
    c. China with the TERM-China model.

The standardised regional product TERM-Australia model can be used for any disaster related impact assessment and workforce planning.

2.8.8 CONTRIBUTION OF EACH INDUSTRY TO THE GLP

The share of each industry in the GLP of the local area is important information that may help in post disaster economic impact analysis. Additionally, the resilience and vulnerability of an area depend on the type of major industries in the area and the share of each industry in the GLP as some industries are more vulnerable to natural disasters than others. For example agricultural sector compared to service sector is more vulnerable to natural disasters. Also, this information would be requirement for disaster related economic management and planning.

This framework identifies that information provisioning at the small area level on share of each industry in the GLP is important requirement for disaster management.

Existing Capabilities and Gaps in Data Requirements:

This information at small area level needs to be modelled and estimated using information from Australian Bureau of Statistics' Input–Output (I–O) tables (ABS, 2016) and CGE Modelling capability from the Centre of Policy Studies (CoPS), Victoria University.

2.8.9 ANNUAL PRODUCTIVITY BY INDUSTRY

Productivity is the ratio of outputs to inputs in production. It is calculated as the ratio of value added to total hours worked by all workers (measured in FTEs) in each industry. It measures how efficiently inputs, such as capital and labour, are used to produce outputs in the economy. Productivity is also referred to as productive efficiency. Productivity increases if output grows faster than inputs (or shrinks more slowly). Conventionally, growth of productivity is measured as the growth of output over and above the growth of inputs. The multifactor productivity is estimated as value adding output produced per unit of combined inputs of labour and capital (ABS, 2014). It is the measure that comes closest to the underlying concept of productivity efficiency of producers in producing output using both labour and capital. Growth of multifactor productivity is the growth of output over and above the growth of labour and capital inputs (Productivity Commission, 2015).

Labour productivity measures output produced per unit of labour input. Growth of labour productivity is the growth of output over and above the growth of labour input — it captures the value added from growth in capital (including more advanced technologies intrinsic in the new investment) that supports increased output without the increased use of labour (referred to as capital deepening) and multifactor productivity (Productivity Commission, 2015).

This framework identifies that information provisioning at the small area level on annual productivity by each industry is important requirement for disaster management. As, this information would carry high weights in the post disaster resilience, vulnerability and productivity loss modelling.

Existing Capabilities and Gaps in Data Requirements:

Census of Land Use and Employment (CLUE) in their City of Melbourne Economic Profile presents this information. This information at small area level for rest of Australia needs to be modelled and estimated.

2.8.10 LABOUR FORCE CHARACTERISTICS IN THE LOCAL ECONOMY

Labour force characteristics such as employment and unemployment rates and employment type such as part time, fulltime or casual employment rates in a local area are important indicators of an economy's overall performance and labour mobility. They are important indicators of vulnerability and resilience of the residents to natural disasters. Natural disasters when affect the local economy, affect the employment status of the people as businesses and industries close down and consequently it adversely affects their income and wellbeing. Also, the magnitude of impact of disasters varies across industries as they affect different industries in different ways. Consequently, while the labour force characteristics of population at small area level in Australia have been listed as exposure information requirement in the milestone report Built Environment Exposure Information Framework (Nadimpalli and Mohanty, 2015), this framework identifies following information on the business component of the labour force characteristics at small area level that may help in disaster management and planning:

1. Workforce distribution by industry;
2. Workforce distribution by employment type by industry;
3. Changes in local jobs by industry and employment type; and
4. Changes in workforce by gender.

Existing Capabilities and Gaps in Data Requirements

The above information on workforce distribution by industry and type of employment, gender composition and change over time at small area level need to be estimated from the most latest and previous Australian Bureau of Statistics Census of Population and Housing data using TableBuilder software. Census of Land Use and Employment (CLUE) in their City of Melbourne Economic Profile presents this information.

3 SUMMARY AND CONCLUSION

This is the first attempt to develop a generic consistent and standardised Business and Economic Exposure Information Framework for Australia. The framework provides the collective views of data managers, researchers and end users on business and economic activity exposure information requirements that will support vulnerability assessments for disaster risk reduction and socio-economic impact analysis with a multi-hazard focus at all levels of resolution. More importantly the framework identifies the gaps and overlaps in business and economic activity exposure information requirement at different levels of governance and provides suggestions to overcome those deficiencies. The report identifies a list of exposure elements across different components of the business and economic activity that are presented in the following Tables: Summary of the Business and Economic Activity Exposure Information Elements. In this respect, findings presented here provide an important first step in understanding and identifying the complexity in exposure information requirement.

SUMMARY OF THE BUSINESS AND ECONOMIC ACTIVITY EXPOSURE INFORMATION ELEMENTS

TABLE 3.1: EXPOSURE ELEMENTS AT MICRO ECONOMIC LEVEL

Type	Business Organization	Business Size	Business Operations	Space Use	Workforce Characteristics	Input Requirement
ANZSIC - Division - Subdivision - Group - Class	Legal Organization Business Structure - Sole Trader - Household - Partnership - Trust - Corporate - Government - Non-Profit Business Name Business Age/Registration Date	Employees - Sole Trader - Small - Medium - Large Revenue/Turnover - Small - Medium - Large Assets - Fixed vs. Variable - Tangible vs. Intangible Ownership of premises Labilities Coverage - Local - National - Multinational	Multi-location/Single-location Operational hours/Shift-operations Business Track Record Cash Flow Cash Reserves	Office Space/Operational/ Other - Retail - Wholesale - Manufacturing - Workshop - Storage - Education - Parking - Construction	Number of employees Employment Type - Full Time - Part Time - Casual - Permanent - Non-Perm. - Contractors - Consultants - Tenure Workforce by Age Workforce by Gender Workforce by occupation Workforce daily turnover	Input Composition, Output and Business Sectoral dependency – single sector vs. multi sector

TABLE 3.2: EXPOSURE ELEMENTS AT MACRO ECONOMIC LEVEL

Size and Performance of the Regional Economy	Share of each Industry in the Regional Economy	Labour Force Characteristics in the Regional Economy
Gross Domestic Product (GDP) Gross Local Product (GLP)	Type of major industries in the region Number of establishments in each industry Sectoral dependencies and input-output modelling Contribution of each industry in the GLP Annual productivity by industry	Workforce distribution by industry Workforce distribution by employment type by industry Changes in local jobs by industry and employment type Changes in workforce by gender

ANNEXURE

NATIONAL BUSINESS AND ECONOMIC DATA

AUSTRALIAN BUREAU OF STATISTICS

COUNTS OF AUSTRALIAN BUSINESS INCLUDING ENTRIES AND EXITS (CABEE)

Counts of Australian Businesses including Entries and Exits (CABEE) (Australian Bureau of Statistics, 2014) provide users with an annual snapshot of Australia's actively trading businesses. CABEE uses administrative data sourced from the Australian Business Register (ABR) which includes information about a wide range of business entities throughout Australia. The data source for CABEE, the ABR, provides data on all Australian businesses (i.e. it is a Census).

This publication provides new business counts, entries, exits and survival information as at June 2014. The scope of business counts is limited to businesses actively remitting in a GST role. This publication continues to provide counts by selected demographics including:

- Industry;
- Geography;
- Institutional sector;
- Type of legal organisation; and,
- Business size.

Business size data is provided by selected annual turnover and employment size ranges. These (employment) data indicate that most Australian businesses are small (95.6%) and that most of Australia's small businesses do not employ any staff (62.7%). The counts in this release are heavily influenced by entries and exits within Australia's small business sector. Users should take this into account when interpreting results including when comparing these data with other ABS statistics

Counts of Australian Businesses include Entries and Exits (including data by Industry, State/Territory, Sector, Type of Legal Organisation, Employment and Turnover, Size Ranges and Small Area Information).

Specifically, selected cross-classified proportions of small business operators are presented. The data covers the following topics:

- sex of operators;
- age of operators;
- (usual) hours worked by operators, per week;
- birthplace (Australian born or born overseas); and
- number of business operations conducted.

COUNTS OF BUSINESS OPERATORS

The selected characteristics of businesses including details of the ownership structure, length of operation, the use of computers and Internet access. Data are classified by state and territory, business size and by sex of operators.

CHARACTERISTICS OF SMALL BUSINESS

Under this category, detailed information related to the use of information technology (IT), innovation and a broad range of other non-financial characteristics are included. Data released in this publication, as commentary or in data cubes, includes:

- nature of business ownership
- collaborative arrangements
- franchising agreements
- performance measures
- barriers
- government financial assistance
- finance sought
- innovation
- business use of information technology
- skills
- markets
- competition

LONGITUDINAL INFORMATION

The Business Longitudinal Database (BLD) is designed to enable analyses of the characteristics and financial attributes of cohorts of businesses over time. It is longitudinal survey of businesses and is designed to measure micro drivers of business performance. The BLD has been designed to produce estimates which are representative of the total business population to provide an even proportion of businesses by industry and size so that analysis over time of business classified by these dimensions will be possible. The BLD aims to increase understanding of:

- the activities or factors that are relevant to small and medium business productivity, competitiveness and viability;
- the business characteristics that are associated with these activities or factors.

AUSTRALIAN CENSUS 2011 – PLACE OF WORK PROFILE

The Working Population Profile (WPP) (Australian Bureau of Statistics, 2011) is derived from the 2011 Census. This contains 23 tables of key Census characteristics of employed persons. The data are based on where people work. The profile includes data on hours worked, industry of employment, occupation, qualifications and method of travel to work etc.

Although the data that is publicly available does not link directly to individual businesses, it provides a snap shot of the industry sectors of employment as well as indicating the location of employees, the location of industry and method of transport to work.

Figure 1 provides an example of the usefulness of the Place of Work Profile with the location of the place of residence for all workers within the local government area of Hume in Victoria. This data can also show the place of residence or place of work for specific industries.

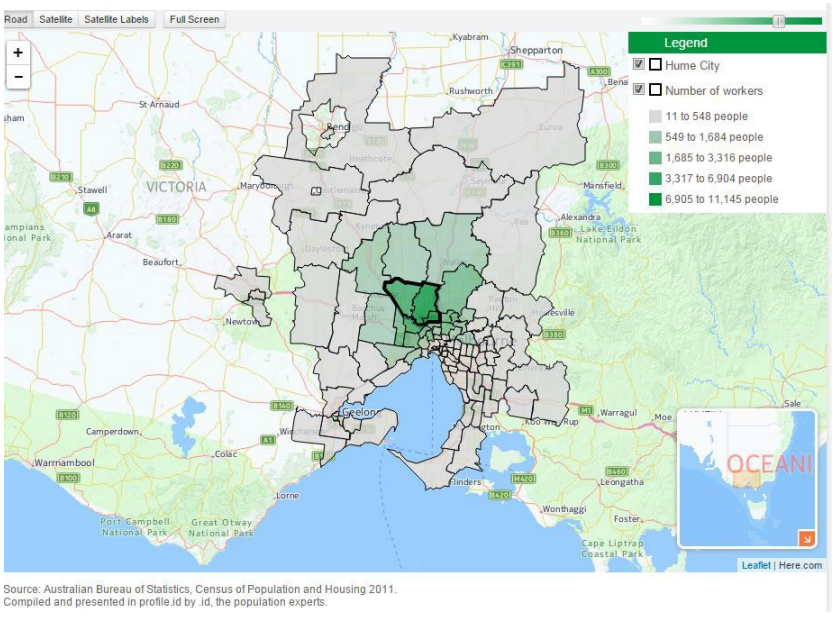

Figure 1. Place of residence for workers within the Victorian local government area of Hume derived from ABS Place of Work Profile (Source: .id)

AUSTRALIAN SYSTEM OF NATIONAL ACCOUNTS

The Australian System of National Accounts (Australian Bureau of Statistics, 2015) provides national accounts estimates which are provided for gross domestic product (GDP) and its components, the national income account, the national capital account, the national financial account and the national balance sheet. Income, capital and financial accounts and a balance sheet are provided for each sector of the economy. Also provided is a range of information classified by industry, details of capital formation (including capital stocks) and productivity statistics.

Industry sectors as classified by ANZSIC codes (Australian Bureau of Statistics, 2006)

This database provides following information related to values of fixed assets for the whole of Australia including:

- Consumption of Fixed Capital, by Industry and institutional sector - Current prices
- Gross Fixed Capital Formation, by Type of Asset
- Private Gross Fixed Capital Formation, by Industry - Current prices
- General Government Gross Fixed Capital Formation, by Level of government and purpose - Current prices
- Public Corporations Gross Fixed Capital Formation, by Level of government and industry - Current prices

- Capital Stock, by Institutional sector
- Capital Stock, by Industry
- Livestock, Value and number of Fixed Assets and Inventories
- Value of Land, by Land use by State/Territory
- Value of Demonstrated Mineral and Energy Resources, by Commodity
- Net Capital Stock, by Industry by type of asset
- Gross Fixed Capital Formation, by Industry by type of asset
- Consumption of Fixed Capital, by Industry by type of asset
- Machinery and Equipment Net Capital Stock, by Industry
- Machinery and Equipment Gross Fixed Capital Formation, by Industry
- Machinery and Equipment Consumption of Fixed Capital, by Industry
- Information Technology Net Capital Stock, Selected items by Industry
- Information Technology Gross Fixed Capital Formation, Selected items by Industry
- Information Technology Consumption of Fixed Capital, Selected items by Industry

INDUSTRY SPECIFIC INFORMATION

Economic Activity Survey

The Economic Activity Survey (EAS) produces estimates of the economic and financial performance of Australian industry. The estimates are derived using a combination of data directly collected by the Australian Bureau of Statistics (ABS) and Business Activity Statement (BAS) data provided by businesses to the Australian Taxation Office (ATO).

Other industry sectors

The ABS also provides a range of data that has been collected over the years and available by industry sector. Typically, these are aggregated at a state or national level and are not comprehensive. Some of the data is from surveys or research completed many years previously. For example, the most recent small area data on the dairy industry in Victoria dates from 1991.

ABS has made data available under the following industry sectors:

- Agriculture, Forestry and Fisheries
- Business Demography
- Construction
- Culture and Leisure
- Electricity Gas and Water
- Finance
- Health and Community Service Industries
- Hospitality Industries

- Innovation Science and Technology
- Manufacturing
- Mining
- Property and Business Services
- Retail
- Small Business
- Tourism
- Transport
- Wholesale

AUSTRALIAN BUSINESS REGISTER

The Australian Business Number (ABN) is a unique identifier issued by the Australian Business Register (ABR) which is operated by the Australian Taxation Office (ATO). The ABN is a component of the System introduced on 1 July 2000.

The ABR provides a bulk data extract of selected elements of information on Australian businesses with a current ABN.

The extract information contains a subset of the publicly available information supplied by businesses when they register for an Australian Business Number (ABN). Current details for the following attributes are available:

- ABN
- ABN Status and Date
- Entity Type
- Legal Name
- Business Name(s)
- Trading Name(s)
- State and Postcode of Main Business Location
- ACN/ARBN
- GST Status and Registration Date
- Deductible Gift Recipient Status and Dates

Further information is collected by the ABR but is not made available through the bulk extract. This information is, however, available to the Governments as required when responding to disasters. This information includes data such as:

- Business locations
- Associates details
- For each associate the business operator provides:

- For individuals – date of birth, gender, position held, tax file number (TFN) or residential address if TFN not provided.
- For organisations – ACN/ARBN/ABN if applicable, TFN or address and date of formation if TFN not provided.

The ABR requests businesses to specify their main business activity in accordance with ANZSIC codes. The main business activity is usually defined (but not always) the activity that is the main source of income for the business or organisation.

Examples of business activity descriptions from the ABR are given below:

AGRICULTURE

The type of agriculture the business is undertaking - include farming methods where appropriate:

- wheat farming
- salmon farming in ponds or tanks
- vegetable growing in greenhouses
- dairy cattle farming
- grain and sheep farming
- sheep and beef cattle farming.

CLEANING

The specific type of cleaning activity of the business, which can include a description of what is cleaned and how it is cleaned:

- cleaning shops or offices
- residential cleaning services
- curtain cleaning services.

CONSTRUCTION

Describe details of the types of construction activities that are being carried out:

- house building
- telecommunications infrastructure construction
- road construction
- carpentry services
- bricklaying services
- fence erecting services
- plumbing services.

EDUCATION AND TRAINING

The type of education services the business provides:

- primary and secondary school education

- lecturing in law
- dance teacher.

INVESTMENT

The main areas the business invests in:

- investment – shares
- property investment.

SALES

- The business including whether it is wholesale or retail:
- selling meat wholesale
- selling mobile phones to retailers wholesale
- operating of a retail supermarket
- furniture retailing.

SERVICE BUSINESSES

The service provided, the location and the clients serviced by the business:

- home care nurse for disability or palliative care
- child care in a facility or at home
- provide administrative functions at a client's business premises.

MANUFACTURING

The types of products the business manufactures and what materials the products are made from:

- clothing manufacturing
- hearing aids manufacturing
- baking of bread on the premises
- pesticide chemicals manufacturing
- steel wire manufacturing.

MINING

The mining activity which includes extraction or exploration for minerals, oil and gas equally describes the types of material mined or explored:

- black coal mining
- oil and gas drilling
- gold mining
- zinc exploration
- stone quarrying
- sand mining

AUSTRALIAN TAXATION OFFICE (ATO)

The Australian Taxation Office provides detailed financial information regarding business in Australia on an annual basis sourced from company tax returns. This information is aggregated at the national level.

The industry groups are based on two digit ANZSIC 2006 codes based on information in the Australian Business Register. 'Other' includes companies whose stated industry was unknown and/or companies registered under the public administration and safety industry code. For single and multiple businesses, the industry description and code should relate to the activity from which the business derived the highest gross income or incurred the smallest loss.

ATO requires the operators to list a business industry code (BIC) that must be reported on relevant tax returns and schedules along with an accurate description of the organisation's main business activity. They come from the Australian and New Zealand Standard Industrial Classification (ANZSIC) codes.

To provide a level of privacy, the ATO notes that the following measures have been applied to the data:

1. Number indicators shown may have been rounded to the nearest multiple of 5.
2. Statistics for some items may not be included in some tables.

Industry benchmarks

A range of industry benchmarks are available in detailed table format in the form of financial and activity statement ratios. The benchmarks can be used by tax advisers to identify average performances and those that vary significantly from those averages.

NON-GOVERNMENTAL DATA SOURCES

NATIONAL INSTITUTE OF ECONOMIC AND INDUSTRY RESEARCH PTY LTD

The National Institute of Economic and Industry Research Pty Ltd is an Australian Private Company. It is a trustee for the NIEIR Research Foundation (a not-for-profit education and research trust). The National Institute of Economic and Industry Research grew out of the Econometric Forecasting Project established at the Melbourne University Institute of Applied Economic and Social Research in 1974. The project used state-of-the-art forecasting techniques – particularly econometric modelling- to develop short-, medium- and long-term forecasts of economic activity at industry level.

NIEIR's regional database includes traditional data sources as well as modelled data that can be used for information on local area economies. In their website, it is stated that NIEIR is recognised as the industry leader in economic modelling at the smallest credible geographical unit, the Local Government Unit (LGA).

COMPANY360

COMPANY360 is an international company database compiled and maintained by Dunn & Bradstreet that contains information on approximately 50,000 Australian businesses.

Rather than the standard ANZSIC industry codes, this database use the Standard Industrial Classification (SIC) codes which are four-digit numerical codes assigned by the U.S.

government to business establishments to identify the primary business of the establishment. The classification was developed to facilitate the collection, presentation and analysis of data; and to promote uniformity and comparability in the presentation of statistical data collected by various agencies of the federal government, state agencies and private organizations.

The SIC system arrays the economy into 11 divisions, that are divided into 83 2-digit major groups, that are further subdivided into 416 3-digit industry groups and finally disaggregated into 1,005 4-digit industries.

As of August 2015, the database includes 43,248 private companies and 6,778 public companies. The majority of these have less than 51 employees (30,684 in all).

The database includes information on the business registered location and a summary of the business, key financial and employee data, management, shareholders, and key competitors.

IBISWORLD

IBISWORLD database provides industry sector overviews for approximately 500 industries based on the ANZSIC classification. It also includes information on the top 2,000 companies in Australia.

Industry research reports

IBISWorld states that the industry reports provide "extensive, objective and easy to digest information. IBISWorld's industry research reports offer the very latest content on almost every Australian industry – including new report titles on emerging industries. Each report consists of 30 to 40 pages of key statistics and analysis on market characteristics, operating conditions, current and historical performance, a five-year forecast, major industry participants and more".

There is little to no geospatial data available as part of the reports.

Company research reports

Research reports are available for the top 2000 companies based on financial data and include public companies, foreign-owned businesses, trusts and governments departments. This includes both listed and non-listed companies.

These research reports detailed company information including the registered company address, company history, key personnel, financials, growth and financial ratios, comparison against industry averages, the competitive environment, shareholders, subsidiaries, and service providers.

MORNINGSTAR DATANALYSIS

Morningstar provides detailed company and financial information on the approximately 2200 companies that are listed on the Australian stock exchange.

- Corporate Details
- Business Summary
- Substantial Shareholder's & Director's Trades
- 10 years of financial data
- Individual Director's Resumes
- Operational history
- All ASX announcements in PDF

- Share Price History and Market Data
- Dividend History
- 2 page Company Summary

STATE AND TERRITORY BASED BUSINESS AND ECONOMIC DATA

VICTORIA

City of Melbourne's Census of Land Use and Employment (CLUE)

The City of Melbourne has been collecting land use and employment data since 1962. The latest Census of Land Use and Employment (CLUE) was conducted in 2012. Data for CLUE 2012 was collected between November 2011 and August 2013. The previous CLUE was conducted every two years from 2000 – 2010 and 1997 and each five years prior to that. Electronic data is currently available for census years: 1992, 1997, 2000, 2002, 2004, 2006, 2008, 2010 and 2012.

Originally collected on a five-yearly basis, every commercial property in Melbourne is be surveyed at least once every two years with new buildings surveyed on completion. A team of surveyors conducts a field survey which involves visiting every establishment in every building in the census area (City of Melbourne municipality). Information is collected such as trading name, activity description, a space type code, number of employees, number of parking spaces and capacity measures.

Data on specific businesses or specific buildings is not made available for reasons of confidentiality. Confidentiality does not, however, extend to data that is public knowledge, such as trading names. If the information required is not in the free reports, it is possible to submit a request for a customised report. Customised data can be ordered and tailored to meet individual requirements. Data can be provided in Excel, Word, or PDF format as figures, graphs or charts depending on your needs. CLUE data is subject to confidentiality restrictions and any data which may identify an individual business/establishment will be restricted.

The Census area is divided into city blocks, each of which is identified by a unique block number. There are 606 individual city blocks which are primarily bounded by main roads and also take into account similar space use (for example, office use). In order to enable statistical analysis and to generate maps from the CLUE data, geospatial map layers in Esri shapefile format for CLUE small areas and blocks are available. These map layers use a spatial reference projection of GDA 1994 MGA Zone 55.

Victorian WorkCover Authority

Victorian WorkCover Authority maintains information on approximately 280,000 Victorian businesses. They provide limited summary data aggregated at the state level on topics such as the number of workplaces by ANZSIC code, injuries, fatalities and other work cover claims. They also provide some summary state level information gained through Work Health checks.

NEW SOUTH WALES

City of Sydney, Floor space and employment survey (FES)

FES of Sydney is equivalent to CLUE of Melbourne. Every 5 years the City of Sydney conducts a floor space and employment survey (FES) of all buildings and businesses

across the whole local area. The latest survey started in January 2012 and took around 10 months to complete the fieldwork. The data collected from the survey informs short- and long-term strategic planning and helps in monitoring trends in land use, building characteristics, employment and parking around the local area. As part of FES fieldwork, surveyors approach a key contact person for each business to give them access to all floors and ensure all spaces associated with the business or building are fully captured through visual inspection.

Surveyors capture a diverse range of information directly during the fieldwork including the type of business operating, how long the business has been at the current premises and the number of full- and part-time employees on each floor.

Although taking part in FES is not compulsory, the businesses are encouraged to participate. All specific business-related data collected during the survey remains confidential and it is not released to the public. The results are instead aggregated and presented in reports and tables that cannot identify specific business operations. FES data is also available for use by businesses, developers and residents providing our stakeholders with a valuable source of information about the local area.

SOUTH AUSTRALIA

Adelaide City Census of Land Use and Employment (ACCLUE dataset)

Type of information provided by ACCLUE:

- Land use (industry) for businesses and organisations
- Number of employees for businesses and organisations
- Buildings with showers facilities and bicycle storage
- Residential dwelling types
- Offstreet car parking
- Duration of stay for businesses
- Vacant establishments

The level of detail of information released by Adelaide City Council from the ACCLUE is subject to confidentiality to ensure the privacy of businesses is respected.

WESTERN AUSTRALIA

Perth: Land Use and Employment Survey

The Department of Planning carries out surveys every few years, of all commercial and industrial areas and places designated for public purpose use, such as schools, hospitals, recreation and open space in the Perth metropolitan and Peel regions, and the State's major urban centres.

The survey collects information relating to land use and employment including:

- the type of activities businesses conduct;
- the floor space the activity occupies; and
- the number of people work in each activity.

More recent information form DoP can be obtained from Central Metropolitan Perth Sub-regional Strategy – Draft.

Land Use in Western Australia Metadata Information

Land uses across Western Australia have been mapped at 1:25 000 in urban areas, 1:100 000 in agricultural areas and 1:250 000 in pastoral zones. For agricultural enterprises

land use had been attributed according to the dominant land use per enterprise, the principal economic activity on that enterprise or property. Three zones were used to attribute land use: a. zone 4 – Perth Metropolitan Area, south western an forests region b. south west agricultural region outside zone 4 and c. pastoral and desert region referred to as the extensive land use zone Zone 4 contains information on production attributed to the cadastral parcel level. In other areas, land use is attributed at the whole of property scale. The data was prepared as part of the joint land use and vegetation mapping project between Agriculture WA and the National Land and Water Resources Audit.

Data are available subject to a Western Australia or Commonwealth licence agreement. Agriculture WA (Western Australia) and the National Land and Water Resources Audit (the Commonwealth) have joint copyright. The data was prepared as part of the joint land use and vegetation mapping project between Agriculture WA and the National Land and Water Resources Audit. (However – this does not provide information about the number of employment.

QUEENSLAND

Brisbane Community Profiles

The Brisbane Community Profiles provide detailed statistical information for Greater Brisbane and Brisbane City using information from the Australian Bureau of Statistics, Commonwealth and Queensland Government sources.

Profiles are generated using the latest demographic, social and economic data to gather information about the people who live in an area (Resident Profile) the workers and businesses that operate in the area (Workforce Profile) or how the area has changed over time (Time Series Profile).

TASMANIA

City of Hobart Economic profile

City of Hobart Economic profile covers areas such as resident population, demographics, working population, employment, business, housing, office accommodation, education and tourism.

However, it seems like the information is based on ABS 2011 Census of Population and Housing: Basic Community Profile (Hobart LGA, Greater Hobart, Tasmania).

Bureau of Infrastructure, Transport, Regional Economics

The Bureau of Infrastructure, Transport, Regional Economics (BITRE) provides economic analysis, research and statistics on infrastructure, transport and regional issues, to inform Australian Government policy development and through publication, wider community understanding.

- Industry Structure Database
- Education and Occupation Databases
- Social capital indicators database
- Taxable Income Database
- Income support payments database
- Household wealth database
- Cost of remoteness dataset
- Regional aviation database

ECONOMIC POLICY AND DECISION MAKING (DEAKIN UNIVERSITY)

References are made to BNHCRC A8 Project:

Given A8's multi-disciplinary scope, a wide range of datasets are used in this project. First, annual data on sector-specific Gross State Product (GSP) for the period 1990-2013 is taken from the Australian Bureau of Statistics (ABS, 2014c). Second, for disaggregating these sector-wise GSP to a smaller geographic level, the total number of employment in each sector at a finer spatial unit—Destination zones (DZNs) —is taken from the Place of Work database (POWP, 2011, AURIN also hosts the dataset). Third, the exposure dataset (building) is taken from NEXIS (GA, 2012). Fourth, historical weather data (rainfall, temperature from 1900 to 2014) is provided by BoM (2015).

Generally, two criteria are widely used for macroeconomic policy simulations under the simultaneous equation modelling approach. First, a macroeconomic system can be simulated under a well-specified structural model involving all economic sectors where feedback from one sector on another sectors output is not specified. Second, the vector-autoregressive model (VAR) is the vector-generalisation of autoregressive models and can be regarded as an unrestricted reduced form of a structural model, where the specification is capable of addressing inter-sectoral linkages between economic activities. In regards to the policy simulation, both of the above approaches suffer from misspecification issues as they either do not incorporate inter-sectoral feedback of economic activities or do not address possible correlation of residuals in presence of the same disaster shocks across different sectors. To circumvent these problems, the newly proposed econometric techniques in the field harp on pinning down the causal relationships over estimating statistical correlation, and hence, exogenous shocks such as natural disasters are modelled using single-equation estimators (e.g., IV-2SLS) instead of the earlier used system settings (see Cavallo et al 2010, Dell et al., 2014). In accordance, the single-equation reduced form approach is employed which incorporates both inter-sectoral feedback as well as cross-equation correlation of residuals in presence of the same disaster shocks traversing to all sectors of the economy. The proposed economic model is estimated using the Seemingly Unrelated Regression (SUR) estimation technique to decipher the effect of natural disasters on sector-specific GSP at DZN level.

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