



Australian Government

IP Australia

Methods for Estimating the Market Value of Indigenous Knowledge

Final Report to IP Australia

Dr Boyd Blackwell, Dr Kerry Bodle, Dr Janet Hunt,
Dr Boyd Hunter, Mr James Stratton and Ms Kaely Woods

Centre for Aboriginal Economic Policy Research
The Australian National University

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Abbreviations

AASB – Australian Accounting Standards Board
ACCC – Australian Competition and Consumer Commission
ANTA – Australian National Travel Association
ANU – The Australian National University
ASIC – Australian Securities and Investment Commission
BLADE – Business Longitudinal Analysis Data Environment
BWS – Best Worst Scaling
CAEPR – Centre for Aboriginal Economic Policy Research
CATSI – *Corporations (Aboriginal and Torres Strait Islander) Act 2006*
CM – Choice Modelling
CV – Contingent Valuation
DCE – Discrete Choice Experiment
DPMC – Department of Prime Minister and Cabinet
FPIC – Free, Prior and Informed Consent
GIs – Geographical Indications
HC – Human Capital
ICH – Indigenous Cultural Heritage
ICIP- Indigenous Cultural and Intellectual Property
IIP – Identifiable IP
IK – Indigenous Knowledge
ILUAs – Indigenous Land Use Agreements
IP – Intellectual Property
IP Australia – Intellectual Property Australia
IPAs – Indigenous Protected Areas
NIAAC – National Indigenous Arts Advisory Council
NIIP – non-identifiable IP
NSWATOC – New South Wales Aboriginal Tourism Operators Council
ORIC – Office of the Registrar of Indigenous Corporations
PC – Productivity Commission
PwC – Price Waterhouse Coopers
RP – Revealed Preference
SC – Stated Choice
SP – Stated Preference
TCE – Traditional Cultural Expressions
TK – Traditional Knowledge
TOs – Traditional Owners
WAITOC – Western Australia Indigenous Tourism Operators Council
WOC – Working on Country
WTP – Willingness to Pay
WIPO – World Intellectual Property Organization

Executive summary

Objectives and overview

This report provides guidance to IP Australia on the best approaches to estimating the market value of Indigenous Knowledge (IK) now and in the future, along with consideration for IK's value in the context of patents, trade marks, designs and plant breeder's rights.

We have done this by undertaking the key activities from the IP Australia Terms of Reference as fully outlined in Chapter 1. Specifically, we have:

- a) Conducted a national and international **literature review** on IK (Chapter 3 Literature review) and its commercial use **now** (Chapter 4 Case studies) and in the **future** (Chapter 2 IP instruments), and wherever possible, **the valuation of traditional knowledge (TK) and traditional cultural expressions (TCE)** (where protection other than copyright is used) (throughout all chapters but especially Chapter 5 Methods) to assess the state of knowledge about the **current and potential commercial use** and **current or potential markets** for the relevant sectors or industries.
- b) Undertaken a **preliminary scoping** of the areas/industries identified **in Australia**, drawing largely on written sources (Chapters 2 Instruments, 3 Literature review and 4 Case studies).
- c) Identified **potential data sources** and **explored possible methodologies** for assessing both the current and the potential market value of Indigenous Knowledge (Chapter 5 Methods).

IP instruments, institutions and caveats

Given the paucity of existing research on measuring the market value of IK in existing and future markets, we have built up our analysis from first principles. We have described the existing and potential legal instruments and institutions that could protect IK and capture value (Chapter 2), should Indigenous communities choose to use that knowledge to produce goods and services for the market.¹

Chapter 2 outlines the instruments available to help protect IP. These can range from enforceable instruments to voluntary protocols. Enforceable instruments have a clear connection to market value, typically being tradeable with a cost incurred to protect their attributable IK. While legal costs and patent prices and licence fees are private, it may be possible to gain access to summarised and de-identified data.

Non-enforceable rights such as protocols, codes of conduct and certification may involve compensation or payments designed to protect IK. Price premiums may help to capture the market value of attributable IK but require careful methodological consideration.

A diverse range of instruments helps to provide choice to Indigenous peoples and creates a system that may support the development of social and market norms that encourage the recognition and protection of IK.

Given that some of these instruments are emerging and untested in the marketplace, we cannot be definitive about the efficacy of these instruments in capturing the value of IK in production and consumption for the owners of that knowledge.

¹ We define a market as any situation which involves a transaction for a good or service.

Accordingly, any conclusions about the relative merits of various instruments and institutions should be treated with caution and monitored to ensure that the owners and custodians² of IK are appropriately rewarded for its contribution to the value creation process in the market.

If the suggested legal instruments prove to be unenforceable, then policy makers need to pay due attention to the development and facilitation of institutions that appropriately remunerate Indigenous owners or custodians of IK. The research of Janke et al. (Janke 2009a, b 2018a, b; Janke and Dawson 2012; Janke & Sentina 2018; Sentina et al. 2018) points to the development of suitable protocols, however authenticity labels may be another option.

If it remains problematic to enforce legal instruments, the ultimate strategy would be to facilitate the use of IK within culturally safe environments such as Indigenous community organisations or Indigenous businesses (see Appendix C).

Literature review

Chapter 2 outlines the literature relevant to the valuation of IK. In doing so, the chapter focusses on the commercial or market value of IK. Three areas of the literature are outlined: (i) general approaches to valuing IK including the accounting profession's treatment and approaches to valuation through the valuation of intangible assets, (ii) approaches to calculating the market value of IK including sectoral assessments of value and broad economy assessments of Indigenous business, and (iii) studies of the commercialisation of IK.

There is no specific study of the economic valuation of IK in Australia or overseas that relates to the value of IK contained within IP instruments such as patents, trade marks, designs, licenses, geographical indications or plant breeder's rights. Instead there is a disparate series of literature across the above three topics that have not previously been brought together into a synthesised whole.

By doing so, we provide guidance on the best approach to valuing IK now and in the future. This survey has identified that the production function approach to valuation is potentially an ideal approach for valuing IK, but this would require copious case study analyses, including choice modelling surveys, to help address the IK attribution problem.

Valuation approaches, the attribution problem, case studies and future research

We found that the literature, including our own methodological development, attempts to conceptualise how IK fits within the production processes for goods and services that would be sold on the market. We outline a taxonomy of general approaches to the valuation of IK in Chapter 5 (Methods). Here we found that while accountancy perspectives on the value of IK may seem promising, they highlight the fundamental problem - the attribution of IK - for measuring the value of IK in markets.

The attribution problem can best be described as knowing precisely the relative contribution in percentage terms of each factor of production, and of most concern to IP Australia, the percentage contribution that IK makes to this value in the context of any given good or service. In the absence of any estimates of IK attribution in the literature, we have made

² Custodians of IK in Australia are typically Aboriginal and Torres Strait Islander peoples. However, non-Aboriginal and Torres Strait Islander peoples can hold IP rights over IK. Our reference here is to respecting the traditional owners of IK and ensuring that free, prior and informed consent is sought to use Aboriginal and Torres Strait Islander peoples' knowledge. This will aid social and cultural cohesion as an engine for sustainable economic development.

some simplifying, though likely inaccurate assumptions, to estimate attribution percentages in specific case contexts (see Chapter 4 Case studies). Future research beyond the scope of this project is required to solve this problem more precisely through surveying the producers (as outlined in Box 5.1) along with surveying consumers to gain their willingness to pay (or demand) for the IK used in creating specific goods and services across a selection of sectors.

Once measures of the percentage of IK attribution have been more precisely estimated through this additional research, these could then be used to estimate the contribution made by IK to these sectors. It will take some time and some investment in this future research to ensure that reasonable IK attribution percentages are ascertained for a practicable and representative sample of sectors across the economy. Once this is achieved, a macroeconomic assessment of the market value contribution that IK makes to the national economy can be undertaken. Importantly for IP Australia, this broader national information will then help inform how much IK may be captured through the current (and any future scenarios of) arrangements of IP instruments (outlined in Chapter 2).

Methodological approaches to valuation

In addition to using Accounting Standards to value IK through 'intangible capital', the report identified several other areas in the literature where arguably researchers could attempt to value the contribution of IK but ultimately are presently unable to do so definitively because of the attribution problem. These approaches include valuations of the contribution of IK to specific sectors, valuations of the Indigenous business sector and valuations of the commercial use of IK. As Chapter 5 demonstrates, these avenues for measuring the value of IK are not only constrained by the attribution problem but also the existence and coverage of relevant data. This is either partial or incidental in nature, with data being collected for other purposes that do not necessarily adequately address the need to capture the value of IK.

Case studies

Because of the abstract nature of IK valuation and the challenges in estimating market values, Chapter 4 provides evidence from a range of Australian case studies that illustrate the relevant issues for policy makers.

The review of the case studies is undertaken to identify specific market values, consider the attribution of IK to these values, and identify what data would be required to ultimately estimate the market value of embodied IK.

Market values are significant and vary by good and service type and the industry in which they are supplied. Using the production function approach and arbitrarily allocating percentages to other factors of production, recommended IK attribution varies from between 1.7 percent in the case of furniture manufacturing to 28.5 percent in the case of Indigenous Protected Areas and ranger programs.

There are significant values resting with the embodied IK of Indigenous Protected Areas and associated ranger programs, commercialisation of plant species, cultural education programs, Indigenous traditional healing and Kirrikin and Koskela fashion and homeware design.

Embodied IK is *sui generis* in nature across this range of goods and services and further forensic work using case-specific financial accounting information is needed to have greater reliability over the interval for attribution of IK in any given setting.

In contrast to the microeconomic-style assessment presented through these case studies, future research opportunities may exist in a macroeconomic assessment of the market value of IK now and in the future. However, the *sui generis* nature of IK, as presented in the case study analysis from this chapter would need to be accounted for in such research.

While such case studies provide a suitable level of contextualisation, all must deal with an almost insurmountable challenge of attributing some portion of the measured value to IK: the attribution problem. The attribution percentages we estimated should therefore be viewed with caution and are likely to be conservative. Future research through direct questioning of producers is required to more precisely adjust our simplifying assumptions for IK attribution.

Possible culturally-adapted and mixed methods

Given the challenges to measuring the market value of IK in the case studies, Chapter 5 discusses four possible methods that might allow greatest insight into the value of IK in market goods and services.

The first method draws from accounting profession guidance on the valuation of intangible assets, combined with an economic production function approach to valuing IK. This approach is particularly suitable to microeconomic needs for IK values such as for the firm's financial accounts and IP portfolio decision making. Within this first approach, the chapter outlines a series of direct questions that could be asked of specific producers, by combining cost- and income-based accounting valuation approaches, to help obtain a case-specific and refined measure of the percentage of IK attribution in future research.

The second approach involves using macroeconomic assessments of the Indigenous sector in national economies by again making a relatively arbitrary attribution for IK. The assessment is macroeconomic in that it takes into account the broader economic impact of IK on other sectors (e.g., through its impact on aggregate demand and aggregate supply).

The third method involves attributing IK to commercial and market values estimated for specific industry sectoral cases and the fourth method surveys people to assess their willingness to pay (demand) for the IK embedded in goods and services.

All methods require further research to solve the attribution problem in specific settings. The fourth method can incorporate IK as a specific attribute to be valued relative to competing attributes.

Related to this final method, are the revealed preference methods of travel cost and hedonic pricing which would use econometrics to isolate the contribution made by IK between goods and services of similar types (substitutes) while controlling for all other factors of difference.

An additional method involves ascertaining the differential value for IK between the market prices for goods of a similar type, but one with IK and another without. This could prove cost effective where data is available to ascertain the differential value attributable to IK.

As a research plan, microeconomic studies should begin in earnest, to ascertain the percentage of IK attribution in sectoral contexts. Once a sufficient number of sectoral attributions can be estimated, then macroeconomic assessments can begin. These suggested approaches are not without limitation, particularly given the complex communal nature of IK and the need for socially contextualised valuations. Consulting with Indigenous peoples in this regard would be necessary.

Again, to reemphasise, we found that incorporating non-market valuation methods such as choice modelling (CM) may prove beneficial. CM was historically created and continues to be used today by marketing researchers to estimate the price or value of attributes for products which have not yet been released to the market. This method was therefore found to be well aligned to capturing the value of IK embedded in specific goods or services using targeted case examples. Good examples of where this approach could be developed in future research include the use of species, health, and fashion, design, homewares and lifestyle (See Chapters 3 and 4 and Appendix A for a full listing of cases where IK is used to produce and sell goods and services). However, given that non-market valuation methods have been developed from Western and typically individualistic perspectives, they will not be perfect in estimating the value of IK for Aboriginal and Torres Strait Islander peoples' communities in all contexts of the use of IK. Drawing from these peoples' perspectives in redesigning these non-market valuation methods would be wise.

Moreover, our guidance suggests a mixture of methods, combining surveys of consumers incorporating CM, as well as surveying producers to address the attribution problem for specific sectors and specific uses of IK as a first step. Concurrently, price differentials for similar products, where IK is used and not used, controlling for other factors could also prove fruitful (e.g. through hedonic pricing, travel cost approaches and differential market pricing econometric analysis).

Future research focus and the policy challenge

Allocating resources to targeted research to help solve the attribution problem quantitatively for specific goods and services in specific markets presents a unique opportunity, a global first to identify the value of IK in contributing to sustainable Indigenous economies.

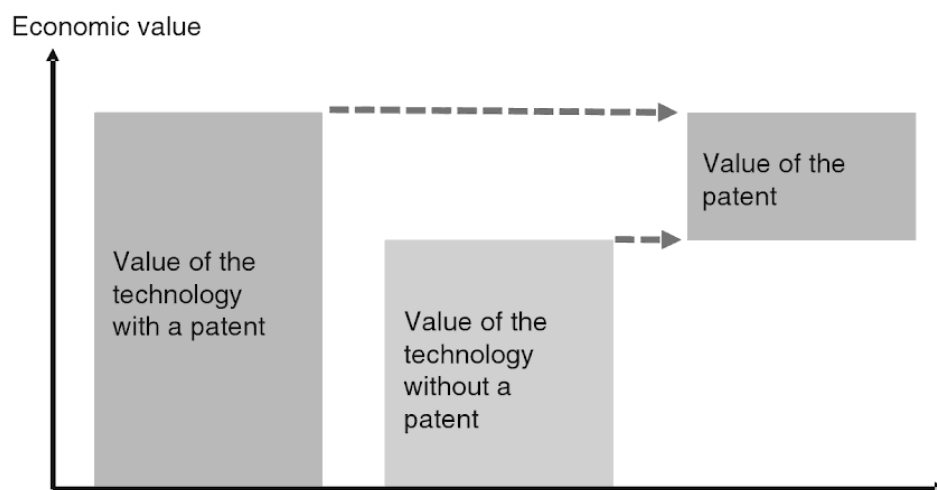
Notwithstanding the challenges identified in this report, the Indigenous business and community sector is extremely dynamic and creative and has the scope to add significantly to the Australian economy. The fundamental challenge is to ensure that IK is both adequately rewarded, and that the owners or custodians of that knowledge are primary beneficiaries. The adequate protection of IK is a substantial challenge that needs monitoring by both the Indigenous community and IP Australia. The policy challenge extends well beyond the remit of IP Australia. Ultimately, policy may need to facilitate capacity and governance of Indigenous organisations within the community and business sectors to monitor and protect IK to optimise the value added to aid the broader economic independence, initiative and success of Indigenous peoples.

1. Introduction

This report provides an approach to the valuation of the potential market value of Indigenous³ knowledge (IK) including traditional knowledge^{4 5} and cultural expressions⁶ for IP Australia (IP Australia, 2018e; Janke & Sentina, 2018). The report has a particular focus on the current and potential future market value created through legislated protection measures including patent law, trade mark law, design legislation and plant breeder's rights. These are the protective mechanisms, which do not include copyright law, that sit within IP Australia's jurisdiction.

The market value of IK is connected to, though not the same as, the market value of IP that protects that IK, just as the value of derivatives in the financial markets is connected to though not equal to the value of their respective underlying stocks. This insight is drawn from the observation that the value of technology is connected to, though separate in value from, the value of the IP that protects that technology, as depicted in Figure 1.1.

Figure 1.1: The relationship between the value of innovation and the IP instrument



Source: Munari & Oriani, 2011, p. 7

IP Australia has conducted a series of roundtables to talk with Aboriginal and Torres Strait Islander people about the best way to protect IK. IP Australia (2018c) in their roundtable invitational pamphlet defined IK to include:

- Indigenous products such as bush foods, medicine and craft products;
- Traditional knowledge of plants and animals that may be used in new technologies;
- Culturally significant words and images that may be used in trade marks and designs; and
- Indigenous knowledge that may be used in research.

³ No disrespect is intended for Aboriginal and Torres Strait Islander peoples by using this term; rather it is used in order to represent indigenous people across the globe.

⁴ Know-how, practices, techniques and skills, from: (IP Australia, 2018b)

⁵ We use the adjective 'Indigenous' instead of 'traditional' to describe knowledge to reflect the continual evolution and use of IK in the past, present and future (Janke & Sentina, 2018).

⁶ Visual imagery, performance, design, words and names, from: (Janke & Sentina, 2018).

1. The Specific Requirements

IP Australia has requested the following (bold emphasis added):

IP Australia is interested in providing better protection of Indigenous knowledge and products associated with that knowledge for which there is currently **no copyright protection**. IP Australia's objective is to identify opportunities to promote the cultural integrity and economic potential of Indigenous Knowledge for Indigenous people. Within that objective, the **market potential of Indigenous Knowledge** has been identified as an information gap.

IP Australia requires the Supplier to advise on the **literature and evidence base** around **approaches to market valuation of aspects of Indigenous Knowledge**, particularly **Traditional Knowledge**, with a view to undertaking a **quantitative valuation** of the **current and potential market value** of Traditional Knowledge in the future.

For the purposes of this work, Indigenous Knowledge will encompass:

- **Traditional Knowledge** – the practices, know-how and skills developed by Indigenous communities, including knowledge about the properties and uses of native genetic resources
- **Traditional Cultural Expressions** – traditional artworks, designs, and stories **not covered by copyright law**.

The focus will be on those aspects of Indigenous Knowledge that may **potentially be protected by patents law, trade mark law, design legislation and plant breeder's rights**.

Scope of requirement

The Supplier is required to:

- Undertake a **comprehensive literature review** of Indigenous Knowledge with a focus on research or promotion contributing to the understanding of the current and potential value of Indigenous Knowledge in Australia that may be covered by any of the above mechanisms.
- The **scoping study** should look towards valuation of existing and potential market value for Indigenous Knowledge and provide a **basis for identifying specific sectors** with the best prospects to fill a key information gap.
- Identify possible **data sources** for measuring the potential market value of Indigenous Knowledge and their availability.
- Identify possible **methodologies** to consider as ways to measure the potential market value of Indigenous Knowledge in Australia.

The Supplier shall develop an **approach** to placing a market value on the use of Indigenous Knowledge. There will be three aspects to this activity:

- a) Conduct a national and international **literature review** on Indigenous Knowledge and its commercial use **now** and in the **future**, and wherever possible **its valuation**, in all the above areas, to assess the state of knowledge about the **current and potential commercial use** and **current or potential markets** for the relevant sectors or industries.
- b) Undertake a **preliminary scoping** of the areas/industries identified **in Australia**, drawing largely on written sources.
- c) Identify **potential data sources** and **explore possible methodologies** for assessing both the current and the potential market value of Indigenous Knowledge.

The final report will comprise two parts. Part 1 will cover task (a) above and Part 2 will cover tasks (b) and (c) above.

2. Traditional knowledge and cultural expressions – their unusual nature

The Productivity Commission recommended a series of amendments to IP protection laws⁷ to allow for a better balance between the need to create incentives for the creation of new knowledge while not providing undue impediments to follow-on innovation, competition and access to goods and services (Productivity Commission, 2016). The Productivity Commission (2016, p. 58) Inquiry Report identified that Indigenous cultural and intellectual property (ICIP) has a very different set of economic characteristics compared with standard IP, particularly where it is created from community traditional knowledge or cultural expressions:

The Indigenous people would like to see a stronger regime that actually protects their traditional cultural expressions and their traditional knowledge, which are embodied in work that they create. ... it comes at intellectual property from sort of a different perspective [which is] very communal in its nature and it has been passed down from generation to generations over thousands of years. So it's not all about individual rights for individual rights holders or creators. (Arts Law Centre of Australia, trans., p. 137)

According to the Productivity Commission (2016), the National Congress of Australia's First Peoples found that the ICIP of Aboriginal and Torres Strait Islanders peoples could extend to include:

- literary, performing and artistic works, including songs, music, dances, stories, ceremonies, symbols, languages and designs;
- scientific, agricultural, technical, and ecological knowledge;
- all items of movable cultural property;
- knowledge about culture, roles and relationships;
- human remains and tissues;
- immovable cultural heritage including sacred sites, historically significant sites and burial grounds; and
- documentation of Indigenous peoples' heritage in archives, film, photographs, videotape and all forms of media.

According to the World Intellectual Property Organization (WIPO, 2018a, b), Western IP systems historically view traditional knowledge and cultural expressions as being in the public domain, free for anyone to use and thus subject to unwanted misappropriation and misuse.

Understanding that ICIP, because of its communal nature and its connection to the cosmos (not just country but everything; land and water, stars and space), is affected by more than just the IP laws (see Figure 1.2) was an important point raised by the Productivity Commission. Also, the Productivity Commission (2016, p. 59) recommended improved governance arrangements to apply to the IP system as a whole and argued that this would 'further ensure a broad based examination of IP issues confronting Aboriginal and Torres Strait Islander (Peoples)... ..in the future'. The Productivity Commission (2016) identified that protocols, which are inherently voluntary, involving use of ICIP in a respectful way, can

⁷ For example, for some of the amendments see (IP Australia, 2018d).

be a flexible alternative to a legislated approach, but that the Arts Law Centre of Australia identified that there are more cases where protocols are ignored rather than respectfully adhered to.⁸ The Commission referred to the *Aboriginal Heritage Amendment Act 2016* (Victoria) which established a group of traditional owners to determine when ICIP may be used, in what form, and when royalties are payable.

Figure 1.2: ICIP is affected by more than IP laws



Source: Productivity Commission, 2016, p. 59.

3. Outline of the report

The remainder of this report consists of five chapters. Chapters 2-4 are papers (ready for publication or submitted for publication)⁹ that have been prepared to address the IP Australia requirements: Chapter 2 being a review of the legal instruments and their relationships with protecting IK; Chapter 3 being a review of the literature; Chapter 4 being an analysis of a range of case studies from sectors where IK is an important input in an attempt to provide some indication of possible IK attribution percentages in these sectors; and Chapter 5 being a review of methods and data which could be used to estimate the market value of IK. The report ends with some concluding comments in Chapter 6.

⁸ Another interpretation of this result is that when followed, protocols may be invisible to detection because people are simply seen as collaborating or that people may not engage because of a misunderstanding of protocols.

⁹ While not conventional for reports to be prepared in a format that is ready for publication in the international journals, we have developed (we believe for the first time) a report by publication (or ready for publication) where a series of papers form the body of the report. This is similar to the more recent convention for PhDs to be prepared with the body of the PhD consisting of a series of papers which have been published or are ready for submission to peer reviewed international journals. Reports or PhDs by publication have the advantage of being scrutinised by international peer review, or ready to be submitted for international peer review. This peer review process typically results in a higher quality research outputs and evidence.

2. An overview of legal instruments and other measures to aid in the protection and valuation of Indigenous knowledge

Stratton, J., Blackwell, B., Bodle, K. and Hunter, B.

Chapter summary

This chapter outlines the legal instruments and other measures used to support the protection of Indigenous Knowledge (IK), with a view to attributing market value to IK. These instruments are categorised as either enforceable instruments or voluntary protocols, standards and guides. Enforceable instruments have a clear connection to market value, typically being tradeable with a cost incurred to protect their attributable IK. While legal costs, patent prices and licence fees are private, it may be possible to gain access to summarised and de-identified data. Non-enforceable rights such as protocols, codes of conduct and certification may involve compensation or payments designed to protect IK. Price premiums may help to capture the market value of attributable IK, but require careful methodological consideration. A diverse range of instruments helps to provide choice to Indigenous Peoples and creates a system that may support the development of social and market norms that encourage the recognition and protection of IK.

1. Introduction

This chapter reviews the instruments and other measures relevant to supporting the protection of Indigenous Knowledge (IK) in Australia, with the intention of identifying ways to estimate the market value attributable to IK.

The definitions of both IK and market value are contested (in relation to IK, see Janke and Sentina (2018); in relation to market value, see Lind (1998)). Following the World Intellectual Property Organization (WIPO) (2015, p. 1), we use the term IK to refer to the ‘living body of knowledge that is developed, sustained and passed on from generation to generation within a community [of Indigenous People], often forming part of its cultural or spiritual identity’.¹⁰ We also take a broad view of market value: value is created whenever transactions take place, whether in a traditional private market sense or a quasi-market sense when goods and services are demanded by government, civil society or philanthropists. The focus is on market value, rather than book value, because there is a gap in the literature with respect to markets identified by Janke and Sentina (2017).¹¹ We are also conscious of the sharing, new or circular economy which is emerging across the full gambit of traditional industries (Rifkin, 2011; Rifkin, 2014). This emerging economy is exciting also for Indigenous businesses, as they continue to permeate these industries and grow (Nana, Khan and Schulze, 2015; PwC, 2018; TD Economics, 2011).

¹⁰ In this chapter we use the term Indigenous Knowledge (IK), but could arguably refer to Indigenous Peoples’ Knowledge to be explicit about from whom the knowledge has originated. The latter term implies that Indigenous People have a legal right of ownership to knowledge. However, the experience of Indigenous Peoples is that this ownership is not always legally recognised, which is part of the motivation for this project. Given that such knowledge may be considered to be owned by the Indigenous community (or even Indigenous culture as a whole), we will simply refer to IK in the remainder of this chapter. Also, we acknowledge that Indigenous practitioners with individual rights may exist outside a given community as an employee or as a business owner and that the enforcement of collective rights in the case of individual practitioners is a significant policy issue (Morphy, H. 2019, pers. comms, 10 May, ANU, Canberra).

¹¹ Note that the book value is the number on the balance sheet, which is original cost less any depreciation, amortization or impairment costs.

Protecting IK requires a balance between encouraging the creation of new knowledge (and the conservation of ancient knowledge) by rewarding creators (curators), and, where appropriate, sharing knowledge across society to deliver broader benefits (Productivity Commission, 2016). Some knowledge is to be shared outside the community while other knowledge is to be always protected and kept from non-community members; this is the essence of appreciating the strategic cultural knowledge that constitutes IK (Marr, 2017).¹² Kathleen Wallace's painting 'Two Women Learning' (Figure 2.1) visually depicts, using ancient symbols, this critical balancing act that rests with Aboriginal and Torres Strait Islander communities across Australia.

Figure 2.1: 'Two Women Learning', by Aboriginal artist, Ms Kathleen Wallace, 'illustrates how different people hold different knowledge, different parts of the story, and how they are responsible for keeping that story safe and passing on the knowledge'



(Source: Permission to use obtained from Ninti One Ltd, 2018).

In reviewing the instruments for the protection of IK, we reflect on the need to balance these competing objectives and consider opportunities for improving these instruments so that they better capture market value from IK.

Finally, we consider the market value of IK that may be protected in the future. This consideration is complicated by the fact that the instruments reviewed, and their social settings, are likely to change over time as government and stakeholder groups strike a different balance between these competing objectives. For this reason, we also consider the future role of instruments that are developing or not widely used at the time of writing.

¹² Marr (2017) refers to strategic data or information. In this context, data, information and knowledge are very similar terms and are used interchangeably in this chapter.

2. Overview of instruments

Figure 2.2 divides instruments for capturing IK into two broad categories:

- Legally enforceable instruments; and
- Voluntary protocols, standards and guides.

Figure 2.2: Instruments for the protection of IK



Legal enforceability represents the highest standard of protection. This protection may arise both through statute and/or case law. Although protocols, standards and guides are distinguished as a category by the fact that they are not typically legally enforceable instruments, they may be enforceable in certain situations, such as when they are codified into contracts. In other cases, although these protocols are not legally enforceable, other sanctions may render the instruments effectively mandatory for market participants. This distinction is described in more detail as each instrument is described.

Instruments for the protection of IK typically have the effect of creating either a market for IK, through generating a tradeable right to the use of knowledge, or an implicit pricing mechanism for IK, such as a price premium or the cost of enforcing protections for IK. In this sense, an economic analysis of these instruments demonstrates their usefulness in developing a methodology for valuing IK.

The two categories of instruments are addressed in turn. The chapter ends with some concluding comments.

3. Legally enforceable instruments

Legally enforceable instruments grant holders of IK rights to use or control IK or undertake action against inappropriate use. With these rights is the power of enforceability, which naturally translates to a cost on the bearer to enforce their right to retain benefit. These costs of enforcement are typically revealed in markets, such as the costs of paying solicitors to settle out of court, or paying a legal team including a barrister to pursue a matter within court.

In Australia, as noted in Figure 2, there are four main avenues toward legally protecting IK: (i) recognition of IK as intellectual property (IP), including certification and collective trade marks and geographical indications (GIs); (ii) *sui generis* laws for particular contexts; (iii) enforceable

private agreements; and (iv) actions against the misuse of IK under the Australian Consumer Law (ACL), in tort or in equity.¹³

Recognition of IK as IP

Recognition of IK as a form of IP grants owners time-limited rights over some aspects of the use and control of their creation (WIPO, 2004). Recognition of IP rights includes:

- **Copyright regulation**, which protects relevant works and materials such as literature, films, music and art, and related rights such as moral rights, resale rights and performers' rights;
- **Patents**, which protect inventions;
- **Trade marks**, which protect distinctive signs or brand names identifying goods or services as produced by a particular firm or in a particular manner;
- **Designs**, which protect the shape, configuration, pattern or ornamentation giving a product a unique appearance; and
- **Plant breeder's rights**, which protect the creation and exploitation of new varieties of plants.

Copyright law is administered by the Department of Communications and the Arts, whereas the four other ('industrial') types of protection are administered by IP Australia.

A number of barriers to IK being recognised as IP are detailed in Sentina, Mason and Janke (2018). As WIPO (2018a, b) has noted, IK is often viewed as having passed into the public domain, which removes the possibility of protection through copyright, patents, or designs (although it does not remove the possibility of trade marks). Copyright, designs and patents all require an element of novelty or originality, and an identified owner; these features are often unavailable for IK which has been built up communally over an extended period of time, typically thousands to tens of thousands of years with the difficulty of operating group rights within a market system of individual rights. One key issue is identifying the relevant group of knowledge-holders who are entitled to grant such a right. In addition, copyright requires a 'material form', which prevents oral stories, songs or dances from being protected unless they are recorded such as through a written document (including electronic documents), sound recording, or video. In some cases, this process of recording may vest rights in the researcher, rather than the traditional owner themselves (Sentina et al., 2018). Plant breeder's rights only extend to new or recently exploited varieties of plant, and there is no requirement for applicants to acknowledge collaboration with Indigenous peoples in the process of development.

Furthermore, in every case other than trade marks, IP rights accrue to individuals for a limited period of time, whereas Indigenous Peoples often seek communal rights over knowledge in perpetuity (Davis, 1997). Although trade marks have no time limit, and can be communally owned, they protect only names and symbols, rather than IK more broadly, and can be removed for non-use. Moreover, in some cases, non-Indigenous businesses have registered trade marks for Indigenous words and symbols without the relevant group's consent, which may prevent an Indigenous person, group or business from registering that name as a trade mark (Janke and Dawson, 2012).

¹³ The discussion of each instrument draws on Sentina, Mason and Janke (2018), although the categories used differ.

Finally, recognising IK as IP requires extensive application processes and legal knowledge with the associated time and cost reducing the accessibility to holders of IK (Davis, 1997).¹⁴ IP Australia has taken some steps towards increasing Indigenous Peoples' awareness of IP protection, such as through the publication of a guide to protecting IP aimed at Indigenous People (IP Australia, 2014a). The guide provides a general introduction to IP and directs creators through the process of registering and managing IP rights. The general discussion is complemented by a number of case studies of Indigenous businesses which have successfully used IP to help grow their business (IP Australia, 2014a).

IP rights can be traded or licensed, and thus, in some cases, have explicit market prices. However, due to limited transparency in most IP markets, licence agreements are typically private, and prices are rarely observed (Lemley and Myhrvold 2008). In addition, IP instruments that are never sold or licensed still provide value to their holders, in that they protect against others using the IP. This option value should be included in the market value of IK, but would be excluded by solely considering sale prices or licence fees.¹⁵

Although trade secrets have certain features that differentiate them from other categories of intellectual property rights, and are not registered by IP Australia, they can nonetheless be included within Australia's system of intellectual property law, broadly defined: see, for instance, Davis (1997). Trade secrets have been perceived to be well-suited to the task of protecting IK (Long, 2011): in particular, trade secrets are not subject to time limitations. Further, there is no requirement that a trade secret be registered, which may lower the barriers to using trade secrets as a form of protection. Reasonable efforts to keep knowledge secret are required in order to receive protection as a trade secret. However, existing precedents in other contexts under Australian law have referred to cultural knowledge that is well-known within a community as still being kept secret from outsiders (Antons, 2009) — see, for instance, *Foster v Mountford*.¹⁶

Protection of IK as a trade secret would only apply where reasonable efforts have been made towards secrecy. Where knowledge has been restricted to a small group of individuals, this requirement may be satisfied; however, it may not be met in circumstances in which knowledge has been willingly divulged (Long, 2011). Moreover, trade secrets protection does not apply where the subsequent discovery is independent of the trade secret holder, unlike the majority of intellectual property instruments. Trade secrets will also only protect commercial value, not broader social or cultural value (Simpson, 1997). In part for these reasons, trade secrets may be most relevant to IK in the areas of biodiversity, traditional medicinal knowledge, and environment management practices (Simpson, 1997).¹⁷

Collective and certification trade marks

In its submission to the House of Representatives Standing Committee on Indigenous Affairs *Inquiry into the Growing Presence of Inauthentic Aboriginal and Torres Strait Islander 'Style'*

¹⁴ While the IP maintenance costs are small (e.g., IP Australia has estimated that the cost of maintaining a patent over twenty years is around \$8,000 (Sentina, Mason and Janke, 2018)) there are broader 'costs' associated with acquiring the legal and system/process knowledge.

¹⁵ Option value is important to estimating the market value of IK. Option value is the value in taking up the option to use a given right, in this case, to enforce an IK protection right, such as through the legal instruments that IP Australia administer.

¹⁶ (1976) 29 FLR 233.

¹⁷ A conceptually similar but legally distinct instrument relating to breach of confidence is considered in a later section.

Art and Craft Products and Merchandise, IP Australia (2017b) noted that two categories of trade marks may be valuable, but are not currently widely used, in protecting IK: certification trade marks; and collective trade marks.

Certification trade marks are used to indicate that a good possesses a particular standard or characteristic (as opposed to an ordinary trade mark, which indicates that the good was produced by a particular seller). They are usually owned by a central body which enforces the trade mark on behalf of producers; for instance, the Heart Foundation's 'Tick' symbol was used to indicate the healthiest food item in a particular category (Hallett, 2013). In effect, certification supports a voluntary protocol by creating a legal instrument that distinguishes between compliers and non-compliers (Johnson, 2012).

Some insight into the effectiveness of certification trade marks in protecting IK may be gained by considering the experience of the Label of Authenticity, which operated as a certification trade mark for Indigenous cultural products in the early 2000s (IP Australia, 2017; National Indigenous Arts Advocacy Association, 2002). The system was administered by the National Indigenous Arts Advocacy Association (NIAAA) and consisted of either a 'Label of Authenticity' for 'authentic' goods produced by Indigenous individuals, or a 'Label of Collaboration,' where Indigenous artists had licensed non-Indigenous entities to produce the good. Producers using the labels were required to demonstrate 'fair trading terms,' which included a consideration of 'whether the Indigenous person is required to assign their intellectual property rights in the work without additional payment of consideration', giving a direct link to the market value of IK.

The scheme was discontinued in 2003 when the NIAAA ceased operations (IP Australia, 2017b). Some 160 creators had used the label as of that time (Standing Committee on Environment, Communications, Information Technology and the Arts (Standing Committee), 2007). There were a number of problems with the label: it was criticised as being poorly-promoted and administered; it was difficult to provide an agreed definition of authenticity; the test for Aboriginality was complex, with over 75 percent of applicants failing to meet the requirements; and the 'tick of approval' was perceived as implying that non-participating producers were selling inauthentic art, even though some legitimate creators chose not to participate for other reasons (Standing Committee, 2007; Graber and Lai, 2012).

Supply Nation's certification trade marks indicate goods and services which have been either "certified" or "verified" as being produced by Aboriginal and Torres Strait Islander businesses (Supply Nation, 2018). Supply Nation's certification trade marks do not directly indicate the use of IK, as they relate instead to business ownership: Aboriginal and Torres Strait Islander businesses may use the Supply Nation trade mark even if their products do not directly make use of IK. However, the growth of Supply Nation since its founding in 2009, and its success in promoting Aboriginal businesses (Supply Nation and First Australians Capital, 2018), could be considered a possible exemplar for the use of certification trade marks.

The international track record of certification trade marks in protecting Indigenous culture has been mixed. For instance, Canada's Igloo trade mark for the works of Dené, Métis and Inuvialuit Peoples and the US' Silver Hand trade mark for native Alaskan artists have been viewed in some parts as largely successful (Standing Committee, 2007), while also receiving criticism for testing artists' ancestry, rather than their training and cultural status (Wheelersburg and Martin, 2017). In 2017, rights over the Igloo trade mark were transferred from the Canadian Government to the Inuit Art Foundation to allow for greater control

among Inuit artists over the usage of the trade mark (Inuit Art Foundation, 2017), which may represent a preferable approach to preserving cultural knowledge while maximising autonomy (Altman, 2003). Likewise, the New Zealand Government disinvested in the 'Māori Made' *Toi Iho* certification mark in 2009 because it had not increased sales of Māori art, although it has since been taken up by a private foundation of Māori People (Graber and Lai, 2012). However, the *Toi Iho* certification mark may have had beneficial effects for both artists and consumers (Johnsson 2012: 161). These experiences suggest there may be value in protecting IK through certification trade marks, but that this value may not always be achieved. The various international experiences could be pursued as individual case examples.

Geographical indications (GIs) are one type of certification trade mark put forward as emerging instruments to protect IK. GIs provide producers in an area with the exclusive right to market goods as being produced in that area, and are an accepted part of Australia's certification trade mark system.¹⁸ They can specify both the location of production, and features of the manner of production (IP Australia, 2018a).

Although GIs are currently used largely to promote the regional heritage of certain agricultural products (such as 'Parma Ham' or 'Barossa Valley Wine'), they are arguably a natural 'fit' for the requirements of protecting IK (van Caenegem et al., 2014 and Singhal, 2015) because:

- unlike the majority of IP regulations, they are designed to protect cultural traditions, rather than encourage innovation;
- they create communal, rather than individual, rights;
- there is no time limit on the rights created;
- they are not freely transferable, instead remaining connected to the group that initiated the rights; and
- they are decentralised, which allows the definition of authenticity to be proposed by the group seeking protection, rather than by legislation.

For these reasons, GIs have been put forward both as a possible current mechanism for the protection of IK, and as a proposed template for new IP regulations aimed specifically at the protection of IK (Sherman and Wiseman, 2016).

However, GIs may be ill-suited to protecting IK in some regards. Because GIs are tied to a specific geographic area, they may be unable to accommodate displaced Indigenous Peoples (Singhal, 2008).¹⁹ GIs require agreement among the relevant producers around the criteria to be a 'traditional' product; this could lead to a large number of different GIs in areas with different TOs, which would reduce consumer awareness of each GI. GIs have also been accused of inhibiting innovation, rather than facilitating the continued development of IK (Frankel, 2011). Most importantly, the protection provided by GIs is limited: non-Indigenous producers would still be able to brand their products as 'Indigenous-style' (Singhal, 2008); and the protection applies only to the commercial name used, not IK itself (Frankel, 2011).

IP Australia (2018a) identifies that GIs for all food products in Australia may be registered as certification trade marks, and that a standalone system for protecting GIs also exists but only for wine. Given that there are some Indigenous businesses involved in wine production (Brady

¹⁸ Certification trade marks are one route to creating a geographical indication in Australia; the other applies only to wines.

¹⁹ Also, a geographical area may become highly contested.

2018; Nicol 2017), it is possible that this stand-alone system could be used by Indigenous businesses to register GIs.

There is substantial evidence from the EU to suggest that consumers take GI certification into account when choosing between products, and that GIs create a positive price premium (Török and Moir, 2018). However, the evidence is more mixed regarding whether this price increase is realised as a benefit to producers; in some cases, it appears that the positive price effect is captured by retailers, rather than producers, or that the increase in prices is largely offset by the increased cost of certification and compliance (Török and Moir, 2018).²⁰ The share of the price premium provided to producers likely depends on particular structures of the market, including features such as producers' relative bargaining power and the elasticities of supply and demand. For this reason, caution is required when using international evidence to consider the effects of GIs in the context of Indigenous cultural goods.

As an alternative to certification trade marks (including GIs), collective trade marks indicate membership of an association (IP Australia, 2014). An association of Indigenous creators could apply for such a collective trade mark, which would then certify that the creator was a member of that association.

Of the 324 collective trade marks listed as registered and protected on IP Australia's publicly accessible Trade Mark database, only three trade marks are explicitly associated with Indigenous Peoples and appear to draw on Indigenous cultural symbols. Two of these trade marks are associated with a charitable organisation working with Indigenous students (IP Australia, 2019b and IP Australia, 2019c); the third is associated with a motorcycle club (IP Australia, 2019d). It is possible that there are other collective trade marks which incorporate the use of IK, but do not explicitly identify themselves as such.

There are a number of international examples of the use of collective trade marks to protect IK (IP Australia, 2017a). In New Zealand, a local association can create a 'collectively owned' trade mark in the absence of an official GI system (Overton and Heitger, 2008 and WIPO, 2003). It is possible that a local organisation, such as a recognised TO organisation, could also be used to register a certification trade mark for certain cultural products in Australia.

If either certification trade marks or collective trade marks were to become a common way of protecting IK in certain goods, then the price premium associated with trade marked goods could be used to indicate the market value of IK. However, this would be an indirect estimate of the market value of IK, as it would indicate consumers' willingness to pay for goods that are certified as treating IK appropriately, rather than their willingness to pay for IK itself. Some process of adjustment would be required to estimate the desired value.

Sui generis laws protecting IK in particular contexts

Whereas statutory recognition of IK as IP creates broad rights to the use and control of IK (and therefore the capacity to trade or obtain commercial gain from IK in markets), various pieces of legislation at the Commonwealth and State level grant control of IK in particular contexts. For instance:

²⁰ These costs also apply to all other instruments where certification and compliance apply; for example, patents and trademarks involve application and renewal fees and can be viewed as defensive costs revealing some portion of the underlying good's market value.

- **Cultural heritage laws** protect areas, objects, and/or intangible heritage of significance to Traditional Knowledge and Traditional Cultural Expression;
- **Biodiversity laws** regulate access to biological resources and associated Traditional Knowledge, and, in some cases, require benefits sharing agreements in return for the use of the genetic resource and/or Traditional Knowledge; and
- **Museums and archives laws** exempt certain material from publication; for instance, the *Archives Act 1983* (Cth) leaves scope to protect some forms of secret knowledge (Sentina et al., 2018).

As Janke and Sentina (2018) note, these laws provide only for particular manifestations of IK, not IK more broadly.

In some cases, *sui generis* laws may give rise to a monetary value for IK. For instance, the Victorian Government's *Aboriginal Heritage Amendment Act 2016* (Victoria) allows Traditional Owners (TOs) to register 'intangible cultural heritage'²¹ on the Victorian Aboriginal Heritage Register. Individuals wishing to use that heritage for commercial purposes are obliged to seek the permission of the representative group of TOs, which may include entering into an Aboriginal Intangible Heritage Agreement involving compensation (Aboriginal Victoria, 2016) with fines for individuals and corporations amounting to \$0.5m to \$2.5m respectively (Parkin, 2017). For example, O'Faircheallaigh (2008) reviews 41 agreements finding that they have the potential to protect Indigenous cultural heritage where underlying weaknesses for Aboriginal people in the bargaining process are addressed (Gibson & O'Faircheallaigh; Blackwell & Fordham, 2018). Janke (2018a, b, c) finds that for the better recognition of ICIP rights *sui generis* law is needed but has not occurred in Australia leaving Aboriginal and Torres Strait Islander Peoples to work within existing laws, pushing the boundaries, using agreements and protocols for recognition of their rights (Gibson and O'Faircheallaigh, 2015; Blackwell and Fordham, 2018). These agreements have the legal effect of contracts (Australian Copyright Council, 2016), which are considered in the next section.

Similarly, biodiversity laws such as access and benefits-sharing regimes may also facilitate the valuation of IK. For instance, the *Environment Protection and Biodiversity Conservation Regulations 2000* (Cth) Part 8A includes among its purposes "recognising the special knowledge held by Indigenous persons about biological resources" and "ensuring the equitable sharing of the benefits arising from the use of biological resources".²² Where Indigenous Peoples' land is held under lease by the Commonwealth,²³ or a native title determination has been made with respect to that land,²⁴ then an applicant for a commercial permit for access to biological resources will be required to enter into a benefit-sharing agreement with the relevant Indigenous group, unless special circumstances apply. The benefits-sharing agreement must provide recognition of and valuation for IK to be used in accessing the biological resources, including a formal statement regarding any use of IK.²⁵

²¹ 'Aboriginal intangible heritage' is defined in s 79B *Aboriginal Heritage Act 2006* (Vic) to include 'any knowledge of or expression of Aboriginal tradition, other than Aboriginal cultural heritage, and includes oral traditions, performing arts, stories, rituals, festivals, social practices, craft, visual arts, and environmental and ecological knowledge,' and any intellectual creation or invention derived from this knowledge, but does not include anything that is widely known to the public.

²² rr 8A.01(c) and 8A.01(b) *Environment Protection and Biodiversity Conservation Regulations 2000* (Cth).

²³ r 8A.04(1)(c) *Environment Protection and Biodiversity Conservation Regulations 2000* (Cth).

²⁴ r 8A.04(1)(i) *Environment Protection and Biodiversity Conservation Regulations 2000* (Cth).

²⁵ rr 8A.08(h)-8A.08(j) *Environment Protection and Biodiversity Conservation Regulations 2000* (Cth).

The scope of this legislation may expand in future due to Australia's implementation of the Nagoya Protocol, an international agreement implementing the third objective of the *Convention on Biological Diversity (CBD) 1992*, which is 'the fair and equitable sharing of the benefits arising out of the utilisation of genetic resources'. The Australian Government has signed the Protocol and is preparing for the implementation of the Protocol (Janke and Sentina, 2018; Department of Environment and Energy, 2019).

Existing legislation in Australia satisfies most requirements of the Protocol (Matheson and Bull, 2014). However, it is anticipated that full implementation may require new legislation. This could contain new protective instruments including to ensure that holders of IK associated with genetic resources have given free, prior and informed consent before to its use (Art 7, Nagoya Protocol), and that where this consent is given IK holders share in the benefits (Art 12, Nagoya Protocol) (Evans et al., 2017 and Smith and Collings, 2011).

Increased global use of benefits-sharing agreements could give rise to a means of valuing IK, through monitoring the magnitude of payments in these agreements. However, although the Nagoya Protocol includes the creation of an Access and Benefit-Sharing Clearing-House through which countries can share information on genetic resource access and benefit-sharing (Art 14, Nagoya Protocol), it is likely that individual benefits-sharing agreements would remain private, as discussed above. Where the information from these private agreements is amalgamated so no individual agreement holder can be identified, this could help to estimate the value of IK as the World Bank has previously done with private royalty agreements in mining (see Blackwell and Dollery, 2013).

Contracts and agreements

Indigenous Peoples can also make private agreements to protect IK. These agreements are then treated as legally enforceable private contracts, which can provide Indigenous Peoples with access to a means of enforcing their rights to IK. Also, state governments have negotiated Indigenous Land Use Agreements (ILUAs) with Indigenous Peoples which include provisions around using resources in the course of Traditional Cultural Expressions, which are one form of IK (WIPO, 2016).

Where these contracts and agreements include clauses calculating compensation to TOs on the basis of their IK, they can be used to value IK. Again, although some native title agreements and ILUAs are public, contracts and agreements are typically confidential, which makes assessing the magnitude of returns difficult. However, there may be ways to gain access to this information, particularly where the magnitudes are aggregated across a population of agreements and individual TOs cannot be identified. Of course, this would require approval by the parties to these agreements. For an example of the use of individual native title determinations as case studies, see Quicke et al. (2017); for a broadly analogous situation, see the World Bank's reporting on private mining agreements with Indigenous Peoples (Blackwell and Dollery, 2013).

Actions against misuse of IK under the Australian consumer law, in tort or in equity

Even where there has been no other recognition of IK, certain actions in statute or general law may prevent others from misusing IK. These actions include:

- **Actions for passing off** under common law, which can prevent firms from misrepresenting goods as being Indigenous;
- **Actions for misleading and deceptive representations or conduct** under the Australian Consumer Law (*Competition and Consumer Act 2010* (Cth)). This includes actions taken against traders who falsely market products by creating an impression that they are made by Indigenous persons (through a combination of artwork and words such as 'hand painted,' 'handcrafted,' 'Aboriginal Art,' and 'Australia');²⁶ and
- **Breach of confidence actions for misuse of private information**, which can prevent individuals from releasing confidential information about IK. These actions may arise from breach of contract (where there has been an agreement about the use of private information) or in equity.

In these cases, the choice to pursue legal action indicates that the expected benefits provided through protected use of IK are at least as great as the expected costs of preventing misuse, including legal costs. For this reason, the cost of preventing misuse could provide an indicative lower bound measure of the benefit associated with legal protection of IK through the relevant instrument. However, it may not necessarily represent a lower bound of *market value*: in some cases, the primary benefit of taking action may be to avoid cultural offence, rather than to protect economic value (Martin, 1995). An example of IK attribution is given in Box 2.1.

Box 2.1: Hypothetical example of attribution of market value to IK

Assume an artefact was sold in a tourism store at an airport, indicating that it was a genuine Aboriginal artefact when in fact it had been mass produced from a factory overseas, using the IK encapsulated in a very similar but more expensive, genuine product. The owner of the genuine product takes action against the owner of the fake good for the tort of passing off. Assume the legal costs involved along with other costs of bringing a case before the courts amount to \$45,000. The actual market value of the fake product is \$200,000 to date, that is, sales of 50,000 products at \$4 per item. The genuine item sells for \$30 and sales of 5,000 have occurred over the same period. In this case, the \$45,000 cost to bring a case before the courts is below both the genuine and fake product actual market value of sales to date and therefore provides a lower bound or minimum value of protecting the genuine product.

Of course, courts can award damages, and in this case assume the court awards damages of \$200,000 to the genuine product owner. The award of \$200,000 to the appellant is a measure of the 'market value' to the real owner of taking action for passing off.

Some measure of the good's value would be attributable to IK. If we assume, for the purposes of this example, that 85% of the good's value can be attributed to IK, and that the full value of the piece of IK is represented in the legal action, then the 'market value' of Indigenous knowledge ranges between the proxy from costs (85% of \$45,000) of \$38,250 to (85% of \$200,000) \$170,000 for the damages awarded through the courts.

²⁶ See, for example, *Australian Competition and Consumer Commission v Birubi Art Pty Ltd* [2018] FCA 1595.

4. Voluntary protocols, standards and codes

As an alternative to legally enforceable instruments, voluntary protocols, codes of conduct and certification schemes encourage, but typically do not mandate, appropriate treatment of and compensation for the use of IK. This section first considers these codes in broad terms, and then specifically considers accounting standards, which have particular relevance to estimating the market value of IK.

Over the last two decades, a large number of these codes have been published, some of which are outlined in Table 2.1 for art, research and language.

Table 2.1: Voluntary protocols, standards and codes examples

Area	Producing body (date published)	Name of code	Description	Reference to payment or compensation for the use of IK
Art	National Association for the Visual Arts and the Australia Council for the Arts (2009)	The Indigenous Art Code	Standards for dealings between art dealers and Indigenous artists; dealers and artists can become signatories to the Code. The Code is now administered by Indigenous Art Code Ltd, a public company in its own right.	The Code describes standards for process of art dealers paying artists, but no discussion of level of payment, or broader community compensation.
	The Australia Council for the Arts (2007a – 2007e)	Protocols for Producing Indigenous Australian Visual Arts; Protocols for Producing Indigenous Australian Music; Protocols for Producing Indigenous Australian Writing; Protocols for Producing Indigenous Australian Media Arts; Protocols for Producing Indigenous Australian Performing Arts	Protocols for various forms of art; applicants for funding from the Australia Council for the Arts who are working with Indigenous artists are required to comply with the relevant protocol.	The Protocols refer to payment for copyright owners, and describe the possibility of broader benefits-sharing arrangements.
	Screen Australia (2009)	Pathways & Protocols: A filmmaker’s guide to working with Indigenous People, culture and concepts	Protocols for filmmakers working with Indigenous People or depicting Indigenous culture or country; filmmakers working with Screen Australia are required to comply with the protocols.	The Protocols advise that Indigenous People should share in benefits from the use of their images, stories, dances or knowledge, by direct payment or other assistance (e.g. skills development). In some cases, a royalty is recommended.
	Arts NSW (2011)	Aboriginal Arts and Cultural Protocols 2011	Protocols for people working with the NSW Aboriginal arts sector; used to assess funding applications for some arts programs. The Protocols are administered by the successor body to Arts NSW, Create NSW.	No discussion of compensation.
	Museums Australia (2000)	Previous Possessions, New Obligations: Policies for Museums in Australia and Aboriginal and Torres Strait Islander Peoples	The policies set out certain aspects of museums’ obligations regarding Aboriginal or Torres Strait Islander objects. The document is also referred to in Museums Australia’s Code of Ethics (1999).	The policies state that museums are obliged to account for the views of Aboriginal communities in the treatment of Aboriginal objects, and that museums should actively promote the employment of Aboriginal and Torres Strait Islander Peoples. There is no discussion of payment for objects.
	Arts Tasmania (2009)	Respecting Cultures: Working with the Tasmanian Aboriginal Community and Aboriginal Artists	The guide provides certain standards for working with Aboriginal artists and community members.	One of the principles included in the guide is the principle of “Proper Returns”, which encourages discussions of intellectual property protection and informing Aboriginal individuals of the potential for commercial returns. Another principle encourages written

Area	Producing body (date published)	Name of code	Description	Reference to payment or compensation for the use of IK
				and informed consent for use of material.
	City of Melbourne (2007)	Code of Practice for galleries and retailers of Indigenous Art	The Code, written by Terri Janke for the City of Melbourne, guides galleries and retailers in displaying Indigenous art and interacting with Indigenous artists.	The Code emphasizes fairness and transparency in commercial terms, including prompt payment. The Code also prohibits selling forged or fake Indigenous art.
Research	Australian Institute of Aboriginal and Torres Strait Islander Studies (AIATSIS) (2012)	Guidelines for Ethical Research in Australian Indigenous Studies (GERAIS)	Principles for ethical research into Indigenous Australian issues; all research sponsored by AIATSIS must comply with guidelines.	The Guidelines require that Indigenous People involved in research benefit from the research. This includes people who contribute IK, who 'should receive fair and equal benefits'. In particular, 'certain cultural information is owned and may need to be paid for'.
	National Health and Medical Research Council (NHMRC) (2018a-2018b)	Ethical conduct in research with Aboriginal and Torres Strait Islander Peoples and communities	Guidelines for ethical research; compliance is a condition of NHMRC funding.	The Guidelines include a principle of reciprocity, which requires that Aboriginal and Torres Strait Islander People benefit from research, and that the benefits be fairly distributed among the community.
		Keeping research on track II	Practical guide to general guidelines above, aimed at Indigenous People and communities participating in research.	The guide notes that holders of IK have not had their rights adequately recognised in the past, and that they deserve a fair and equitable share of benefits derived from the use of IK.
	Kimberley Land Council	Kimberley Land Council Research Protocol (2011)	Protocol for conducting research within the Kimberley; the Kimberley Land Council will only support research if the Protocol is followed.	The Protocol states that researchers must 'demonstrate a commitment to negotiating fully and equitably with Aboriginal People involved in the research,' including holders of IK.
		Kimberley Land Council Intellectual Property and Traditional Knowledge Policy (2011)	Policy for conducting research within the Kimberley; the Kimberley Land Council will only support research if the Protocol is followed.	The Policy states that researchers must gain free, prior and informed consent when using IK, including providing information about the effect of the research on any intellectual property rights, and the details of fair and equitable compensation.
		Collaborative Science on Kimberley Saltwater Country — A Guide for Researchers (2017)	Guide for researchers working with land and sea managers in the Kimberley Region. The document was prepared by Mosaic Environmental.	The Guide gives examples to assist researchers to understand the role IK can play in research. The Guide also contains information around forming an agreement with project participants, including terms relating to intellectual property.
Desert Knowledge Cooperative Research Centre (CRC) (2007)	Desert Knowledge CRC Protocol for Aboriginal Knowledge and Intellectual Property	Protocol for researchers working in Aboriginal communities, with guidance on how to generate resources from IP (e.g. through benefit-sharing).	The Protocol comments that Aboriginal People whose knowledge benefits a research project should be able to negotiate compensation.	
Language	The Federation of Aboriginal and Torres Strait Islander Languages and Culture (FATSIL) (2004)	FATSIL Guide to Community Protocols for Indigenous Language Projects	Protocols for people working with Indigenous language, e.g. schools working with the local Indigenous community to develop a language program, community-based and academic linguists.	No discussion of compensation.

Voluntary protocols may provide effective protection for IK if they become accepted norms and there are strong incentives for compliance (Janke and Dawson, 2012). In particular,

certification as having followed the protocol assures consumers that the goods purchased have treated IK appropriately; moreover, it can avoid the 'Market for Lemons' problem that arises when asymmetric information leaves consumers uncertain about the quality of a product, drives high-quality producers out of the market, and lowers the overall market price (Akerlof, 1970).

In the long run, these instruments may also contribute to the development of institutions and norms that create a strong social expectation of compliance. North (1991, p. 97) describes how 'institutions' can contribute to the evolution of market value:

Institutions are the humanly devised constraints that structure political, economic and social interaction... They evolve incrementally, connecting the past with the present and the future; history in consequence is largely a story of institutional evolution in which the historical performance of economies can only be understood as part of a sequential story.

However, the success of these protocols relies on other institutional features to ensure their acceptance; otherwise, producers may choose not to comply (ACCC, 2011). In particular, the market will only sustain a positive price premium for certified products if consumers are both willing to pay for certification, and able to differentiate between goods that are certified as being Indigenous by an appropriate body, and goods which merely purport to be Indigenous. The Arts Law Centre of Australia (2012, p. 5) has commented that the success stories of compliance 'are quantitatively outweighed by circumstances in which protocols have been ignored and cultural sensitivities trampled upon'.

For this reason, institutional development and voluntary protection of IK may be of more significance to its future market value than its present market value, as social norms around appropriate treatment of IK continue to develop. Voluntary protocols may also have other beneficial long-run effects, such as increasing public awareness of IK (ACCC, 2011). In some cases, codes have been expressly written with the hope that they may be incorporated into statute in the future (Pham and Janke, 2009).

One way to encourage compliance may be through subsidies via government assistance; for instance, compliance with the Australia Council and Screen Australia protocols is a prerequisite for receiving government funding, which is seen as one reason behind their success (Janke and Sentina, 2018). Increased government willingness to support these protocols may increase their scope in the future.

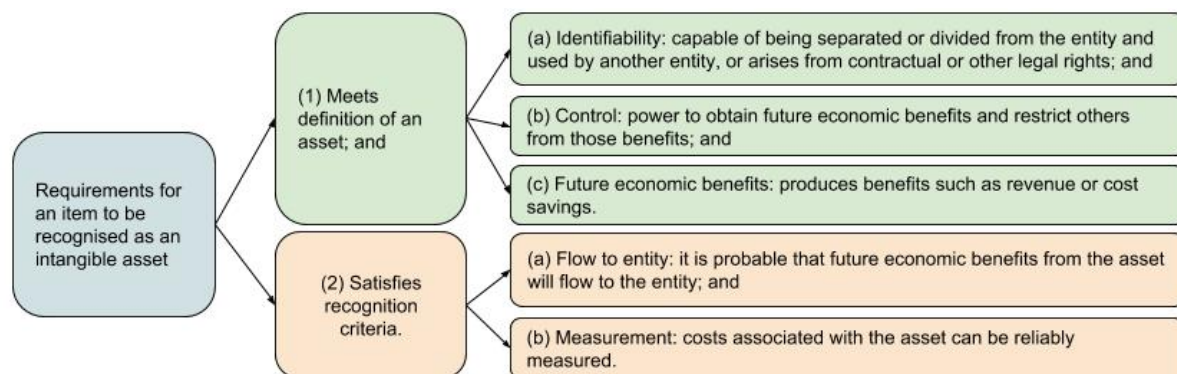
Where some producers, but not others, are certified to be following protocols, the price difference between certified and non-certified goods or services would indicate consumers' marginal willingness to pay (WTP) for certification, reflecting appropriate treatment of IK. While giving some insight into the market value of IK, this measure would only provide a lower bound estimate, because marginal WTP for certification would not account for the value IK contributes to the non-certified product, even if that value has not been acknowledged by the producer. Furthermore, wide adoption and acceptance of certification as a mark of authenticity of IK would be reflected in an increase in the marginal WTP for certification.

Accounting standards for the valuation of intangible capital

Alternatively, the protection of IK through a legal instrument would be revealed through the valuations prepared on the accounts of an organisation in accord with accounting standards. These standards set out obligations for ‘reporting entities,’ including whether reporting entities are obliged to include intangible assets on their balance sheets. The standards also set-out the methods for valuing any intangible asset. Wild (2013) argues that IP within tourism falls within the scope of International Public Sector Accounting Standards that are based on International Financial Reporting Standards. While cultural IP could be classified as a cultural asset, defined by particular ‘historic, artistic, scientific, technological, geophysical or environmental qualities’ (Accounting Standards Board 2006, paragraph 5), it is likely to be difficult to directly match income streams to such assets (Bodle et al., 2018).

Whereas International Public Sector Accounting Standards are limited to the public sector, frameworks established by the Australian Accounting Standards Board (AASB) are applicable to both the public and private sectors. As noted in Figure 2.3, AASB 138 (para. 18) permits items to be recorded as intangible assets on a balance sheet if the item meets both the asset definition and the recognition criteria.

Figure 2.3: AASB 138 requirements for an item to be recognised as an intangible asset



Source: AASB 138; Bodle et al. (2018).

These criteria may be difficult for IK to satisfy. IK is typically only partially excludable and non-separable, which creates difficulties in the identifiability and control tests of the asset definition requirement (Bodle et al., 2018). In addition, the difficulty of attributing economic benefits to IK is a central impediment to it satisfying the recognition criteria. This creates the problem that the costs associated with ‘acquired or purchased’ IK are included on balance sheets, whereas the asset value created by IK is excluded (Bodle et al., 2018).

Where IK does satisfy these requirements – for instance, through being capitalised as an asset through a trade mark or patent – then AASB 138 becomes relevant (IP Australia, 2019a). In that case, the failure of a reporting entity’s accountants to include IK would need to be disclosed in the notes to the financial statements if deemed ‘material’ or be justified to fellow professional accountants. The ‘enforcement’ of these accounting standards needs to be considered as part of changing the traditional accounting standards to incorporate Indigenous methodologies when accounting for IK. In such cases, the ‘naming and shaming’ of managers, severe reprimands, fines and loss of membership from the accounting professional bodies and reporting non-compliance in peer-reviewed publications are possible enforcement measures under the current system of self-regulation (CPA Australia, 2019; CA ANZ, 2019).

More extreme cases of misrepresentation of the accounts, such as under criminal law, can be prosecuted or pursued through the courts.²⁷

5. Conclusion

This chapter has outlined two broad groupings of instruments that can be used to protect IK: legally enforceable instruments and voluntary instruments. Enforceable instruments have a clear connection to market value, as they are typically tradeable, and therefore give rise to a market value. Moreover, considerable expense is incurred to protect the relevant IK through the legally enforceable instrument, which gives a lower bound for market value. The methodological problem is gaining indications of prices or costs, which are typically not available to the public, though one could envisage that these could be presented in an anonymous or non-identifying way, to ascertain indicative market value. Voluntary instruments such as protocols, codes of conduct and certification are more difficult, though they may have compensation or payments associated with them, which imply a 'market' value. Having a diverse range of instruments helps to provide a system of rights to Indigenous People and would allow them to choose those rights which are most useful to them in any given situation. A diversity of rights may also aid in developing social and cultural settings that encourage society to do the 'right thing' in recognising and protecting IK.

²⁷ For example, for the Enron and Arthur Anderson collapses see Chaney and Philipich (2002); for other US firm analyses see Brown et al. (2013) and Wilson and Grimland (1990); in Australia, see Clarke and Dean (2014)).

3. Literature review of the market valuation of Indigenous²⁸ knowledge²⁹

Blackwell, B.D., Stratton, J. and Hunter, B.

Chapter summary

This chapter outlines the literature relevant to the valuation of IK. In doing so, the chapter focuses on the commercial or market value of IK. Three areas of the literature are outlined: (i) general approaches to valuing IK including the accounting profession's treatment and approaches to valuation through the valuation of intangible assets, (ii) approaches to calculating the market value of IK including sectoral assessments of value and broad economy assessments of Indigenous business, and (iii) studies of the commercialisation of IK. There is no specific study of the economic valuation of IK in Australia or overseas nor that relates to the value of IK contained within IP instruments such as patents, trade marks, designs, licenses, geographical indications or plant breeder's rights. Instead there is a disparate series of literature across the above three topics that have not been brought together into a synthesised whole. By doing so, we provide guidance on the best approach to valuing IK now and in the future. This survey has identified that the production function approach to valuation is potentially an ideal approach for valuing IK, but this would require copious case study analyses, including choice experiments, to help address the IK attribution problem.

1. Introduction

The economy involves a complex set of transactions that take place in a cultural and institutional context. Contemporary Indigenous economic activity takes place in a modern marketplace and depends on the nature of the interactions with the institutions that drive the broader economy. The access to resources and control of Indigenous assets is a crucial determinant of the economic independence of Indigenous peoples. This research focuses on the market valuation of Indigenous knowledge (IK) as the authors seek to inform policymakers at IP Australia about the nature and extent of transactions that drive this value. The chapter therefore focuses on the literature that discusses legal instruments that IP Australia have some policy control over including trade marks, patents, designs, geographical indications and plant breeder's rights, with particular reference to categories of commercial use that could be protected by intellectual property regulations (IP Australia, 2019a). Notwithstanding, there are other legal instruments that are potentially important in determining market values such as copyright which are also briefly discussed.

Definitions

While market institutions are central to the nature and extent of much economic activity, it is ironic that most neo-classical economists do not think much about these institutions, which drive the modern capitalist economy (North, 1991 being an important exception). Markets are institutions that can take on different forms depending on the social, historical and institutional context.

What is a market transaction? One definition of a market transaction is an exchange that is voluntary: each party can veto it and (subject to the 'rules of the marketplace') each party

²⁸ We refer to Indigenous in describing knowledge without intending disrespect by not referring to Aboriginal and Torres Strait Islander Peoples more specifically. We use the more general term to depict an emerging set of rights that are being used by various institutions to help protect Indigenous Peoples' rights across the globe.

²⁹ This chapter provides general advice only in an effort to encourage constructive debate on the topic. It is not intended to be legal advice. If you have a particular legal issue, we recommend that you seek independent legal advice from a suitably qualified legal practitioner.

freely agrees to the terms (McMillan, 2002, p. 6). A market is a forum for carrying out such exchanges. The core of this definition is that a market transaction is voluntary and needs to be in the interests of both the buyer and the seller. Note that the acceptance of IP instruments, identified above by economic agents, is an important factor driving market value. One important question for this broader research is the extent to which Indigenous people will voluntarily use their knowledge in a market context.

IK is knowledge that comes from Indigenous Peoples and has two distinct categories:³⁰

Traditional Knowledge (TK) refers to the knowledge resulting from intellectual activity in the traditional context and includes know-how, practices, skills and innovations. Traditional knowledge can be found in a wide variety of contexts, including: agricultural knowledge; scientific knowledge; technical knowledge; ecological knowledge, medicinal knowledge, including related medicines and remedies; cosmology; and biodiversity related knowledge. This includes knowledge about genetic resources.

Traditional Cultural Expressions (TCE), also referred to as ‘expressions of folklore’, refers to tangible and intangible forms in which traditional knowledge and cultures are expressed, communicated or manifested. Examples include languages, music, performances, literature, song lines, stories and other oral traditions, dance, games, mythology, rituals, customs, narratives, names and symbols, designs, visual art and crafts and architecture. (Janke & Sentina, 2018, p. 17).

While the World Intellectual Property Organization (WIPO, 2019d) of the United Nations has an Intergovernmental Committee on Intellectual Property and Genetic Resources, Traditional Resources and Folklore (IGC) and refers to TK to include TK and TCE, Janke and Sentina (2018, p. 17) argue that Aboriginal and Torres Strait Islander people in Australia prefer to use the term ‘Indigenous’ to describe knowledge rather than ‘traditional’. This preference exists because ‘traditional’ may imply that Indigenous culture is locked in time. To avoid this, Janke and Sentina (2018) recognise that TK and TCE are evolving and not locked in time.

The general IK literature

The general literature on IK in recent decades has been expanding and is all encompassing. For example, IK has been discussed in the context of politics and power (Agrawal, 2005), asymmetry with science (Dickison, 2009), anthropology (Brush, 1993), value through integration with science in resource management (Williams, 2009), biodiversity and language conservation (Wilder et al., 2016), sustainable management of forests (Camacho et al., 2016) and fire (Mistry, Bilbao & Bernardi, 2016), ecosystem restoration (Reyes-Garcia et al., 2019), health, water and sanitation (Tharakan, 2015), improved water planning processes (Ayre & Mackenzie, 2013; Jackson, 2018) agricultural development (Lwoga, Ngulube & Stilwell, 2010; Middleton, 2007), its lack of use in rural development (Maunganidze, 2016), Indigenous rights over and IK’s management through libraries and copyright law (Janke, 2005) and through information technologies (Hunt, 2013), IK’s role as intellectual property (IP) in supporting an Indigenous innovation system³¹ (Drahos and Frankel, 2012), as a technology resource (Tharakan, 2015) and to create burgeoning industries (Simpson, 2015).

³⁰ This definition is broader than that provided in the Terms of Reference outlined in the Introduction to this report and is provided for completeness rather than contradiction.

³¹ An indigenous innovation system is a system of culture, institutions, rules and law that supports, encourages and delivers indigenous creation of new knowledge (ideas) and technology. It ‘is often place-based innovation that is cosmologically linked to land and an indigenous group’s relationship with that place, rather than

IP systems and the implications of valuing IK

Inevitably, any valuation study of IK will inherently involve judgements about rights, equity and compensation (Brush & Stabinsky, 1996), that is, through valuing IK for past and future use, with the latter being characterised by option value.³² The better process for compensation from IK conservation and protection via market or non-market means (Brush & Stabinsky, 1996) remains debatable, but in a western capitalist system of governance, market means are generally preferred; though given that IK can also be a shared good, this system also allows for compensation outside the market (e.g. through government programs as outlined Chapter 4). Alternative means of compensation also aligns with the current appreciation of Indigenous economies as hybrid, exhibiting private, public and customary sectors (Altman 2009; Hunter, Foley and Arthur, 2019).

Brush (1993) argues that IP rights are a means toward the goal of conserving biological resources and IK, because IP returns economic benefits to Indigenous Peoples for the use of their knowledge and resources. However Brush and Stabinsky (1996) are aware of the adverse equity consequences for relying solely on a system of IP rights (as per IP Australia's jurisdiction) for Indigenous and subsistence peoples. For these reasons, we believe a diverse system of instruments is required to address these equity concerns which have important political and distributional consequences (for more detail see Chapter 2 of the Report).

Economic Nature of IK, Implications for Management and Valuation

IK is an unusual asset.³³ While it can be held individually it can also be shared, mirroring Indigenous peoples' views of the world as an integrated whole (Janke, 2005), providing a broader community and public good. For these reasons, IK does not easily fit within the standard Western views on the creation of tradable property rights in intellectual property (IP) (Bodle et al. 2018). However, IK does present an opportunity for harnessing a system of instruments which are broader than those falling under the narrow definition of property rights that better match the communal view and use of IK to Indigenous Peoples (Chapters 2 & 4 of this Report). Indeed, communal pasture property can become 'so bare worn' and the cattle 'so puny and stunted' and 'the encouragement to moral constraint (to reproduce) is equally wanting' (Lloyd 1833, p. 30). However, communal property has been shown to provide enduring community benefit where appropriately managed (Ostrom 1990). As a result, managed communal property can avoid the 'Tragedy of the Commons' (Hardin 1968).

While knowledge through education exhibits the characteristics of a pure public good (that is non-excludable and non-rival), institutional design elements such as those provided through IP rights (copyright, patents, trade marks, designs, licenses, plant breeder's rights, geographical indications), allow for an exclusion mechanism and change the pure public good into a club good, one that is non-rival but excludable (Buchanan, 1956). In summary, IK captured through IP rights are club goods. IK not captured in IP rights or through other

laboratories' (Drahoš and Frankel, 2012, p. 2). It would also include an integrated model of IP rights, real property, and traditional law and customs', no matter how challenging this is for Western legal traditions (Drahoš and Frankel, 2012, p. 2).

³² Option value is the value obtained through conserving a resource for possible future use. The option to use does not have to be exercised to have value in and of itself. The financial markets have put and call options that allow the holder to sell or buy a stock at a particular price by a given date in the future. These options have their own price or value separate from the underlying stock or share.

³³ For this reason, it may be better conceptualised as cultural capital (Morphy, H. 2019, pers. comms, 23 June, ANU, Canberra).

mechanisms will tend to be pure public goods. While attributing a market value to pure public goods may appear to be a nonsense, because public goods are more attuned to non-market valuation, the government and other groups in society may make payments, that is, undertake transactions, to ensure these public goods are provided (or protected and conserved). As a result, the monetary amounts of these transactions are comparable with the monetary values of purely private goods in markets.

Intangible assets and IK

Tangible and intangible assets (or capital) differ where the former can be touched and the latter cannot. The International Accounting Standard 38 defines *Intangible Assets* as non-monetary assets which are without physical substance but are identifiable, either being separable or arising from contractual or other legal rights. They are typically measured at cost and amortised over their useful life. Examples of intangible assets include: patented technologies, computer software, databases and trade secrets, trade marks, trade dress, newspaper mastheads, internet domains, video and audio-visual material like motion pictures and television programs, customer lists, mortgage servicing rights, licensing, royalty and standstill agreements, import quotas, franchise agreements, customer and supplier relationships including customer lists, and marketing rights. In the context of IK, the intangible capital needs more definition:

Intangible forms of capital – [including] social capital, institutional capital, and knowledge in general – differ from the common factors of production in so far as they are public goods, that is they are not the property of any individual firm, and no one can be excluded from the use (Komlos, 2019, p. 121).

This definition of intangible capital is itself problematic in the context of IK which may be ‘owned’ by small groups of Aboriginal and Torres Strait Islander peoples (and hence some exclusion of knowledge is practiced in the control of who has the knowledge and the right to practice). Even if IK is classified as intangible assets, ownership and control of those assets may be hard to establish in terms of standard notions of IP.

It is important at the outset to establish that identifiable intangible assets have a different accounting treatment to non-identifiable intangible assets. The former can be included in the accounts of an organisation helping to encourage further investment in business development (Chapter 2 & Chapter 3 of this Report). The property rights currently under consideration, that is, trade marks, patents, designs, geographical indications and plant breeder’s rights, fall into the category of identifiable intangible assets in our view. We refer to these as identifiable IP (IIP) and non-identifiable IP (NIIP).

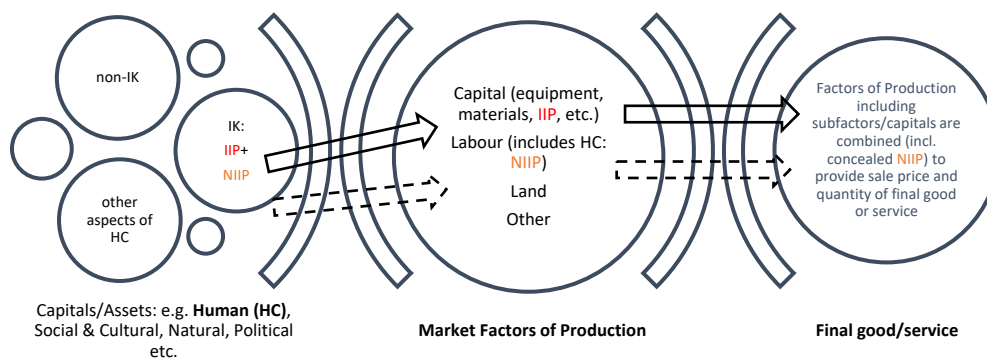
IP systems and Indigenous innovation

Some authors have argued that a focus on the IP system rather than Indigenous innovation can create perverse and unintended social and cultural consequences over the division of monetary returns under an IP system of rights (e.g. Drahos and Frankel, 2012). This maybe the reason why the Australian House of Representatives Standing Committee on Indigenous Affairs (2018) explicitly declined to estimate the market value of Indigenous arts, but the reason is more likely due to data limitations. Drahos and Frankel (2012, p. 28) argue that focusing on Indigenous innovation would raise the question: ‘How might we intervene in the (western) IP system to increase the bargaining power of Indigenous innovators?’ Indeed, this is the ultimate policy question to answer for the broader project associated with IP Australia (2018b).

IK as a production input and IK attribution

In addition to striking the correct balance between a system that rewards innovation created by Indigenous people and the sharing of IK as a public good, it is important to ensure that we do not over or understate the attribution that IK may make in the production process of goods and services. It is therefore important to be explicit about what factors of production (also sometimes described in the literature as capitals or in accounting terms as assets) are combined to provide for the sale of a good or service. Figure 3.1 depicts these. As noted in the Figure, only identifiable IP (IIP) of IK would enter the cost of production in the accounts of the supply organisation and any non-identifiable IP (NIIP) of IK and other related communal and non-market goods and services that go into production process will be captured in its final sale price but not in its cost of production. It is almost as if NIIP of IK disappears through the accounting process but reappears as part of the conglomerate of the final sale price. It therefore would be included in any congealed profit (price above cost of production) (or loss) made by the supplier and any congealed consumer surplus (willingness to pay above the price paid) gained by the purchaser of the good or service.

Figure 3.1: Factors of production in the supply of a good or service, including IK.



(Notes: IIP=identifiable intellectual property, NIIP=non-identifiable intellectual property. IIP is formally costed in the accounts of the supplying organisation, while NIIP is not likely to be costed and may not be realised until the good/service is sold but its separate value is concealed in the congealed final price of sale of the good/service.)

A further complication is that while humans create and hold IP, separate institutions or people can own that IP as an identifiable asset, such as in cases where the material is created by an employer; the asset is a commissioned film and sound recording; and where the asset is assigned and where it is converted to an IP instrument such as a patent, license, trade mark, geographical indication, or plant breeder's right. In the market production process, the human capital (HC) IP then gets split between IIP (separate asset – or referred to as capital such as equipment) and NIIP which remains as part of the HC or Labour. This distinction is drawn in Figure 3.1 with IIP coloured red and NIIP coloured orange and strikes at the heart of the problem of attributing a precise percentage to IK of the final value of the given marketed good or service. Added to these complications, it is possible that NIIP is not valued correctly or not fully incorporated into the final price of sale. In either case, NIIP is likely to be under or overestimated depending on how these two factors come to bear on the final congealed price. Estimating the percentage of IK attribution is indeed very difficult, though not impossible (see Chapter 4).

IK raises the value of labour

An important economic insight is relevant at this point of the discussion for IK in the production process of goods and services. The marginal product of labour increases as capital is added in the production process. To the extent that intangible assets or capital embody IK, the productivity of the workers using that knowledge increases. Workers who have the skill-level to use IK can therefore demand, *ceteris paribus*, a higher level of pay. In summary, IK has a positive impact on the value of labour in the production process and this is why a study of the value of IK is very important to a well-functioning economy in addition to a well-functioning society.³⁴

Biases within the literature review process

Given this brief conceptual background on the nature and use of IK in creating market goods and services, naturally there will be some selection bias in the collation of literature on the question at hand. This is because the vast majority of research and researchers and practitioners in the IP area are non-Indigenous and the literature will tend to reflect western views (and not Indigenous ones). The literature will tend to focus on market values and not community values which are not typically captured in market values. In contrast, our definition of market value is wider and incorporates any situation where a transaction occurs, regardless of the parties between whom the transaction occurs.³⁵ There is further bias resulting from the fact that most Indigenous Peoples' oral histories by definition are not recorded, despite efforts to record and collate histories and language (e.g. see Curren, Carew and Martin 2019), and a literature review, by definition, is of written materials.

Chapter outline

The remainder of the chapter consists of four sections. Section 2 outlines the general approaches to valuing IK including the accounting profession's treatment and approaches to valuation through the valuation of intangible assets. Section 3 discusses the approaches to calculating the market value of IK including sectoral assessments of value and broad economy assessments of Indigenous business. Section 4 gives an overview of the literature regarding the commercialisation of IK in general, with particular reference to the industries which draw on IK most heavily. These provide context for understanding the scope of IK in creating economic market value. Australian examples describe the current market and comparisons to international experience may give a sense of the possible characteristics of future markets.³⁶ The chapter ends in Section 5 with some concluding remarks.

³⁴ Such outcomes require a recognition and development of IK supported through research and investment in the development of regional economies where the vast majority of clearly identifiable and distinctive Indigenous IP is located (e.g. CSIRO with the potential plant, animal and mineral resources) (Morphy, H. 2019, pers. comms, 22 June, ANU, Canberra).

³⁵ By market value we take a broad definition including any 'market' where an economic transaction occurs regardless of the participants in the market. For example, where the government demands goods and services and there is a transaction, this would be considered a market value, though under a strict definition it may be referred to as a quasi-market value.

³⁶ IP Australia has asked that we develop a methodological approach that can take account of the current and future market values of IK, within the context of the IP instruments within their jurisdiction. For this reason we cover most instruments, however we do not pay great attention to copyright.

2. General approaches to the valuation of IP

The mission of the World Intellectual Property Organization (WIPO) is to promote innovation and creativity for the economic, social and cultural development of all countries through a balanced and effective international property system (WIPO, 2019c). The system includes patents, trade marks, industrial designs, appellations of origin,³⁷ domain names, and dispute resolution (WIPO, 2019c). IP and other intangibles (technology, design, brand value, workers skills and managerial know-how) captures twice as much value (at a third of the total value) of products compared with tangible capital (WIPO, 2017, p. 20) but less than labour (wages and other compensation to workers).

Indeed, WIPO indicates that while they have reviewed a number of case studies to identify the income attributed to intangibles in the global value chains for specific case studies such as coffee, photovoltaic and smart phones, little research has been done to establish who gains this income.

At the level of countries, cross-border ownership and sharing of intangible assets makes it difficult to associate assets and earnings with a particular country location. At the level of individual earnings, little systematic evidence exists on how intangibles affect the compensation of workers at different skill levels. Future research that offers empirical evidence on these questions would be of great value. (WIPO, 2017, p. 5)

In addition, WIPO has a specific 'Indigenous Peoples and Local Communities Portal' and have had in place since 2000 an Intergovernmental Committee which began text-based negotiations in 2009 to reach agreement on an international legal instrument or instruments to help protect traditional knowledge, cultural expressions and genetic resources (WIPO, 2019d). However, given the complexities and *sui generis* nature of IP in Indigenous settings, an agreement has not yet been reached, though draft articles on protecting traditional knowledge and cultural expressions have been prepared (WIPO, 2019d; 2012).

There is also a large body of literature on the valuation of IP, see, for instance, Parr (2018). In another example, King (2005) provides a theoretical and practical short guide on valuing IP, intangible assets and goodwill but not specifically in the context of IK and cultural expressions. However, King's framework provides an important background for our methodological scoping study. King (2005) summarises the difficulties posed by intangible capital by detailing the various approaches to valuing 'identifiable intangible assets and intellectual property': cost-based, market-based or estimates based on past or future economic benefits.

Cost-based approaches value IP using the costs of developing a piece of IP, potentially including the future costs of development, as a proxy for its value (Potter, 2007). These approaches rely on a relationship between market value and cost of production which is often hard to justify empirically (Griffith Hack, 2015), and may be difficult to apply in the context of IK, where there is usually no data on the costs associated with gradual accumulation of knowledge. Not only may the mode of production or technology be unique for IK, but the economist's abstracted concept of a 'market' may not be completely transferable in the Indigenous context because some transactions may take place between Indigenous agents outside the market. This insight is not derived from an Indigenous

³⁷ This instrument helps to protect a sign (geographical indication) used on a product indicating its distinct geographical origin under The Lisbon System for International Registration of Appellations of Origin (WIPO, 2019b).

epistemology but comes from a standard economic model of transaction cost economics whereby the institutions and organisations working in a market arise as agents and organise themselves to minimise transaction costs (Williamson 1995). The shape of markets and their governance structures evolve over time and are dependent on the social and cultural contexts. In the context of IK, it is reasonable to suppose that joint production will take place in an Indigenous organisation, rather than as a market transaction, to ensure that the Indigenous community retains control over the knowledge.

Market-based approaches consider sales of comparable IP assets, and are best-suited to valuing homogeneous assets 'with an active market', because these provide the highest likelihood of there being a large number of comparable sales (Griffith Hack, 2015). Although this is theoretically possible in the case of IK, given the heterogeneity of uses of IK, it would require a large pool of data on sale prices.

For these combined reasons, it seems as though benefits-based approaches to valuing IK are most applicable. Approaches based on economic benefits consider 'potential economic returns that could be earned from products/services developed from the IP' (McDonald & Drinkwater, 2004, p. 12). In most contexts of practical valuation, this involves considering comparable transactions or benchmarking according to an industry standard (McDonald & Drinkwater, 2004). The economics literature on market-based approaches has tended to consider firms whose value can be precisely estimated from the perspective of market agents, such as public companies. In this context, Dzinkowski (2000) states that the typical indicator of intellectual capital value is the difference between market value (measured by the product of share price and number of shares) and book value. As Dzinkowski (2000) notes, there may be barriers to this strategy due to other factors which could cause market value to deviate from book value; moreover, the strategy relies on a precise estimate of a firm's market value, which will likely be unavailable for smaller firms.

Greenhalgh and Rogers (2007a) make the point that IP can be measured in theory using a production function and Greenhalgh and Rogers (2007b), for example, find that firms that trade mark have significantly higher value added, by between 10 and 30 percent, than those that do not. Their reasoning is that trade mark activity 'proxies a range of other, unobservable, firm-level characteristics including innovation that raise productivity and product unit values' (Greenhalgh and Rogers 2007b, p. 2).

Extending this discussion to one of predicting future value, Arrow (1962) notes that the market value of intellectual capital usually cannot be predicted in advance, which increases the challenge of using a benefits-based approach to determine future market value.

Valuing Indigenous characteristics for particular goods or services has also been undertaken. For example, Miller, Tait and Saunders (2015) estimate Indigenous cultural values for freshwater systems to the Māori in New Zealand. Willingness to pay (WTP) was NZD 40 per household per year by Māori and NZD 28 per household per year by the general public to enhance Māori and cultural attributes captured through the valuation process in the use of a cultural health index. The index accounted specifically for *mahinga kai* (a composite of species availability, ongoing abilities to harvest and access the sites, and perceptions of site use), traditional association and cultural stream health. Within these characteristics is the use and sharing of IK.

In another study, Zander and Straton (2010) found through a choice experiment of Australian tropical river catchments that Aboriginal residents were willing to pay higher amounts for

some river attributes like cultural values than non-Aboriginal respondents but were indifferent over the use of water in agriculture. The economic benefits for 'good' water holes were found to be \$240 greater for Aboriginal peoples compared to non-Aboriginal people (\$300 versus \$60) (Zander and Straton 2010, p. 2424). Zander and Straton (2010, p. 2420) state that waterholes 'are important to Aboriginal people for hunting, teaching and carrying out traditional responsibilities to their people'. As well as providing food through hunting and fresh, clean water for daily use, the authors also stated that waterholes were culturally significant through songs, ceremonies, collecting, and other activities that bind people to their country. All these activities involve the use and sharing of IK.

In another choice experiment, also in Australia, Windle and Rolfe (2003) estimated the non-use values for protecting cultural heritage sites within the context of further allocations of water and irrigation development. The attributes in this study included healthy vegetation left in the floodplain, kilometres of waterways in good health, protection of Aboriginal cultural sites, unallocated water and an annual payment. Significant differences were found in the benefits held from protection of cultural sites: Rockhampton Indigenous population mean WTP was \$3.22 while non-Indigenous populations in Rockhampton and Brisbane had benefits of around negative \$2 for a one unit change (Windle & Rolfe 2003, p. S92). IK would need to be used in identifying cultural heritage sites in further irrigation water development.

All three studies involved choice modelling (CM) which is a non-market economic valuation method that captures both the market and non-market values for the good or service in question. However, because the modelling involves monetary and other attribute trade-offs (i.e. it is constrained and realistic) it reveals how much people would be willing to pay should a market be established, or market-based instruments be used. Thus, this method could be used to estimate the willingness to pay and benefits for IK through various current or future forms of IP instruments. However, there are limits to these approaches which rely on individual preferences. In the case of complex social goods (Stoeckl et al., 2018), such as IK, capturing the economic value of cultural benefits and given the 'ubiquity of intangibles', may mean that current approaches are incapable of capturing the full extent of cultural values (Chan, Satterfield and Goldstein, 2012). Indeed, Throsby (2001, p.13) identifies that 'the economic impulse is individualistic, the cultural impulse is collective' and CM is typically done on an individual basis rather than in group settings. However, economics has much to say about collective action (e.g. see Buchanan, 1965) and the behaviour of individuals in collective and group contexts. Therefore, CM conducted in communal settings, such as through group valuations, would be an interesting methodological development in valuing IK.

2.1 Accountancy perspectives on the value of IK

Bodle et al. (2018) specifically address the need for the Australian Accounting Standards Board (AASB) to better capture the need for Aboriginal and Torres Strait Islander peoples to value traditional knowledge as a critical success factor in sustainably managing Indigenous business. Specifically, Bodle et al. (2018) argue that Indigenous cultural heritage (ICH)³⁸ and ICIP³⁹ need to be recognised and realised as assets in the accounts of Indigenous business by:

³⁸ ICH consists of places and items that are of significance to Indigenous peoples because of their traditions, observances, lore, customs, beliefs and history (adapted from NSW Office of Environment and Heritage, 2018). IK is needed to help identify, conserve, monitor and manage ICH.

³⁹ ICIP is all the rights that Indigenous peoples have, and want to have, to protect their traditional arts and culture (Arts Law Centre of Australia, 2019). This includes the right to protect their IK.

- including Elders in the valuation;
- raising the financial and commercial literacy levels of Indigenous entrepreneurs;
- treating ICH and ICIP as intangible assets; and
- developing an auditing and accounting model which incorporates cultural, social and environmental measures.

Janke (2009b) concurs. In practice, this involves the use of environmental management accounting, social or sustainability balanced score card or contingency valuations methods to quantify environmental impacts through costs, benefits risks and opportunities related to current sustainability management practices (Bodle et al. 2018). Such management techniques are designed to make environmental, social and cultural factors visible in the accounts.

Bodle et al. (2018) emphasise that the standards only permit intangible assets to be recorded as assets if they meet the definition of an asset (1-3a) and the recognition criteria (3b-4):

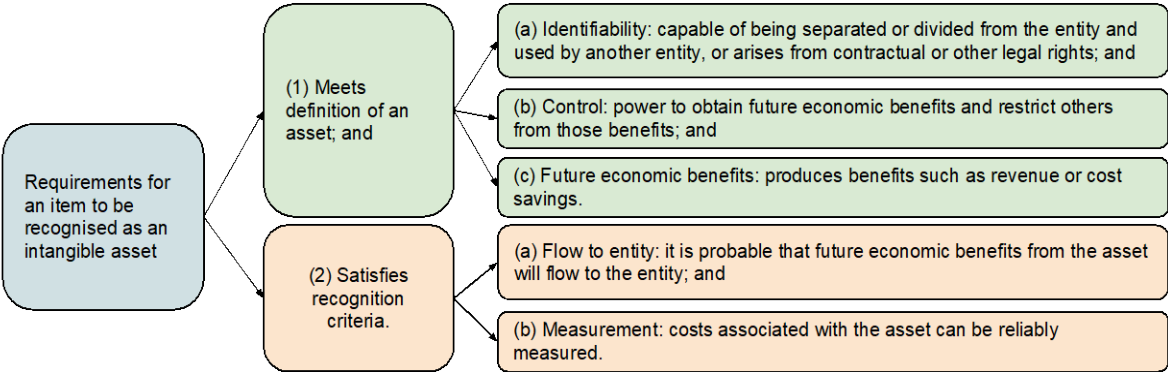
1. the assets are identifiable (AASB 138, para 18)
2. the assets are controllable (AASB 138, para 18)
3. a. the assets provide future economic benefits (AASB 138, para 18) b. which will flow to the entity (these are probable) (AASB 138, para 21) and
4. the costs of the assets can be measured reliably (AASB 138, para 21).

These standards are summarised in Figure 3.2.

However, Indigenous assets are often shared, non-separable and partially excludable, and may be inherently uncertain. These facets will tend to mean that intangible assets are typically not recorded on the balance sheet unless they are identifiable (Chapter 2 of this Report).

ICIP is even more vexed, where it is internally generated and cannot be directly linked to a firm's income stream and thus, cannot be accounted for under current accounting standards. However, investments in the creation of IP are expensed as they occur. This results in the earnings and the book value of equity being undervalued, making it increasingly difficult to raise the necessary finance for business development in this area. Managing the business also becomes difficult because the information required to do so is not immediately available through the accounting reports. As noted previously Greenhalgh and Rogers (2007a, b) identify the production function as an approach to valuing intellectual property and that trade marks account for a significant percentage of extra value add for firms.

Figure 3-2: AASB 138 Accounting standard requirements for recording of intangible assets



Source: Chapter 2 of this report

Furthermore, Bodle et al. (2018) go on to identify that IP, when used in tourism, falls within the International Public Sector Accounting Standards based on International Financial Reporting Standards. Where IP is kept by a business to contribute to knowledge and culture, it should be classified as a heritage asset because of its historic, artistic, scientific, geophysical or environmental quality. As noted in AASB138, reporting and accounting for ICH assets is not possible where an income stream cannot be directly matched to the asset, and heritage assets are more likely to be creating an expense. In addition, valuing these assets is a costly process discouraging organisations from valuing them (Bodle et al., 2018). These accounting problems also extend to the valuation of crown land including public parks and gardens by Local Government Authorities (Ivannikov, Dollery & Beyerlein, forthcoming).

3. Literature regarding approaches to calculating the market value of IK

Although there is a large literature describing the various uses of IK, calculating the market value of IK is a significantly more challenging task. There appear to be no explicit calculations of the market value of IK that are publicly available – in Australia, or internationally. However, as summarised in Table 3.1, several strands of the literature consider the commercial use of IK in a manner that may indicate some aspects of the task of valuing IK. Each strand is addressed in more detail below.

Table 3.1: Areas of the literature relevant to calculating the market value of IK

Area of literature	Relevance to the market value of IK
Valuations of the contribution of IK to a specific sector	Detailed description of value of some industries, but no economy-wide aggregation. Methodology may be able to be extended to a broader approach to capture the value of IK.
Valuations of the Indigenous business sector	Could be used to provide a market value of IK where the question of attribution is considered by industry and subsector.
Valuing other types of intangible capital	Provides background on possible ways to value IK, by reference to other types of intangible capital.
Accounting standards related to intangible capital and IK	Could potentially be used to value IK, but significant gaps in current practice, particularly for NIIP. (Already discussed in previous section)

3.1 Approaches that measure the value of a specific sector in which IK is embedded

Although there do not appear to be any estimates of the economy-wide value of IK, there are a number of estimates of the market value of IK within particular sectors. As Table 3.2 shows, these estimates vary in both focus and methodology.⁴⁰

Table 3.2: The value of specific sectors in which IK is embedded

Sector(s)	Author (date)	Region	Methodology	Estimated market value of sector
Genetic and natural resources with respect to medicine and healthcare	Daes (1993)	World	Focus on annual market value for medicines derived from medicinal plants discovered using IK. Specific methodology is not clarified; reported as an upper bound estimate.	\$43 billion USD
Genetic and natural resources with respect to all areas	Kate and Laird (2000)	World	Estimates include all markets for IK in genetic and natural resources but does not include subsistence or locally-traded products. A breakdown of the estimate shows that the largest components are agriculture (55-60%) pharmaceuticals (around 15-19%) and biotechnology (around 12-15%).	\$500 billion - \$800 billion USD
Genetic and natural resources with respect to seeds used in agriculture	Posey (1990)	World	Total size of international seed industry is asserted to be around \$15 billion. Much of this involves the use of IK.	Substantial share of \$15 billion USD
Traditional rice crop varieties (landraces)	Evenson (1996)	India	Use and value of landraces contribution to India's rice yields. Landraces are sourced from India and overseas.	\$6.1 billion USD
Bush food	Robins (2007), as cited in Clarke (2012)	Australia	Estimate is sum of farm gate and value added. Methodology is unclear.	\$14 million AUD
	Foster and Bird (2009)	Australia	Estimate of farm gate value, based on sum of eleven native foods, with market value in each calculated as price times quantity produced.	\$6.28 million AUD
	Clarke (2012)	Australia	The value provided is the gross value of production at the farm gate. Accounting for value adding may increase the estimated by up to 500%. The estimate is found based on considering volume produced and prices for thirteen native species.	\$15 million - \$25 million AUD
Arts	Myer (2002)	Australia	Overall estimate for Indigenous arts and crafts sector; report notes that Indigenous individuals only receive \$50 million of the total.	\$200 million AUD
	Altman, Hunter, Ward and Wright (2002)	Australia	Notes substantial uncertainty and limitations of data; estimate is given as an indicative range.	\$100 million - \$300 million AUD
	DesArt (2007)	Australia	No methodology provided.	\$200 million - \$500 million AUD
	Woodhead and Tucker (2014)	Remote areas of Australia	Estimate based on surveys of artists, both in Art Centres and freelance.	\$52.7 million AUD

⁴⁰ The Table is intended to indicate the wide range of approaches and should not be considered exhaustive.

Herbal pharmaceutical products	Market Research Future (2018)	World	No methodology provided.	\$5.1 billion USD
Pharmaceuticals	Principe (1998)	OECD countries	Market value of plant-based medicines sold in 1990 ^a	\$61 billion USD

Notes: Dutfield (2005) notes that 74% of 119 plant-based compounds used in medicine worldwide have the same resemblance to the compounds in the original plant, implying that a large proportion of this value has been developed through IK.

Table 3.2 indicates substantial variations in estimated market value even within a given sector. This reflects differences in methodology and limitations of data. Although the estimates provided in Table 3.2 depict a view of IK in one particular context, they are clearly insufficient to determine the overall value of IK. The estimates measure the value of a particular industry that is associated with IK, rather than the value of IK within that industry; for instance, estimates of the value of the bush foods industry cannot be used as an indication of the value of IK without considering the degree to which the industry's value can be attributed to IK.

3.2 Approaches that estimate the size of the Indigenous business sector

Another strand of the literature seeks to estimate the size of the Indigenous business sector. The differences between this approach and the methodology required to value IK illustrate some of the challenges in valuing IK.

In the Australian context, PwC (2018) set out to estimate the value add of Indigenous businesses to Australian GDP in 2016. The approach taken is broadly similar to international evaluations of the size of New Zealand's Māori business sector (Te Puni Kōkiri, 2013) by value-add or Canada's Aboriginal business sector (Gulati & Burleton, 2015) by business earnings as summarised in Table 3.3. The exceptions are that the New Zealand study also valued the Indigenous asset base and net savings and the Canadian study included the government sector in the Aboriginal economy. Interestingly, the percentage of the Indigenous sector varied across these studies from less than one percent of the overall national economy (Australia) to a couple of percent (Canada) and several percent (New Zealand). PwC (2018) called for an Indigenous Business Number (IBN) to better identify the Indigenous business sector in Australia. This could also help as an initial step in estimating the IK embedded in the national economy but this is not without its problems, among them, because non-Indigenous people can hold rights to IK through IP instruments as well.⁴¹

⁴¹ These rights can be obtained legitimately through fair trade and price from Indigenous people but could also have been stolen.

Table 3.3: Estimation of Indigenous business sector

Source	Location, population	Approach	Economic value	\$ value, billions	% of national income	Issues
PwC (2018)	Australia, Indigenous business	GDP Value Add	Income	AUD 2.2-6.6	0.1-0.4%	Included non-Indigenous employees, calls for an Indigenous Business Number
Te Puni Kōkiri (2013)	New Zealand, Māori enterprises	GDP Value Add	Production, income and expenditure	NZD 11	6%	Need official statistics as well
				NZD 16	8%	
				NZD 18	11%	
		Market	Asset base	NZD 43	6%	Wellbeing broader
		Household income-expenditure	Net savings	(4)		
Gulati & Burleton (2015)	Canada, Aboriginal economy	Total = business +households +government	Income	CAD 31	~2%	Includes government as well

Note: AUD=Australian dollar, CAD=Canadian dollar, NZD=New Zealand dollar.

As an example, PwC (2018) first estimated the number of individuals working in the Indigenous business sector, which it defined to include ‘self-employed’ Indigenous people with no employees, Indigenous-owned ‘enterprises’ with at least one employee, and ‘trusts’ for the benefit of Indigenous Peoples. The contribution to GDP in industry j is the number of Indigenous sector employees in industry j multiplied by the average value add per person in industry j . The average is calculated from industry-wide Australian Bureau of Statistics (ABS) data as the compensation per employee in industry j plus gross operating surplus per employee in industry j . To find the overall contribution, PwC (2018) takes the sum across industries, as equation (1) shows.⁴²

$$Value\ add = \sum_j Employees\ in\ Indigenous\ Sector_j \times \left(\frac{\overbrace{Total\ compensation_j}^{Value\ add\ per\ employee\ in\ industry\ j}}{\underbrace{Total\ employees_j}_{Compensation\ per\ employee\ in\ industry\ j}} + \frac{\overbrace{Total\ gross\ operating\ surplus_j}}{\underbrace{Total\ employees_j}_{Gross\ operating\ surplus\ per\ employee\ in\ industry\ j}} \right) \quad (1)$$

Unlike the Te Puni Kōkiri estimates of the Maori business sector, the PwC estimates do not include an Indigenous-specific component to the production. Equation (1) uses industry-wide averages to get a rough approximation of the size of the Indigenous sector as a whole. While that is understandable for the broad question that the PwC report attempts to address, it is inadequate for the task that this chapter seeks to address. IK is by definition Indigenous-specific, so Australian data analogous to the Maori business sector information collected in

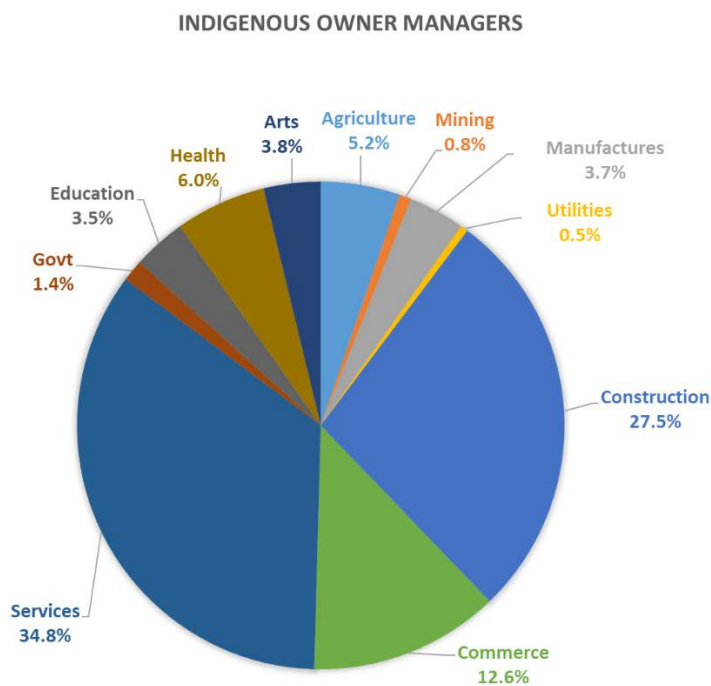
⁴² Equation (1) shows the general method used by PwC (2018). In the case of trusts, which were not assigned to a particular industry, PwC (2018) used economy-wide compensation and gross operating surplus. In the case of self-employed Indigenous people, the compensation per employee component is set to zero, because there are no employees to compensate.

New Zealand would need to be collected for the Indigenous business sector in Australia if it were deemed to be useful for the Indigenous community or policy makers.

PwC scales up the value-added per business identified in equation (1) by their estimate of the number of Indigenous businesses. Performing this calculation gives a total GDP contribution of between \$2.2 billion and \$6.6 billion. The large interval around the estimate reflects uncertainty over the number of Indigenous-owned businesses. In addition, using industry-wide estimates of value add assumes that Indigenous-sector businesses have the same average productivity as non-Indigenous businesses in the same sector. PwC (2018) also uses 2016 ABS census data, which undercount Indigenous people by approximately 19 percent (Shirodkar, Hunter, & Foley, 2018).

Even assuming PwC’s estimate is an accurate gauge of the contribution made by the Indigenous business sector to the economy, it would not be credible to use this figure to estimate the market valuation of IK. The essential problem is one of attribution. It would be inappropriate to assume that all value added by Indigenous businesses can be attributed to IK. Although there are some industries, such as the arts, in which arguably a relatively large share of value could be attributed to IK, these industries represent only a small portion of Indigenous owner-managers, as Figure 3.3a (from Shirodkar, Hunter and Foley, 2018) shows.⁴³ Using the size of Indigenous businesses as a gauge of the value of IK would similarly be an inappropriate way of attributing value to IK. However, where this is done through comparison with non-Indigenous business shares, this may provide the differential or marginal value that Indigenous business is able to extract in any given market. This may provide a way forward towards an appropriation for IK, particularly where other Indigenous factors of production other than IK can be controlled for.

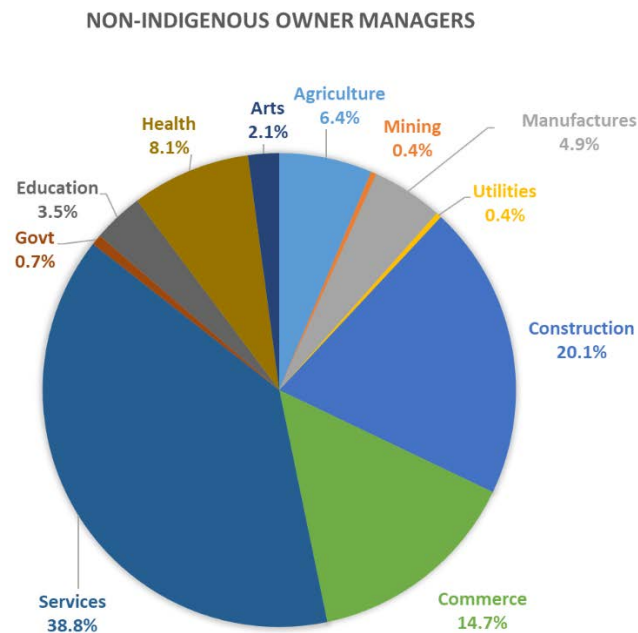
Figure 3.3a: Industry composition by Indigenous owner-manager



Source: Shirodkar, Hunter and Foley, 2018

⁴³ The precise industry composition will depend on the data source and methodology used. For an alternative view, see Supply Nation and First Australians Capital (2018).

Figure 3.3b: Industry composition by non-Indigenous owner-manager.



Source: Shirodkar, Hunter and Foley, 2018

Moreover, focusing on Indigenous-owned businesses excludes other businesses which may *also* draw on IK, despite not being Indigenous-owned. For example, large corporates like Qantas, and the government companies IBA and ILSC. Finally, the contribution of IK is not limited to the business sector: government agencies' use of IK contributes to their societal value (which may include the market equivalent value in the case of Government Owned Corporations which can pay dividends – a proxy for profit), but this use would be excluded by a focus on Indigenous-owned businesses. However, restricting attention to businesses may be more directly relevant for a consideration of market value, rather than societal value.⁴⁴

In this sense, the hurdles PwC (2018) faces in estimating the contribution of Indigenous businesses to GDP indicate some of the difficulties in finding appropriate data to describe Indigenous businesses.⁴⁵ Moreover, the essential step of attribution makes assessing the value of IK a more challenging task than measuring the size of Indigenous business and indeed with the potential for a greater degree of estimation error.

4. Literature regarding the commercialisation of IK⁴⁶

The possible commercial use of IK in a range of industries has been well documented. For example, the 2012 Intergovernmental Committee on Intellectual Property and Genetic Resources, Knowledge and Folklore (IGC) noted that IK 'may be associated with agricultural, environmental, healthcare and medical knowledge, biodiversity, traditional lifestyles and

⁴⁴ Indigenous contributions to brand Australia beginning with the percentage of Indigenous references in advertising, may be an exception, where there are market and societal benefits.

⁴⁵ Supply Nation and its capacity to provide the necessary information is addressed in Chapter 5 in the second last section on data.

⁴⁶ The Indigenous film making and music industries are indeed an area where IK is likely to be used, however we give little attention to this industry because it is mainly captured by copyright law which falls outside the jurisdiction of IP Australia.

natural and genetic resources, and know-how of traditional architecture and construction technologies’ (World Intellectual Property Organization, 2012).⁴⁷ As summarised in Table 3.4, these fields draw on IK to differing extents, and differing legal instruments are relevant to the protection of IK in each field.⁴⁸

Table 3.4: Summary table of major commercial uses of IK

Field	Summary of contribution of IK	Directly relevant instruments to protection of IK
Natural and genetic resources	IK around the properties and processing of natural and genetic resources widely-used in medicine, cosmetics and food industries.	Plant breeder’s rights, patents, requirement for benefits-sharing agreements. Land rights permit processes, and native title agreements.
Healthcare and medicine	IK in production of traditional medicines and use of traditional healing practices.	Patents, trade marks.
Bush food	IK in production of traditional foods.	Patents, trade marks, copyright.
Environmental management and preservation of biodiversity	IK in environmental services delivered by Indigenous and non-Indigenous Peoples.	Patents, trade marks.
Tourism	IK in marketing of goods and services to domestic and international tourists.	Trade marks, copyright.
Designs (architecture and construction, fashion, furniture etc.)	IK used in designs in a variety of industries.	Designs, copyright.
Research and education	IK in research methodologies, or in imparting research to students.	Patents, copyright.
Culture	IK in traditional and contemporary cultural expressions.	Copyright, trade marks.

Source: see detailed discussion of each field in sections below.

4.1 Natural and genetic resources

Over tens of thousands of years, Indigenous peoples accumulated knowledge about the natural resources around them. In a number of cases, Indigenous individuals used this knowledge to direct researchers toward natural flora that were known to have valuable properties. Where these flora are subsequently commercialised, part of the value of that commercial use can be attributed to IK.

Cox and Balick (1994) note that the value of IK in identifying plant species for commercial use will be highest in contexts in which the environment supports a diverse array of flora, the Indigenous group has remained in the region for many generations, and knowledge is transmitted from generation to generation. This suggests that the value of IK in natural and genetic resources may be relatively high in Australia, which fulfils all three criteria.

⁴⁷ Although this list of examples is non-exhaustive and has not been included in some subsequent draft articles produced by WIPO, it provides an indicative starting point for a review of the commercial uses of IK.

⁴⁸ For the most part, copyright is excluded from the discussion, as this report’s scope is limited to industrial property.

Both domestically and internationally, the commercial use of IK in natural and genetic resources has tended to fall into one of three categories: medicinal use; cosmetic use; and food use. Some international and Australian examples of each type of commercial use are provided in Table 3.5.

Table 3.5: Examples of commercial use of IK in natural and genetic resources⁴⁹

Commercial uses of IK in natural and genetic resources	International example	Australian example
Medicinal use	<p>The Mamala tree: Samoan traditional healers used tea made from the Mamala tree (<i>Homalanthus nutans</i>) for medicinal purposes (Bergeron, 2008). Healers directed ethnobotanists to the tree, which was later found to produce prostratin, a potential compound for use in HIV medication (Cox, Johnson, & Tavana, 2008). Researchers from the University of California reached a benefit-sharing agreement with the Samoan Government over potential profits from commercial use of the tree (Forsyth, 2013).</p>	<p>The Mudjala plant: the Jarlmadangah People had traditionally used the Mudjala plant (<i>Barringtonia acutangula</i>) for cultural and medicinal purposes and directed researchers to the plant. The Jarlmadangah People and Griffith University now jointly own a patent over novel analgesic compounds derived from the plant (Marshall, Janke, & Watson, 2013).</p>
Cosmetic use	<p>South African cosmetics development: of 117 South African plants with known traditional uses in skincare, 82 have been commercially explored as cosmetic products (Lall & Kishore, 2014). One well-known example is the Rooibos plant (<i>Aspalathus linearis</i>), which, in addition to being made into teas, has been used in cosmetic products distributed to 34 countries (Joubert & de Beer, 2011). This is consistent with the traditional use of the plant by the Khoi and San people (Siyanda Samahlubi Consulting, 2014).</p>	<p>Lemon myrtle: the lemon myrtle tree (<i>Backhousia citriodora</i>) was traditionally used as a medication or skin product (Outback Chef, 2017). The plant is now used in a number of personal care products, including soaps, creams, toothpaste, shampoos and conditioners, in addition to some food use (Clarke, 2012).</p>
Food use	<p>Cabbage tree: the cabbage tree (<i>Cordyline australis</i>, or tī kōuka) is endemic to New Zealand (Manaaki Whenua: Landcare Research, 2019). Māori people cultivated the tree as a source of food, eating both the leaves and seeds (Cambie & Ferguson, 2003). The tree's produce is still consumed today.</p>	<p>Kakadu Plum: Indigenous Peoples in the Kimberley and the Top End used the Kakadu Plum (<i>Terminalia ferdinandiana</i>) as a source of food (Janke, 2018a). The Plum is now sold as a snack and health food, both in Australia and internationally (Joint Venture Agroforestry Program, 2006).</p>

Notes: The commercialisation of the Mudjala Plant and the Kakadu Plum are discussed in more detail in Chapter 4 of this report.

Of particular note, is the case where Western Samoan IK was used by Dr Paul Alan Cox, then with Brigham Young University in Utah, to help develop a remedy for HIV aids (Cox, Johnson, & Tavana, 2008). Two healers in the *Felealupo* village identified, formulated and used

⁴⁹ The divisions into commercial uses of IK for a given good are not always clear. For example, the Kakadu plum is used for cosmetic and food use.

prostratin from *Homalanthus nutans* or the Mamala tree for healing (Gupta, Gabrielsen & Ferguson, 2005). Prostratin was developed from the use of this IK and Cox prepared a benefit sharing agreement in 1989 resulting in payments of greater than \$480,000 USD to the village. The payments were made for development of schools, medical clinics, water supplies, trails, an aerial rain forest canopy walkway and to establish an endowment for the rainforest.

In 2001, US National Institutes for Health and Aids Research Alliance of America (ARA) signed a licensing agreement for further study and development of prostratin. As required by the National Cancer Institute (NCI) Letter of Collection (LOC), an agreement with the Samoan Government was struck by ARA where 20 percent of commercial profits would be shared with Samoa, including 12.5 percent going to the Samoan government, 6.7 percent with the *Felealupo* village, and 0.4 percent to each of the healer's descendants (Gupta et al. 2005, p. 17).

In 2004, the University of California Berkley (UCB) VC signed another agreement with the Prime Minister of Samoa to clone prostratin genes from *H. nutans* and mass produce it in microbes via genetic engineering. This time, the share to the Samoan government was 50 percent of the commercial development from the genetic resource (Gupta et al. 2005, p. 17). The Samoan share was to be distributed to the villages and families who initially shared their knowledge with Cox, the original researcher.

The Samoan case is not a single event, and overall, the commercial usage of IK of native resources is widespread. For instance, Robinson and Raven (2017) considered 321 plant species with known Australian Indigenous uses; of these species, 66 were mentioned in the title or abstract of a patent in WIPO's database, and more than 1,300 patents were returned in total. This may represent a lower bound for total commercial use, as some firms may choose not to register a patent for their use. However, historically, Indigenous Peoples have received only a limited share of the profits from genetic resources; Posey (1990) estimates that 0.001 percent of profits from drugs derived from traditional medicine have flowed to Indigenous Peoples.

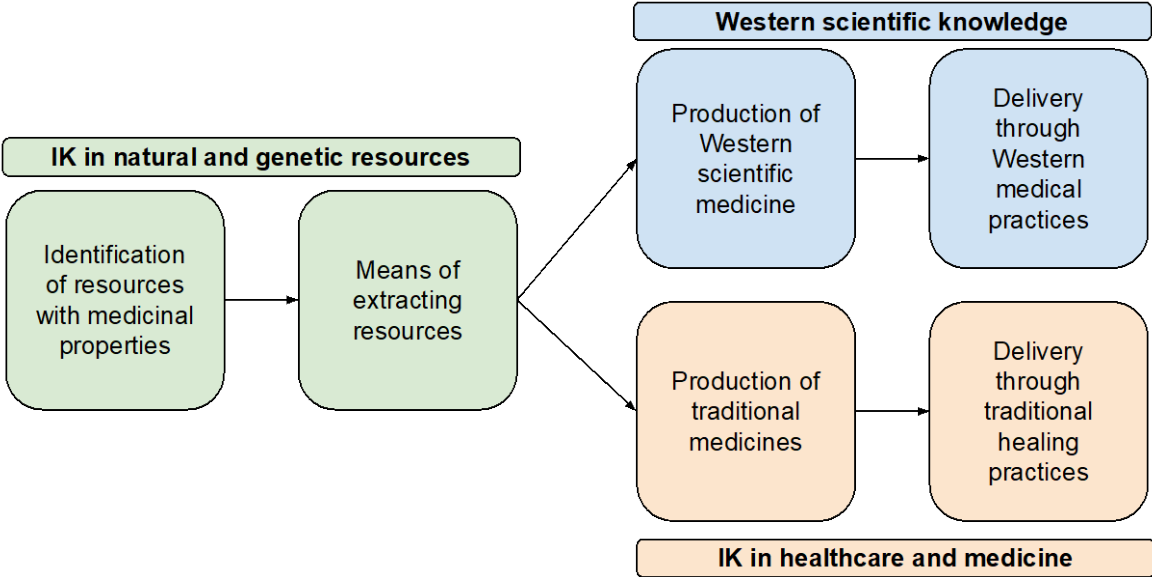
Where IK in native and genetic resources can be protected as IP, this protection will most likely come in the form of patents for the use of plants in certain products, plant-breeder's rights in the case of newly-created plants, or access and benefits-sharing agreements. These agreements will likely continue to grow more widespread with the global implementation of the Nagoya Protocol, which sets out certain access and benefits-sharing requirements (Schindel, et al., 2015).⁵⁰

4.2 Healthcare and medicine

The discussion above considers the use of IK in identifying and extracting resources with valuable properties, including valuable medicinal properties. As Figure 3.4 shows, an additional role of IK is in using those resources to produce and deliver traditional medicines, rather than Western medicines.

⁵⁰ The Nagoya Protocol is considered in more detail in Chapter 2 of this report.

Figure 3.4: Distinction between IK in natural and genetic resources and IK in healthcare and medicine



Traditional healthcare is practised in over 30 percent of Aboriginal primary health care services across Australia today (Oliver, 2013), and exists both as part of a private market for traditional healing, and through government contracts for the provision of traditional healing in conjunction with public health care services (Department of Health, 2013).

The role of IK in traditional healthcare can be separated into:

- **The production of traditional remedies**, which are often used in combination with Western medicine, and involve herbal preparations or external remedies such as ochre and smoke (Maher, 1999); and
- **The delivery of treatment through traditional healing practices**, such as through employing traditional *nangkari* healers, who may administer medicine or engage in other practices such as chanting (Maher, 1999).

Combining traditional and Western health practices has been argued to deliver benefits beyond the single application of a cultural health practice (Shahid, Blears, Bessarab, & Thompson, 2010; Greives, 2013). Integrated traditional healing, which inherently requires IK, has been argued to provide cost savings, assuming people get well sooner and stay well longer with less cost and with fewer relapses (synthesis of Greives, 2018; Panziorini, 2013; Oliver, 2013, McCoy, 2008; Korff, 2018a).

In regard to IP legal instruments, patents may be available to protect certain traditional remedies, where they involve a novel element. Alternatively, trade marks may be used by Indigenous businesses producing medicines.

4.3 Bush foods

Bush foods (also referred to as ‘bush tucker’ or ‘native Australian foods’) are derived from Aboriginal customary foods and are sold to Aboriginal and non-Aboriginal consumers (Walsh & Douglas, 2011). Although the term ‘bush food’ refers specifically to Australian produce, there are equivalent terms in Canada (‘country food’) and New Zealand (‘kai’).

As with traditional healthcare and medicine, there is a distinction between traditional knowledge of resources that could be used as foodstuffs (which is considered IK in natural

and genetic resources) and traditional knowledge of the preparation of foods (which is considered in this section). This knowledge has been commercialised in a number of ways, including:

- Preparation of bush food for retail sale to consumers, either directly, or through grocery stores, such as Outback Pride's produce sold through Woolworths (Outback Pride, 2007);
- High-end Indigenous restaurants, such as Adelaide's Orana (McCabe, 2017), which was named Gourmet Traveller's 2018 Restaurant of the Year (Gourmet Traveller, 2017);
- Recipe books, such as *Bush Tukka Guide: Identify Australian Plants and Animals and Learn How to Cook with Them* (Martin, 2014); and
- Television shows, such as Mark Olive's *Outback Café* series (Best, 2009).

The Orana example of high-end restaurants comes from Adelaide, Australia and was designed to provide broader economic and business development opportunities. The food and experience at Orana relies on IK, combined with other cultural (Italian) knowledge of food. Zonfrillo, Chef and philanthropist at Orana, has collated a database of 700 Indigenous ingredients as part of The Orana Foundation (McCabe, 2017), a not-for-profit, which has a philosophy to 'revolutionise Australian food culture through combining the preservation of Indigenous knowledge and practice with contemporary methods and innovation' (The Orana Foundation, 2016). The University of Adelaide, South Australian Government, provided a \$1.25m grant (McCabe, 2017), and Lipman Karas law firm are partners in the foundation. The foundation '(a)ssists Indigenous communities by stimulating Indigenous enterprise through supporting communities to research, document, commercialise and promote native Australian foods' (The Orana Foundation, 2016). The foundation has a three pronged strategy to form (i) a National Australian Food Database; (ii) an Australian Food Culture Enterprise, and (iii) an Innovation & Enterprise Hub (The Orana Foundation 2016).

The relevant IP instruments used to protect IK in bush foods will depend on the mode of commercialisation. Patents may be taken out over new and inventive food preparation methods; trade marks can protect individual businesses, such as restaurants, through branding; and copyright, though not within IP Australia's jurisdiction, could be used to protect IK in television shows and books.

Australia's bush food industry is reportedly growing significantly (Honan & McCarthy, 2017), and there remains significant room for future expansion: only 13 of the over 6,500 native foods in Australia had received Food Safety ANZ certification and have been developed with Australian and international markets as of 2017 (PwC's Indigenous Consulting, 2017). However, a recent report by BushFood Sensations, an alliance of businesses growing, selling or promoting Indigenous foods, found that only one percent of the industry's produce and dollar value is created by Indigenous peoples (Mitchell & Becker, 2019). This contrasts with the Māori food industry, in which Māori individuals hold substantial control and receive a significant share of revenue (McKerchar, Bowers, Heta, Signal, & Matoe, 2014). This may suggest that Indigenous peoples will gain access to a greater share of the industry as it develops and as it is supported through IP innovation in instruments (for reform suggestions, see Lingard, 2016). To what extent this innovation provides a return to IK is difficult to determine.

4.4 Environmental management and preservation of biodiversity

Indigenous peoples managed country for tens of thousands of years, and often built up sophisticated systems for preserving the resources of the natural environment (Pascoe, 2014). This knowledge is used in the protection of environments today.

Although environmental management serves as an important public good regardless of the existence of a market, a market *value* can only be attributed to environmental management when there is payment for environmental management services. These services can be rendered either by Indigenous peoples drawing on their own traditional knowledge, or by non-Indigenous peoples using IK. The former case typically arises when traditional owners are contracted for the management of their country, as is usually the case with Australia’s Indigenous Protected Areas (IPAs) program, which is considered in Table 3.6. The latter case arises where non-Indigenous organisations make use of Indigenous processes of land management, such as cool season mosaic burning. In both cases, IK is usually complemented by Western scientific knowledge.

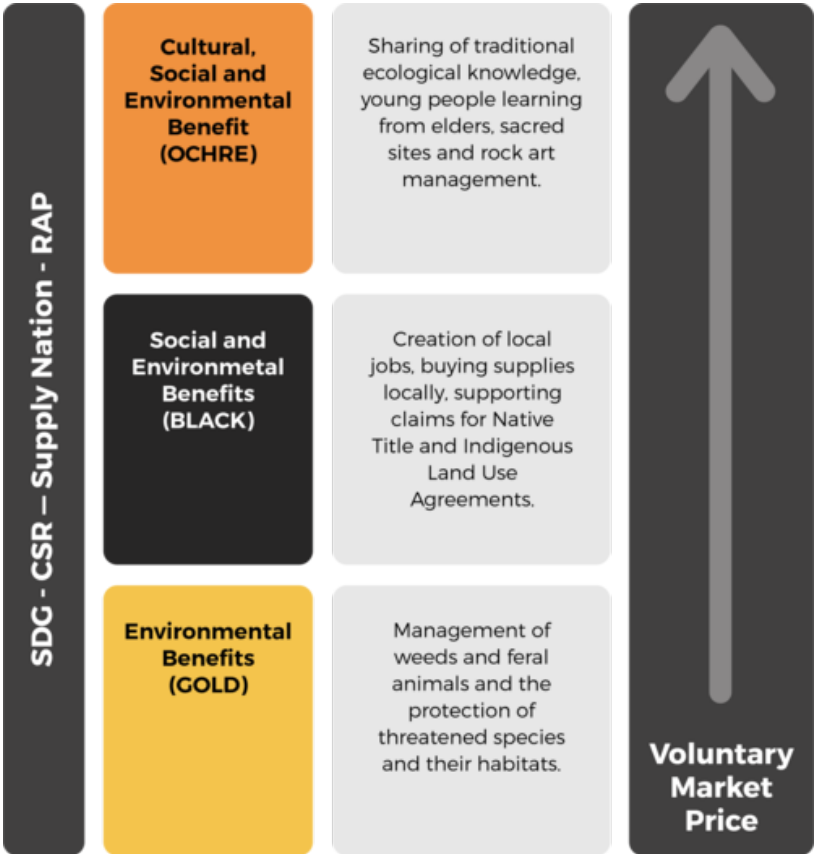
Table 3.6: Examples of commercial use of IK in environmental management and biodiversity protection

Commercial uses of IK in environmental management and biodiversity protection	International example	Australian example
Land management	Canada’s Environmental Management Advisory Board (EMAB) was established pursuant to an environmental agreement between a Rio Tinto subsidiary and a number of Aboriginal groups and governments. EMAB employs Canadian Aboriginal individuals to monitor the environment and ensure protection measures are properly implemented (O’Faircheallaigh, 2011).	Indigenous Protected Areas (IPAs) are areas managed by Indigenous communities under contractual agreements with the Australian Government (Department of Prime Minister and Cabinet, 2018). Traditional owners and rangers are contracted to provide land management services with TK being an identified component (Department of Prime Minister and Cabinet, 2015, p. 2).
Climate change responses and abatement	South American highlands have been exposed to increasingly irregular rain due to climate change, leading to greater drought. These problems of drought were also faced by pre-Colombian communities, who created special irrigation (Caran & Nelly, 2006) and crop rotation (Orlove, Chiang, & Cane, 2000) systems to reduce reliance on water. The Economic Commission for Latin American and the Caribbean (ECLAC) now refers to these strategies in its procedures for sustainable farming (Parry, Canziani, Palutikof, Linden, & Hanson, 2007).	The Aboriginal Carbon Foundation is a not-for-profit company aiming to build a sustainable Aboriginal carbon industry. As part of its operations, the Fund uses traditional owners’ knowledge as part of the response to climate change (Aboriginal Carbon Fund, 2019; Blackwell and Fordham, 2018, Case Study 6).
Protection of native wildlife	Collaboration between researchers and the Comcaac (Seri) People of north western Mexico has involved contracting with Indigenous People in the local area to assist in biodiversity surveys and habitat conservation programs. The projects involve a combination of Western scientific and traditional knowledge (Wilder, O’Meara, Monti, & Nabhan, 2016).	The Bardi Jawi Oorany, Nyul and Yawuru rangers in the Kimberley were contracted, as part of the Kimberley Bilby project, to protect Australian bilbies in their traditional country (Kimberley Land Council, 2017). The project draws on IK of burning and of bilbies’ food sources and habitats (Lindsay, 2017).

Notes: IPAs and the Aboriginal Carbon Foundation are considered in more detail in Chapter 4 of this Report.

An example of the combination of IK in land management combined with scientific knowledge and processes is the Aboriginal Carbon Foundation (AbCF's) *Reducing Carbon Building Communities Fund* that trades Australian Carbon Credit Units with environmental, social and cultural values (AbCF, 2019). The fund, supported through finance from the Queensland Government and advice from Baker McKenzie's Global Environmental Markets and Climate Change practice, allows for three types of carbon credits to be used including OCHRE (cultural, social & environmental), BLACK (social & environmental) and GOLD (environmental) as depicted in Figure 3.5 (AbCF, 2019). The fund allows for an easy way for businesses or philanthropists to invest in rural farming economies, Indigenous communities and climate change initiatives (AbCF, 2019).

Figure 3.5: AbCF's Reducing Carbon Building Communities Fund's credit system



Source: AbCF, 2019.

The use of IK in environmental management appears to be growing due to the renewed emphasis on environmental conservation. Moreover, IK is arguably able to make a valuable contribution in the context of climate change, given that Indigenous Peoples survived long periods of drought or climate adjustment in the past (Makondo & Thomas, 2018). In part due to these social trends, survey data indicate that Australians are already willing to pay more for environmental management from Indigenous people than they currently do (Zander & Garnett, 2011).

4.5 Tourism

Indigenous Knowledge has been commercialised in Australia's international and domestic tourism industry. In the international context, the Australian Government has described Indigenous culture as 'a key point of differentiation in a highly competitive international

tourism market' (Tourism Research Australia, 2011, p. 1). Domestically, interest in experiencing Aboriginal art or visiting Aboriginal sites is a major source of interstate tourism (Destination NSW, 2016).

Commercial use of IK in tourism takes on a number of forms described in detail in Langton, Fitzgerald & Atkinson (2018), including:

- Cultural festivals, such as Northern Territory's Barunga Festival and New South Wales' Saltwater Freshwater Festival;
- Parks containing Aboriginal sites or managed by Aboriginal peoples, such as Kakadu National Park;
- Tours of Aboriginal sites accessible to the general public, led by Aboriginal guides;
- Aboriginal cultural centres and art galleries, such as Sydney's 'Blak Markets', a micro business hub and economic development opportunity for Indigenous business, held regularly at physical locations in Sydney as well as in pop-up shops and online stores (Blak Markets 2019);
- Sporting matches celebrating Indigenous participation, such as the MCG's annual Dreamtime event, which opens with a traditional dancing and smoking ceremony; and
- Souvenirs sales and the like (including the sale of fake Indigenous souvenirs – see section 4.8 on culture).

Because tourism is generally associated with a supply chain from other industries (Tourism Australia, 2011), there may be significant multiplier effects attached to spending on Aboriginal tourism.

An example of the benefits and growth provided through Indigenous events is the Garma Festival in the Northern Territory. Chapter 4 of this report provides estimates of the lower bound value of revenues from ticket sales, sponsorship, expo stalls and advertising to amount to between \$6.8m and almost \$9m annually. Compared with an economic impact assessment undertaken in 2009 (YF, 2014) of \$1.417m, these current values represent a compound annual growth rate of approximately 19 percent over the last decade. Chapter 4 of this Report provides a review of the programme of events including open air art galleries, guided learning on country walks, astronomy lessons and spear making workshops, all of which no doubt have a high level of embedded IK, to estimate the attributable IK value at two thirds or 67 percent.

Despite this promising growth in Indigenous tourism presented through the Garma Festival case, it should be noted that commercial use of IK for tourism remains controversial in some respects and has been criticised for removing cultural control (Altman, 1989) or promoting an inauthentic version of Aboriginal culture (Foley, 2014). The increasing tendency towards Aboriginal ownership or control of tourism may assist in resolving these issues (Colton & Whitney-Squire, 2010).

4.6 Designs

Indigenous designs have frequently been used commercially by both Indigenous and non-Indigenous producers. A number of case studies are described in Table 3.7. These include applications to architecture, fashion, and homewares with examples from Australia and overseas.

Table 3.7: Examples of commercial use of IK in designs

Field	Use of IK	Australian example	International example
Architecture	Indigenous Peoples built structures for housing and other purposes out of local materials, sometimes incorporating elements of local culture (Pascoe, 2014, pp. 97-144). The materials and styles used have now been adopted by some architecture firms (Go-Sam, 2008).	Indij Design is one of a small number of Indigenous architecture and design firms in Australia, based in Cairns (Lane, Lane, & Greenop, 2018). The firm is entirely Indigenous owned (Indij Design, n.d.) and has completed projects for both Indigenous and non-Indigenous clients (Lane, Lane, & Greenop, 2018).	Futuna Chapel in Wellington, New Zealand, was designed by Māori man John Scott to symbolise ‘integration of European and Polynesian culture’ (Gatley & McKay, 2018, p. 608). The exterior of the building is connected to traditional Māori constructions. The building has won a large number of architectural awards (Wellington City Council, 2015).
Fashion	Historically, Indigenous patterns and symbols have often been appropriated by non-Indigenous designers, but there is a growing trend in favour of Indigenous designers drawing on their traditional culture (Allaire, 2018). Both types of use reflect commercial applications of IK.	Magpie Goose is a non-profit fashion label based in Sydney that sells screen-printed Aboriginal fabric clothing (Vanovac, 2017). Fabrics are designed in the Top End by Aboriginal designers, and manufactured in Sydney (Broadsheet, 2018).	Urban Outfitters , an American multinational corporation, released a Navajo line of clothing in 2001, ‘inspired’ by the designs of the Native American Navajo Nation (Woolf, 2016). After Navajo Nation sued for use of its trade mark, Urban Outfitters provided an undisclosed settlement, and entered into a supply agreement with Navajo Nation (Woolf, 2016).
Homewares	Indigenous designs have also been used in the production of homewares, such as furniture and crockery.	Bulurru Australia produces homewares using designs based on Indigenous art (Bulurru, 2016). Artists are paid royalties for their designs (Bulurru, 2019).	Sabina Hill is a Canadian design label creating interior wares and limited edition furniture (Sabina Hill, 2019). The works aim at ‘integrating First Nations motifs with contemporary furniture designs’ by collaborating with First Nations artists, who are paid for their participation (Watson, 2004, p. 162).

Note: Further examples of Indigenous fashion and homewares are given as case studies.

Chapter 4 of this Report provides further case examples, including one of an international high-end fashion company, Kirrikin (meaning ‘Sunday’s best clothes’), which has experienced a 400 percent increase in sales between 2014 (\$250,000) and 2017 (circa \$1m) (Sinclair, 2017). Kirrikin was established in 2014 by Wonnarua woman Amanda Healy, as a social enterprise selling luxury resort wear featuring contemporary Australian Indigenous Artists to Europe and US (Kirrikin, 2019). In return, the artists share in profits and Kirrikin contributes, as an example, towards revitalisation of the Wonnarua nation’s language (Kirrikin, 2019).

4.7 Research and education

Australian National Travel Association (ANTA) historically linked IK with both education and tourism in the long-running magazine, *Walkabout*. Indeed, ANTA engaged in a rather self-conscious use of an educative discourse which promoted ‘travel as the fifth pillar in the national education system, after the mainstays of school, church, library and museum’

(Barnes 2010: 33).⁵¹ As the name of the publication implies, *Walkabout* included numerous features on Indigenous culture and knowledge which ANTA sought to use to promote Australia to both an international and domestic audience. This educative material was almost exclusively from a non-Indigenous perspective and was vicarious consumption of Indigenous culture, but clearly added some value in education forums as well as in Australia's brand within tourism.

In addition to being used within the educational system, IK has also been applied in a number of fields of research, including:

- Anthropology, which has been criticised for failing to properly value IK (Sillitoe, 1998);
- Linguistics, including extensions to Aboriginal-language apps and other teaching (Korff, 2019); and
- Philosophy, especially the contribution of Indigenous ways of thinking (Amarena, 2014).

IK has also been used to impart knowledge through education systems. At the tertiary level, Universities Australia (2017) committed to having plans for all students to encounter and engage with Indigenous cultural content by 2020. At the secondary and primary levels, IK has been integrated into the Australian curriculum as a cross-curriculum priority (Nakata, 2011), and the Australian Curriculum, Assessment and Reporting Authority (ACARA) has developed 95 'elaborations' to demonstrate using concepts from IK to convey aspects of the Australian school curriculum (ACARA, 2019).

A commercial example includes the CORE cultural awareness program which is sold to various universities throughout Australia and is available to every Australian Government Agency (AIATSIS, 2018). The sales and licensing, which are held privately, may give an indication of the market value of these educational programs and suggest that at least one third of materials reviewed in the CORE program could be attributable to IK (see Chapter 4).

4.8 Culture

IK has often been commercially applied to cultural goods. Although these cultural goods are often produced by Indigenous individuals, there is also a significant share of the cultural market producing 'inauthentic' Indigenous cultural goods. These inauthentic goods typically involve the use of IK by non-Indigenous individuals without necessarily providing a benefit to Indigenous peoples (House of Representatives Standing Committee on Indigenous Affairs, 2018).

The commercial application of IK to cultural goods includes:

- The display of Indigenous traditional and contemporary artworks in galleries, both those specialised in Indigenous art and those displaying multiple forms of art (Altman, 2005);
- The sale of Indigenous traditional and contemporary art in art and consumer markets (Altman, 2005);
- The use of Indigenous music, extending to both traditional music, and modern forms of music (Minestrelli, 2017);
- The exhibition of Indigenous dance techniques, such as at Bangarra Dance Theatre (Bangarra Dance Theatre, 2019).

⁵¹ The magazine ceased publication in 1974.

- Theatre such as Ilbjerri Theatre Company in Melbourne and Yirra Yaakin Theatre Company in Perth (Korff, 2018b).
- Films directed and starring Aboriginal and Torres Strait Islander people (O'Reilly, 2018)
- Digital and emerging technologies – (Collisions and Indigital and see Korff 2019)

Although the natural instrument for the protection of IK in culture is copyright, there may be room to use trade marks to protect some cultural goods (Janke & Sentina, 2018, pp. 46-47). Legal obligations can also be established by the contractual framework behind production and collaboration and for design products patents can be used (Curtis, L. 2019. Pers. comms).

Unfortunately, there is little known about the value of the market for fake Indigenous art with current data being poor or non-existent (House of Representatives Standing Committee on Indigenous Affairs, 2018, p. 73). This market value could be mirrored through estimates from values and growth of non-Indigenous art (or the value of programs that are of interest to the general population e.g. ABC TV, 2019). For example, the Federal Court of Australia recently found that Birubi Art misled consumers over fake Indigenous Australian art, selling over 18,000 boomerangs, bullroarers, digeridoos and message stones which were made in Indonesia between July 2015 to November 2017 using words such as 'genuine', 'Aboriginal Art', and 'Australia' (Zillman, 2018). The pecuniary penalties imposed for the contraventions of the consumer law were \$2.3m (ACCC v Birubi Art Pty Ltd [2019] FCA 996). The ACCC referred to the negative consequences, including consumers paying a higher price than they otherwise would have had they known the items to be inauthentic, and the impact on competition for authentic art or souvenirs (i.e. less demand). Another example involved the breach of copyright, though outside IP Australia's jurisdiction, where damages were awarded of \$1,500 per artwork, totalling \$12,000, plus additional damages of \$70,000 (Milpururru v Indofurn Pty Ltd [1994] FCA 1544).

5. Conclusion

As this chapter has shown, the value of IK has been addressed in a number of piecemeal, direct and indirect ways across the literature. This chapter appears to be the first attempt to bring these perspectives together in a synthesised whole, focusing on designing an approach to the market valuation of IK through the use of IP instruments including patents, trade marks, licenses, geographical indications, plant breeder's rights and copyright.

Understanding that IK is one subfactor⁵² among multiple factors of production which determine the final market value (price) of a given good or service is important so as to accurately attribute value to IK. Without considering all subfactors and their parent factors of production, the attribution of IK is likely to be overestimated (or underestimated where it is ignored). However, WIPO argue that intangibles (which includes IP) make twice the contribution, at 34 percent, to the final value of innovation goods and services compared to tangibles, though labour provides the greatest contribution of all at 51 percent.

General approaches to valuing IK include those undertaken to value Indigenous business in Australia and overseas. The accounting profession standards only allow for identifiable IK as an intangible asset to be included in the accounts of an entity; non-identifiable IK cannot be included. This exclusion leaves considerable difficulties for business development and investment in IK which is not currently captured through the IP instruments listed above.

⁵² A subfactor is a sub component of the main factors of production. As noted in this paper, IK sits both within labour (NIIP) and capital (IIP).

Greenhalgh and Rogers (2007a, b) provide a starting point for a production function approach to the valuation of IK.

There are numerous studies of industry subsectors in Australia and overseas where IK plays a critical role, but it is not appropriate to attribute all the value of these industries to IK because, as we stated at the outset, IK is one of many subfactors to consider in the production process. The IK attribution problem remains a key issue to solve in developing an appropriate methodology for estimating the market value of IK.

With regards to the commercial use of IK, IK has been and is used in a wide range of contexts. Although there is a substantial existing literature documenting this use, attempts to estimate a market value of IK appear to be non-existent. These approaches however, do provide some inklings of how market value for IK could be estimated but data is typically limited, held in private locations or would have to be sought-out through interview or survey which is beyond the scope of this project. IP instruments provide insight into the commercial value that IK contributes in the production and final value of goods and services.

Overall, in the interests of having some number rather than no number, a production function approach may help to estimate the market value of IK now and in the future. However, the attribution problem of IK in any given market context would need to be assessed in detailed case studies along with the additional costs of any necessary and supplementary surveys and interviews, including the possibility of a choice experiment.

4. The difficulties of estimating market values for Indigenous Knowledge: evidence from a range of Australian case studies

Stratton, J., Blackwell, B., Hunter, B. & J. Hunt

Chapter summary

This chapter reviews a number of case studies where Indigenous knowledge (IK) is used in the production and delivery of a range of goods and services. The review of the case studies is undertaken to identify specific market values, consider the attribution of IK to these values, and identify what data would be required to ultimately estimate the market value of embodied IK. Market values are significant and vary by good and service type and the industry in which they are supplied. Recommended IK attribution varies from between 1.7 percent in the case of furniture manufacturing to 28.5 percent in the case of heritage protection. There are significant values resting with the embodied IK of Indigenous Protected Areas and associated ranger programs, commercialisation of plant species, cultural education programs, Indigenous traditional healing and Kirrikin and Koskela fashion and homeware design. Embodied IK is *sui generis* in nature across this range of goods and services and further forensic work using case-specific financial accounting information is needed to have greater reliability over the interval for attribution of IK in any given setting. In contrast to the microeconomic-style assessment presented through these case studies, future research opportunity may exist in a macroeconomic assessment of the market value of IK now and in the future. However, the *sui generis* nature of IK, as presented in the case study analysis from this chapter would need to be accounted for in such research.

Introduction

This chapter builds on Chapter 2 of this Report on developing a methodology for IP Australia on the current and future market value of Indigenous knowledge (IK) (IP Australia 2018e). Chapter 2 reviewed the instruments available to help capture IP with a view to their applicability to capturing the value of IK. In contrast, the goal of this chapter is to drill-down into a number of cases where IK is critical to the development of new business opportunities, to help provide guidance on the market values associated with the business, the attribution of these market values to IK, and data that would enable such valuation.

IK takes many forms, but is typically shared and non-rival within a particular group or community (Hunter and Blackwell 2019). Non-rival means that the good or service can be used without impinging on the utility gained by other users (Musgrave and Musgrave 1989). IK is not necessarily shared with all Indigenous peoples and is likely to be shared within a relatively small group of Indigenous people. For example, the Kimberley Aboriginal Law and Culture Centre (which represents traditional owners) has registered a Wandjina figure as a trade mark since 2015 but Wandjinas have different representations for various peoples. It is culturally inappropriate for one people in the Kimberley to paint the Wandjina from another people's country (O'Rourke and McLennan 2019). The creation of Wandjinas is allowed by artists from that country (Mowanjum Art and Culture Centre, n.d.) but it is a significantly copied image by non-Indigenous people (see Wandjina in the Whispering Stone, Arts Law Centre of Australia, 2011). Because of these public good qualities, IK is difficult to value, though we argue it is not impossible to ascribe some value to it.

As discussed elsewhere in this report, there are many factors of production in producing goods that are valued by the transactions in the market: the basic categories being land, labour and capital. IK could be conceived as a form of human capital that requires a return

like all the other factors to ensure investment and maintenance (Throsby, D. 2019, pers. com. 16 Feb). In some economic frameworks, human capital is thought of as an intangible asset that can be valued when either the IK or the goods or services produced by that IK are traded in the market. However, the attribution of value to IK depends on the relative contribution of the intangible assets associated with IK (perhaps including 'good will' associated with a business), other intangible assets associated with other agents, and tangible assets (such as land, fixed assets and working capital).⁵³ In order to provide a clear illustrative example, we assume that others do contribute intangible assets and that tangible assets also make a contribution. To the extent that such assumptions hold, the value attributed to IK will tend to be on the low side.

To date we have not found any literature which specifically values IK in monetary terms, either in markets or through IP instruments (Hunter and Blackwell 2019). This paucity of literature is explained in part by Bodle et al. (2018) who argue that the Australian accounting standards are sufficiently restrictive to not allow businesses to value the IK as intangible assets on their balance sheets, while at the same time businesses incur an expense from creating and using this IK to deliver their goods or services to the market. These standards, as they currently sit, restrict these businesses from leveraging further investment into the market value from their IK.

However, IP Australia and other IP agencies across the globe use a range of legal instruments such as patents, trade marks, designs, licenses, plant breeder's rights and geographical indications to help protect and reward the creators of IP innovation. IP Australia (2019) indicates that these rights should be recognised on the accounts and outlines a number of approaches to valuing IP. Similar methods could be used to value IK on the accounts, particularly where the current IP Australia instruments are adapted to meet the objectives of protecting IK. However, as noted above, IK is a little different to the standard western views and frameworks for protection of IP (PwC, 2018; PC 2016).

Drahos and Frankel (2012) investigate whether IP systems can serve the Indigenous innovation system. They conclude that the two are currently incongruent and that this will create a number of pernicious and divisive social and cultural effects with unintended consequences. Instead, Drahos and Frankel (2012) argue for a focus on Indigenous innovation rather than traditional knowledge, the former resulting in a focus on developing market solutions for new and emerging goods and services. By focusing on Indigenous innovation, a series of subsequent questions would naturally follow including, 'How might we intervene in the IP system to increase the bargaining power of Indigenous innovators?' (Drahos and Frankel, 2012, p. 28). That is a worthy goal for future research to ensure that IK receives an adequate return relative to other factors of production.

Similarly, Simpson (2015) implies that it is surprising that policy makers do not more readily invest in the IK developed over tens of thousands of years from our natural resources to create a burgeoning industry of economic activity.

Given the paucity of literature on the market value of IK, by detailing a series of six case studies, this chapter provides insights into whether and how IK could be valued. The case studies also help identify a number of limitations in valuing IK and methods for overcoming

⁵³ Working capital and finance that is used to fund business and projects is a critical limiting factor to economic development (Blackwell and Dollery 2013, 2014; Wills 2018). For this reason, it can be argued that there is a fourth factor of production, called 'finance', that is particularly important in remote and rural settings.

these hurdles to provide estimates. The remainder of the chapter outlines these case studies and the chapter ends with some discussion and concluding remarks.

As per the scope for the overall report, we emphasise that we have only drawn on the literature and situations described therein; we have not undertaken primary field work – field work is suggested as the natural next step in future research. Furthermore, the literature and contexts are continuously evolving and situations may have changed since the original research was undertaken. However, we believe we have covered the majority of the relevant literature and now that this work is done, updating the literature review contained in this report will be relatively easy in future research.

Case study 1: Heritage protection

Indigenous Protected Areas and associated ranger programs

Introduction

Since 1997, the Australian Government has supported Indigenous communities to voluntarily establish protected environmental areas on land and sea managed or owned by Indigenous peoples⁵⁴ (Social Ventures Australia (SVA) 2016). The program now includes 75 Indigenous Protected Areas (IPAs) managing around 67 million hectares of land and water, encompassing 45 percent of the national reserve system (Department of Prime Minister and Cabinet 2018) or around nine percent of Australia's landmass (Geoscience Australia 2019) .

Rangers are typically employed to manage and protect the land in IPAs and common activities include 'burning country, managing feral animals, protecting threatened species and managing tourist visitation' (SVA 2019, p. 13). Land and sea rangers also provide some community services, such as working with Indigenous children in their local area (Department of the Environment, 2015).

Current and future market value

The market value of IPAs and associated ranger programs can be represented by the value of government expenditure on, and other contributions to, those programs. In the 2015 financial year, the IPA program received around \$14.5 million in government funding, and associated ranger programs received \$42.79 million in funding (SVA, 2016).⁵⁵

SVA (2016, p. 10) sampled five 'very different' IPAs 'to provide points of distinction and comparison': Warddeken in the Northern Territory, Girringun in Queensland, Birriliburu and Matuwa Kurrara in Western Australia and Minyumai in New South Wales. These sites vary in geographical area (thousands to several million hectares), degree of remoteness and inaccessibility (very remote and regional), type of climate and country (e.g. desert to wet tropics), whether Working on Country (WOC) funding was included, ranges of income from hundreds of thousands to millions, and dates of declaration from 2009 to 2015 (SVA 2016, p. 11).

On average across these IPAs, government expenditure was around three-quarters of total expenditure, with carbon offset buyers (12%) and NGOs (6%) the next largest categories. The

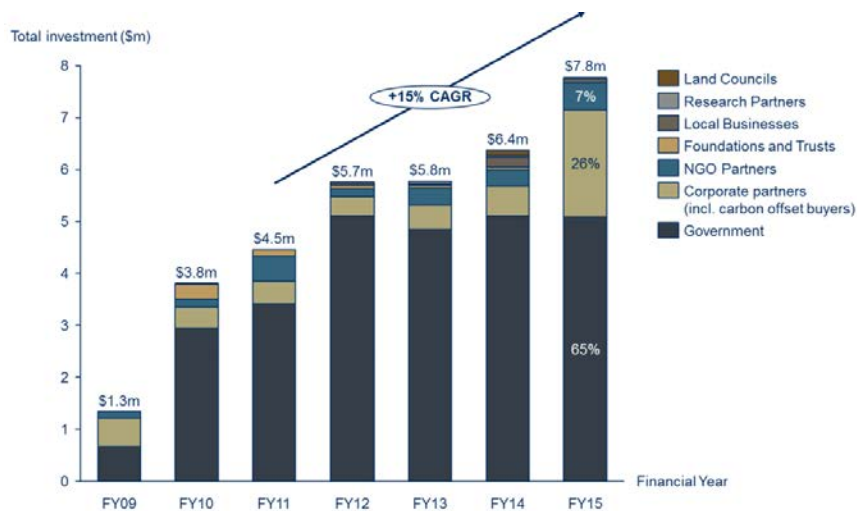
⁵⁴ We use the term Indigenous Peoples to refer to Aboriginal and Torres Strait Islander Peoples, not out of disrespect, but rather for ease of use of two words rather than six. Whenever we use the term Indigenous Peoples, we mean Aboriginal and Torres Strait Islander Peoples unless we are referring to Indigenous Peoples more generally across the globe.

⁵⁵ \$42.79 million is the size of the Government's Working on Country program's contribution to ranger programs in IPAs. This excludes IPAs' contribution to ranger programs within their borders, to avoid double-counting.

five IPAs were chosen to represent the diversity of programs across IPAs. If this composition of funding is representative across all IPAs and associated ranger programs, then the total annual expenditure on all IPAs can be extrapolated to be approximately \$74.5 million.

There is a strong growth trajectory in the IPA program. On the intensive margin⁵⁶, the funding allocated to each IPA has increased: as Figure 4.1 shows, in the five IPAs analysed by SVA (2016), expenditure on IPAs and associated ranger programs grew by 15 percent annually on average between 2011 and 2015 (SVA, 2016).

Figure 4.1: Growth in funding for five IPAs considered by SVA (2016)



Source: SVA, 2016.

Note: The term CAGR in this figure refers to the compound annual growth rate (CAGR) that provides a constant rate of return over a particular time period that facilitates the comparison of revenue growth with other companies in the same industry or sector.

Assuming that the current annual rate of growth continues, and that the rate of growth of the five IPAs studied in detail by SVA (2016) is representative of the growth of IPAs more generally, optimistically, total expenditure on IPAs and associated ranger programs is expected to increase to around \$150 million by 2020.⁵⁷ This estimate assumes that the five IPAs studied are nationally representative and that the growth trajectory (at the intensive margin) in SVA (2016) continues. Of course, these values are subject to the Australian Government’s budget cycle and these budgets can vary from year to year.

There has also been significant growth in the extensive margin, which reflects the number of IPAs. Five new IPAs were announced in 2018 alone (Price, 2018). It would be difficult to forecast the continued growth along the extensive margin, as declarations of new IPAs are discretionary policy changes that may not be easily predicted. However, it should be noted that a further sixteen IPAs are currently listed for development; when these IPAs have been

⁵⁶ Intensive margin refers to ‘how much is produced’ per labour unit. A rise in labour productivity means an increased output per worker, hence an increase in the intensive margin. Extensive margin refers to ‘how many’ labour units are employed.

⁵⁷ Total government funding is \$14.5m + \$42.79m = \$57.29m. From FY2011–2015, government spending was about 76.89% of the revenue of the IPAs studied. (This figure is an average of the government funding levels in Figure 2.1 SVA 2016, weighted by IPA size.). Assuming the IPAs studied are representative, total national spending on IPAs was \$74.5 M in 2015. This is because the \$52.79m above is 76.89% of total IPA spending, so total spending on IPAs was \$57.29 divided by 0.7689 = \$74.51 M in 2015. Applying the CAGR of 15% from 2015 to 2020 (a five-year window), the projected 2020 figure is \$74.51 * (1.15⁵), which is about \$149.86m.

declared, IPAs will cover an area larger than NSW in landmass (Country Needs People, n.d.). For this reason, the future market value of IPAs and associated ranger programs could be higher than suggested by considering the intensive margin alone.

Using an Input-Output Multiplier Model, Allen Consulting Group (2011) estimates the multiplier effects of the Working on Country program, which is one program funding rangers working on IPAs and other land tenures. Allen Consulting Group (2011) consider two types of multipliers: a Type I multiplier, which only considers the production impacts of additional expenditure; and a Type II multiplier, which also considers the effect on household expenditure. Indigenous ranger programs are estimated to have a Type I multiplier of around 1.85, and a Type II multiplier of around 3.43. It should be noted that the growth of ranger programs since Allen Consulting Group's (2011) study could have the effect of changing the associated multiplier, because IPAs are declared in new regions or rangers take up different activities. However, assuming that the multiplier remains constant and that expenditure on IPAs and associated ranger programs have continued to grow at a rate of 15 percent, the 2020 contribution of IPAs to Australian GDP would be between \$275 million and \$512 million, depending on the multiplier used.

Attribution to IK

IK is central to the conduct of IPAs and associated ranger programs. For example, IPAs adopt cultural burning practices based on traditional ways of telling the season, draw on IK to manage species and ecosystems, and rangers lead school groups in discussing traditional ways of caring for country (Department of Prime Minister and Cabinet, 2016).

As a number of management plans for IPAs note, this IK is complemented by Western scientific views of land management as part of a 'two toolbox' approach (Taylor, 2016; NLC Land and Sea Management, 2013; Balangarra Traditional Owners et al. 2011). As Balangarra Traditional Owners et al. (2011) state in their IPA management plan:

Our Rangers have to look after country both ways. The traditional way as our grand-parents told us and the western way. Our Rangers need our traditional knowledge to know when to look for certain animals in country and to find their way around country. The Rangers need the western knowledge when they do fire management, surveys for animals, when they are eradicating weeds or when they are going to forums, meetings and conferences.

There is no publicly available assessment of the split of rangers' and other workers' time between activities that draw mainly on IK and activities that draw mainly on Western scientific knowledge. Some descriptions of IPAs refer, at least rhetorically, to an equal partnership between these two types of knowledge (Department of Sustainability, Environment, Water, Population and Communities, 2012; Ross et al., 2012). Taking these suggestions on face value, an initial estimated 50 percent of the market value of IPAs and associated ranger programs could be attributed to IK as a proportion of total knowledge used.

As noted at the beginning of this chapter, there are other factors of production like capital and land and other labour-related factors other than knowledge. Taking a third of this 50 percent to account for each main factor of production and 25-50 percent again to account for other factors other than knowledge contributing to the value of labour (e.g. once the correct time is chosen for burning, given the signs in seasons and movement of fauna from IK combined with the knowledge of science of burning in obtaining the greatest carbon credit, the burning begins and would continue with manual labour) and 50 percent for other

knowledge results in an attribution of 4.2-6.25 percent. This would provide a conservative interval estimate of IK attribution. To ensure these are not too conservative, these could be double to obtain 8.3-12.5 percent.

For the upper bound however, labour as a whole is typically a large proportion of the provision of services provided to the management of land such as in agriculture (20-30%) and mining (25-35%) (Blackwell and Dollery 2013, p. 387; ABS 2018), although IPAs and Indigenous ranger programs are likely to have a higher relative labour share given the mechanisation of agriculture and mining in recent decades, given their inherent labour intensive nature and remote location. Blackwell and Dollery (2013, pp. 382, 283, 385-387) found a higher premium paid to labour in remote mining locations of around 10 percent of the share of income. Assuming the same for remote IPA management results in an average labour share of 38 percent. Taking 25-50 percent of this labour share to account for factors other than knowledge in labour, and 50 percent again to account for knowledge other than IK results in an upper bound attribution of 9.5-14.25 percent. To ensure we do not underestimate IK, we could double these estimates resulting in a final upperbound of 19-28.5 percent.

In summary, the attribution percentage could range from 8.3 to 28.5 percent.

Data required to activate methodology

The majority of data presently available is from assessments of IPAs and associated ranger programs – see SVA (2016), Allen Consulting Group (2011) and Urbis (2012). These assessments only consider a small number of case studies, rather than considering the full range of programs. They also do not decompose the accounts of running the IPAs and match these to factor share style analyses like Blackwell and Dollery (2013, 2014). Furthermore, our preliminary approach to the attribution of IK requires a degree of caution, since it assumes that the IPA case studies from SVA (2016) are representative. More detailed accounts for each IPA from randomly selecting IPAs may help get closer to a more precise interval of possible attribution percentages. The approach undertaken by Blackwell and Dollery (2013, 2014) for deriving factor shares for remote mining operations from their accounts could be further developed to provide a more precise range of percentages for IK attribution.

Case study 2: Species – IK in commercialising plants

Introduction

IK often directs researchers towards investigating plant species for possible medicinal, scientific or consumption purposes. Where these species are later commercialised on the basis of the recommendation that they be investigated, this represents a market value for IK.

Market value

In a general sense, the market value of the commercialisation of plant species is indicated by demand for products derived from these plants, the price of products sold, and the contribution the plant makes.

A large number of plant species that were traditionally used by Indigenous peoples have now been commercialised. In a quantitative analysis of the patent landscape, Robinson and Raven (2017) compiled a list of 321 plant species with known Indigenous uses; 66 species were mentioned in the title or abstract of a patent in WIPO's database, and more than 1,300 patents were returned. Three specific examples of the market commercialisation value of plant species, are outlined in Table 4.1.

Table 4.1: IK in commercialisation of plant species

Plant name	Market value	Initial attribution to IK
<p>The Kakadu Plum (<i>Terminalia ferdinandiana</i>)</p>	<p>The Kakadu Plum grows in the Kimberley and the Top End of the NT. The fruit from the plum is sold as a snack and used in beauty products, both in Australia and elsewhere (Joint Venture Agroforestry Program, 2006). In 2016, annual production of the Kakadu Plum was estimated at around 5.4 tonnes, and market value was estimated at around \$270,000 (National Resource Management Regions Australia, 2016), although reported prices of Kakadu Plums vary widely (PwC’s Indigenous Consulting, 2017). These estimates of value only consider the value to Australian primary producers of Kakadu Plum, not to companies which process Kakadu Plum, such as US cosmetics company Mary Kay (Janke, 2018a). Arguably, to account for the full market value of the Kakadu Plum, it is this broader measure that should be used, but there are no public estimates available. In the future, the market for the Kakadu Plum can be expected to grow due to recent research suggesting the Plum has antioxidant properties (Williams et al., 2014), and due to its increasing consumption as a novel food (Sultanbawa and Sultanbawa, 2016). The expectation of future market growth is reflected in plans to annually harvest 4-8 tonnes of the Plum in Kakadu National Park (Garrick, 2018).</p>	<p>The Kakadu Plum has been a traditional source of food for Indigenous people in the local area (Janke, 2018a). Although Mary Kay suggested that the use of the Plum in cosmetics was novel, this has been disputed (Robinson, 2010). For this reason, it seems that there is a reasonably large overlap between the commercial uses of the Plum and its known uses by the local community. An attribution to IK of around 34% to knowledge seems reasonable, though this may vary between use in cosmetics and food.</p>
<p>Mudjala Plant (<i>Barringtonia acuteangula</i>)</p>	<p>The Mudjala Plant grows in the wetlands of southern Asia and northern Australia. The plant has cultural significance for the Jarlmadangah community, which approached Griffith University with a view to commercialising the plant (Janke, 2018a). The Jarlmadangah community and Griffith University lodged a patent in 2003 for novel analgesic compounds derived from the plant (Marshall et al., 2013). To date, it appears that the only commercial revenue from the plant has been a licensing of the patent to Avexis in 2008 (Janke, 2018a); the fee charged for the licence could be used to indicate the market value of the Mudjala Plant. However, the licence fee is not currently publicly available.</p>	<p>The Mudjala Plant was commercialised at the direction of Indigenous people based on their knowledge of the plant’s medicinal properties, which suggests that a large share of the plant’s market value could be attributed to IK. The Jarlmadangah community is a joint holder of the patent, in recognition of the contribution of IK to development. For this reason, a 50% attribution to knowledge is suggested.</p>
<p>The smokebush plant family (<i>Cotinus obovatus</i>, <i>Cotinus coggygria</i>)</p>	<p>Smokebush grows in the coastal area between Geraldton and Esperance in WA (Janke, 2018a), and was traditionally used by the Nyoongah People in the area for its medicinal properties (Schiermeier, 2002). In 1993, the US Government’s Department of Health and Human Services filed a patent in the US in 1993 and in Australia in 1994 for the active compound, <i>conocurvone</i>, found in smokebush, able to destroy the HIV virus in small doses (Janke, 2018a). An Australian pharmaceutical company, AMRAD, paid \$1.65 million to the WA Government for research and access rights, and the WA Government reportedly stood to receive over \$100 million in royalties if commercial development was successful (Janke, 2018a). There was no benefits-sharing agreement for Aboriginal Peoples in the local area (Gray, 1997). Because commercial development was unsuccessful, the \$1.65 million initial payment is likely to be the best indicator of the market value of the commercialisation of the smokebush plant.</p>	<p>The smokebush plant family had previously been used by Aboriginal peoples as medicine as a skin cleanser in treating sores, burns or wounds (Verass 2019), but this use was not publicly known before commercial development began, and does not appear to have contributed to pharmaceutical companies’ interest in the plant (Kerr, 2010). In addition, the specific use of smokebush as an inhibitor of the HIV virus, is not directly related to traditional use of the product (Janke, 2018a). For this reason, the share of value attributable to IK may be lower than in the other examples considered in this case study; an attribution of around 20% to knowledge seems appropriate.</p>

Attribution to IK

The proportion of value attributable to IK from the commercialisation of plant species will depend on the extent to which Indigenous people directed commercial researchers to the species (as opposed to commercial researchers independently investigating the species), and whether there were other sources of traditional knowledge that may have contributed to the species being prospected and commercialised (e.g., see the discussion of the combined contributions of traditional Chinese, Japanese and Indian medicines and IK in Robinson and Raven (2017)).

Table 2 in addition to providing the market value of three case studies also outlines our thinking on the attribution of IK to knowledge in the production of these specific cases. Initial estimates of IK attribution to knowledge range between 20 percent and 50 percent. Again, following our approach from case study one, there are at least three factors in the production of goods and services (such as HIV inhibitors): land, labour and capital.⁵⁸ As a result, these percentages can be whittled further by an order of three and then reduced by 25-50 percent because there are other sub-factors contributing to labour in the production of these specialised foods, beauty products, analgesics and HIV treatments, but again the actual mix will vary. Also, these can be further halved because there are other knowledges other than IK contributing to their supply. Finally, we can double these estimates to ensure they are not overly conservative. Making these assumptions means the final IK attribution comes to between 3.3 percent and 12.5 percent. These are lower bound estimates and appear particularly low in the case of the smoke bush where there are some suggestions in the literature as a case of biopiracy (see Janke 2018a, Kerr 2010).

Data required to activate methodology

Although a full survey of the commercialisation of all plants with known uses by Indigenous peoples would not be feasible for the purposes of this study, it does seem possible, using some simplifying assumptions to find the market value of IK in specific cases. Again, as in case study one, being more precise with the allocation of expenditures from the accounts of developing and bringing to market various goods and services which clearly have embodied IK in specific settings would provide a more representative and certain range of attribution percentages. With an appropriately large sample, the market value derived from this exercise could be transferred to IK regarding plants more generally.

Case study 3: Cultural expressions – the Garma Festival

Introduction

The Garma Festival, hosted by the Yothu Yindi Foundation (YYF) representing the Yolngu People, is an annual economic, political and cultural festival held in Northeast Arnhem Land (YYF, n.d.). The festival reached its 20th anniversary in 2018 (YYF, 2018).

Market value

Although there is a significant literature on the Garma Festival's cultural and political significance (Phipps, 2010; Corn, 2013), there is less information available on the Festival's economic and market values. The YYF's 2013-14 Business Plan cites an evaluation of the economic impact of the 2009 Garma Festival on the NT economy by Charles Darwin

⁵⁸ Blackwell and Dollery (2013) argue that there is a fourth factor of production, finance. However, for consistency across all goods and services we have assumed three factors of production in this report.

University (YYF, 2014), but this evaluation is not publicly available, and the Festival may have grown significantly since 2009.

A more direct approach is to calculate the market value of the Garma festival as the sum of the expenditure on the festival by visitors, sponsors, stall-holders and advertisers. As summarised in Table 4.2, primary data were used to estimate each component of market value.

Table 4.2: Components of the Garma Festival's market value

Source	Data used to calculate contribution to market value	Contribution to market value/yr
Ticket sales	Total revenue from ticket sales is not publicly available, but can be estimated reasonably well. Ticket revenue is the product of the number of visitors purchasing tickets and the average ticket price. 2019 ticket prices vary by category, but standard adult ticket price is \$2503.60 (YYF, 2019a). ^a There are generally around 2,500 festival attendees (YYF, n.d.), but this includes individuals associated with the YYF, who do not purchase tickets. A high estimate would suggest that 90% of visitors purchase tickets; a low estimate would suggest that 75% of visitors purchase tickets. These estimates are used to calculate an interval around ticket sales' contribution to market value.	\$4,695,000- \$5,633,000
Sponsorship	A range of sponsorship tiers are available (YYF, 2019b). There is no public list of 2019 sponsors, but the 2018 sponsors are listed in the 2018 Garma programme (2018). Total sponsorship revenue can be found by multiplying the number of sponsors in each tier by the price of sponsorship in that tier, and then taking the sum across tiers. Each sponsorship 'tier' ranges gives a range of levels of support, which gives rise to a high estimate (assuming each sponsor contributes the largest amount that is consistent with their tier) and a low estimate (assuming each sponsor contributes the smallest amount that is consistent with their tier).	\$2,010,000- \$3,245,000
Expo stalls	Prices for stalls vary both by organisation and by stall type (YYF, 2019d). Only 2019 prices are publicly available. Using the 2018 listing of organisations with stalls in the Garma programme (YYF, 2018) gives a high estimate (assuming each organisation chooses the more expensive stall type) and a low estimate (assuming each organisation chooses the less expensive stall type).	\$77,250- \$85,300
Advertising revenue	There are a range of advertisements that can be taken out in Garma's programme (YYF, 2019c). Total advertising revenue can be estimated by multiplying the price in a category by the number of advertisements in that category, and then taking the sum across categories. Although no list of 2019 advertisers is available, the 2018 advertisers can be found in the 2018 Garma programme (YYF, 2018).	\$16,610
Total		\$6,798,860- \$8,979,910

Note: All prices used include GST. There is a lower ticket price (\$1,513.60) for students and a higher ticket price (\$4,128.30) for corporate groups, but no information on the share of visitors in each category. For this reason, the standard price is used.

It should be noted that there are important components to the market value of the Garma Festival that are not included in this calculation, such as expenditure by visitors while on site on Garma merchandise, sales of broadcasting rights and other revenue streams. There are also broader expenditures in the local, regional and state/territory economies from people's

travel to and from the festival. For these reasons, the estimates provided in Table 2 are expected to be lower bound estimates of Festival's true market value and do not include multiplier impacts to the broader regional and national economy.

In 2009, the economic impact on the Northern Territory (NT) economy of the Garma Festival was measured at \$1.417 million by Charles Darwin University with a focus on the expenditures by visitors from outside the NT (YYF, 2014, p. 30). Comparing this impact with the present-day estimate above would suggest that the Garma Festival has had a compound annual growth rate (CAGR) of around 19 percent over the last decade, which suggests a strong growth trajectory.

Attribution to IK

Although the Garma Festival has important political and economic dimensions, it is primarily a festival of traditional cultures. The programme of the 2018 festival suggests that around two-thirds of the activities offered are based on IK, including open air art galleries, guided learning on country walks, astronomy sessions, and spear-making workshops (YYF, 2018). On this basis, a reasonable estimate would be that 67 percent of the Festival's knowledge value is attributable to IK. Again, assuming factors other than knowledge contribute to labour (25-50%) and that this can be reduced by a factor of three to account for the three factors of production.⁵⁹ Also these can be further halved because there are other knowledges other than IK contributing to their supply. If we assume that the only knowledge used at Garma is IK, these adjustments provide an attribution percentage of 3.3-16.8 percent.

Data required to activate methodology

Publicly available information about components of revenue from the Garma Festival allow for a reasonably precise view of its current market value. However, it is significantly harder to estimate future market value, though a ball park estimate would be possible. Gaining more detailed information from the Garma Festival about its recent growth record, and its capacity for further growth, would help illustrate future market potential.

Again like the other case studies through this chapter, obtaining detailed accounting information on the expenditure of monies to all factors of production would help obtain a more reliable attribution to factors of production including IK.

Case study 4: Core cultural learning

Introduction

Core Cultural Learning: Aboriginal and Torres Strait Islander Australia Foundation Course (Core) is an online course developed by the Australian Institute of Aboriginal and Torres Strait Islander Studies (AIATSIS). Core is now available to every Australian Government agency (AIATSIS, 2018), and has also been taken up by some non-government bodies, such as the Australian National University (Australian National University, 2018).

⁵⁹ Again, it could be argued that Garma has a commercial orientation, despite its strong delivery of social and cultural values, a fourth factor of finance could be considered in the analysis. However, for consistency, we simply assumed three factors here.

Market value

The market value for Core cultural learning would consist of the sales and licence fees charged to institutions in return for the use of Core's service. These sales and licence fees are not publicly available.

Attribution to IK

Of Core's ten substantive modules, two are directly related to IK, and another three have some relationship with IK.⁶⁰ On this basis, it would seem that up to 34 percent of Core's knowledge value could be attributed to IK. Again, using a similar metric as the previous case studies, assuming other subfactors making contributions to labour other than knowledge (25-50%), that there are other knowledges contributing (50%) and that labour is one of three factors⁶¹ results in an attribution percentage of 5.7–8.5 percent.

Data required to activate methodology

Sales and price data are required to estimate market value. These data could be requested from AIATSIS. Again like the other case studies through this chapter, obtaining detailed accounting information on the expenditure of monies to all factors of production, would help obtain a more reliable attribution to factors of production including IK.

Case Study 5: Medicine – Indigenous traditional healers

Introduction

Traditional healing remains a significant part of some Indigenous cultures, especially in remote communities (McCoy, 2008). Because traditional healing is intimately associated with Indigenous cultural expression and ways of understanding the cosmos, it represents one source of the market value of IK.

Market value

In theory, the market value of traditional healing practices could be calculated as the product of the number of individuals who use traditional Aboriginal healing, the average number of times they consult a healer annually, and the price (or proxy price where provided gratis) paid per visit.

Although there appears to be some consensus around an average price paid per person per visit (Panzironi, 2013), it would be difficult to estimate the proportion of the population making use of traditional healers, and the frequency of their use. Adams et al. (2015) found that around 2.8 percent of Indigenous cancer patients have used traditional Indigenous therapy, and a similar proportion have visited a traditional Indigenous practitioner. However, it would be inappropriate to use these results to calculate a market-wide estimate of the prevalence of traditional healing methods: there is evidence to suggest that cancer patients are unusually likely to turn to traditional medicine (Damery et al., 2011), and this estimate excludes the possibility of non-Aboriginal people using Aboriginal traditional healers, as is permitted by most traditional healers (Panzironi, 2013). Oliver (2013) reports a survey of Aboriginal primary health care services across Australia which suggests that 32.1 percent of

⁶⁰ Author's estimate based on description of modules in AIATSIS (n.d.).

⁶¹ Again, it could be assumed that a fourth factor, finance, should be taken into account given these educational programs are sold commercially (even though they also provide positive social and cultural outcomes). However, for consistency between our estimates we assume only three factors of production here.

providers offer some form of traditional medicine practice, but this measure does not provide an estimate for the size of providers' programs. In addition, a corresponding study designed to assess the use of traditional medicine outside of primary healthcare facilities failed because of issues in cross-cultural communication and cultural sensitivities for knowledge sharing (Oliver, 2013).

For these reasons, it appears there are currently no immediately available estimates of the market value of traditional healing practices in the literature.

Attribution to IK

Traditional healers' work draws directly on IK (e.g. see Mathibela et al., 2015; Kenyon, 2016; Vandebroek et al., 2004). For this reason, the majority of traditional healers' work can be attributed to IK; an initial attribution of around 80 percent to knowledge seems reasonable. The less than full attribution reflects the fact that there are other components of healers' work that involve partnerships with Western medical experts (Dudgeon and Bray, 2017). Again, accounting for factors other than knowledge contributing to labour at about 25-50 percent, that knowledges other than IK contribute to labour (50%) and accounting for the three factors of production,⁶² the attribution of total market value attributable to IK alone is estimated to be 6.7-10 percent as a lower bound. Common sense however, would suggest that the IK embodied in labour used by the healer in traditional healing would be critical to the delivery of these services. Therefore, a doubling of this estimate may be appropriate – which is equivalent to IK having a predominant occupation of labour (relative to other knowledges and sub-factors of labour). This would provide a range of between 13.3 and 20.0 percent for attributable IK.

Data required to activate methodology

Given the difficulties outlined above, it seems difficult to estimate a market-wide valuation. It may be preferable to contact an organisation with a known association with traditional healers, such as the NPY Women's Council (NPY Women's Council, n.d.) or the Anangu Ngangkari Tjutaju Aboriginal Corporation (ANTAC) (ANTAC, n.d.). The market value of services associated with these bodies would provide some evidence about the use of IK in traditional healing. A macro-assessment of the value of health in the Australian economy, then attributing a proportion for traditional healing and a subsequent proportion for IK, could be an easier way to undertake an assessment of the market value. Certainly, like CORE, these traditional medicine approaches could be protected through IP instruments and should be considered in future research. Gaining access to case based financial account information may help provide a more precise and representative attribution of IK.

Case study 6: Designs – Kirrikin and Koskela

Introduction

Although artworks themselves are generally subject to copyright protection and therefore typically outside IP Australia's remit, industrial designs used in products can be subject to IP Australia's designs protection (IP Australia, 2017a). There is a growing market for Indigenous designs, particularly in fashion (Darwin Aboriginal Art Fair, 2018) and furniture (Todd, 2017).

⁶² Again a fourth factor of finance could be considered but for consistency and simplicity we assume three.

Market value

In general, the value of Indigenous designs will be the average price of a product made, where the produce is the design, multiplied by the total number of such products sold. Where the product uses a design as part of a number of other components, then the value added by the design is the proportion of the price attributable to the design times the total quantity sold.

There does not appear to be any existing assessments of the overall size of the Indigenous designs market. For this reason, this case study focuses on two specific firms: Kirrikin and Koskela.

Kirrikin, a social enterprise founded in 2014 by Wonnarua woman Amanda Healy, sells clothing and swimwear featuring the colours and styles of Indigenous art (Pilat, 2018). The products are both sold domestically and exported, largely to China and Europe (Healy, 2017).

Koskela, a furniture and homewares producer founded in 2000, is a Certified B Corporation using Indigenous-inspired designs (Koskela, n.d. a).⁶³

The market values for these two businesses are outlined in Table 4.3 and are significant in magnitude and growth ranging from \$250,000 per year to \$10m per year with one growth rate being 400 percent over three years.

Table 4.3: Examples of Indigenous design market value and attribution

Firm	Industry	Market value	Attribution to IK
Kirrikin	Clothing and swimwear	Kirrikin reported a turnover of \$250,000 in 2017 (Healy, 2017). There appears to be a substantial growth trajectory: Kirrikin experienced a 400% increase in sales between 2014 and 2017 (Sinclair, 2017).	Kirrikin commissions Indigenous artists to design products in an Aboriginal style (Sinclair, 2017). In addition, Kirrikin is a luxury brand marketing itself heavily on the basis of its use of Indigenous art. Naturally, there are some other components of Kirrikin's production process that do not seem to rely on IK, such as the manufacturing process. Overall, a significant portion of Kirrikin's value could be attributed to IK – an attribution of 50% to knowledge is suggested.
Koskela	Homewares and furniture	Koskela's annual turnover was nearly \$10 million in 2017 (Jones, 2017). There are no publicly available estimates of Koskela's future market potential.	Koskela is a social enterprise with a number of connections to the Indigenous community, including a commitment to spending 1% of sales on projects in Indigenous communities (Koskela, n.d. b). However, it is not entirely clear how much value can be attributed to IK. The majority of products do not seem to be inspired by, and make no reference to, Indigenous design (Koskela, n.d. c). For this reason, a smaller degree of attribution to knowledge seems reasonable; a share of 10% is suggested .

⁶³ Certified B Corporations are social enterprises verified as creating value for stakeholders who are not shareholders, such as their local community (Kim et al., 2016).

Attribution to IK

The proportion of market values that can be attributed to IK will depend on how essential IK is to the design, and the degree to which the design contributes to the value of the product (as opposed to other features, such as its functional use.) As noted in Table 4.4, attribution to knowledge ranges from as low as 10 percent for homewares and furniture design through to 50 percent for women's luxury international fashion design. Again, accounting for the three factors of production, other components of labour factors in addition to knowledge being 25-50 percent, results in an attribution to IK of between 1.25 percent and 6.25 percent. To ensure that our arbitrary estimates are not overly conservative these could be double to come to a final attribution of between 2.5-12.5 percent.

Data required to activate methodology

It seems reasonably easy to estimate the current market value of products that include designs used by Kirrikin and Koskela, but estimating the value add attributable to IK design/s or their future value is far more challenging. As noted in Table 4, Kirrikin showed a 400 percent increase over three years to 2017 and provides an example of business growth resulting, in part, from embedded IK. It therefore shows the greatest promise for estimating future market value. Furthermore, information about future expansion plans could be requested from both firms. In addition, in the case of Koskela, it is difficult to assess the share of products which are designed by Indigenous artists using IK; this information could also be requested. Consistent with all case studies, detailed and specific good financial budgets or accounts could be used to deliver a more precise and representative IK attribution percentage.

Discussion

As these case study analyses demonstrate, there are a number of limitations in estimating the current and future market value of IK with these limitations including:

- incomplete or missing data around market value;
- accounting information that would have to be asked for directly for individual cases from representative organisations (outside the scope of this study) following the approach of Blackwell and Dollery (2013, 2014) to help make an approach to greater precision in the likely interval of IK attribution
- further difficulties in attributing market value to IK as part of total business market value; and
- uncertainty in forecasting how that value will change over time to estimate future market values.

Table 4.4 summarises the case studies and provides some reflections on the implications for measuring market values. Market value is generated in all cases, but sometimes these values are held privately by individuals or even collective groups of people (e.g. education, fashion), and hence are not publicly available or in the public domain.

Table 4.4: Case studies for valuing IK

Case study	Market value	Attribution to IK	Data Sources
1. Heritage protection – Indigenous Protected Areas (IPAs) and associated ranger programs	In 2015, value of government funding was around \$57.3 million. Total market value is greater when accounting for other contributors. Average historical growth rate of over 15 % and evidence for high potential future growth.	Difficult to attribute; but an approximate 8.3-28.5% attribution is suggested.	Existing analyses from Allen Consulting Group (2011), Urbis (2012) and Social Ventures Australia (2016). A more precise estimate would require accounts of expenditure of each IPA to help identify a more precise attribution of IK.
2. Species – IK in commercialising plants	Market value varies by species commercialised; three indicative examples given: Kakadu Plum as snack and use in beauty products, analgesic compounds found in Majala plant, and smokebush <i>conocurvone</i> compound to fight HIV.	Attribution to IK varies between species; for 3 examples: 2.5-12.5%.	Price, quantity and quality data mainly drawn from patent and licence agreements which are not publicly available. Accounting expenditure data is also needed to approach the IK attribution problem.
3. Culture/Tourism – the Garma Festival	Using estimates of the components of market value gives a figure of around \$7.5 million in revenues/yr. The festival has grown significantly over the last ten years and appears to continue to do so.	Based on past programmes, around 3.3-12.5% attribution.	Estimates of market value drawn from past programmes and guides. Few previous analyses of market value, but based on attendance numbers could forecast future values. Detailed financial accounts required
4. Education – Core Cultural Learning	Market value should be straightforward to estimate from sales fees and licence agreements, but data are not publicly available.	Based on course content, around 5.7-8.5% attribution suggested.	Description of course content from AIATSIS (2011) and AIATSIS (n.d.). Price quantity and course types data for market value could be requested from AIATSIS. Detailed financial accounts required
5. Health – Indigenous traditional healers	Value of whole market will be very challenging to estimate because there are a complex range of hurdles and there are currently no estimates in the literature.	Healers directly use IK; 13.3-20% attribution.	May be necessary to contact organisations engaging or with ties to traditional healers e.g. NPY Women’s Council / Anangu Ngangkari Tjutaju Aboriginal Corporation. Detailed financial accounts required
6. Fashion – Kirrikin and Koskela	Market value should be straightforward to estimate from sale and price levels, but data are not publicly available.	Attribution to IK varies between 1.7% and 12.5%.	Public information enables an estimate of current market value, but assessing future market value may require data request from both firms.

Notes: estimates of market value and attribution to IK drawn from the discussion in the main body above.

The attribution to IK across the case studies, noting these tend to be highly conservative and lower bound, are not insignificant and are in the order of two to 30 percent. However, as argued above, these contributions are conservative.

Data sources were found to be dispersed, scarce, not easily accessible, are not always of the same type, and in many cases require further detailed research, including interviews or surveys.

Furthermore, tying down the exact proportion of total value attributable to IK remains a complex task and possibly intractable, however as noted above, all factors of production need to be considered on a case-by-case (*sui generis*) basis. Some goods and services have a public good nature (e.g. IPA and ranger programs) where we argue that only the three main factors of production are relevant, while in the case of commercial goods and services (e.g. plant compounds being used in pharmaceutical applications, Indigenous designed goods), one may argue that the four main factors need to be considered (e.g. land, labour, capital and finance).

For future research, particularly those of a macroeconomic or broad-brush approach to market valuation of IK, the data that IP Australia currently hold with the Office of Chief Economist (2019), is an obvious immediate source – particularly where this can be linked with Indigenous Business ABNs along with suitable IK attribution.⁶⁴ However, the case study analysis presented in this chapter provides important ground truthing and nuance to any macro-level assessment because it provides examples of the *sui generis* nature of the role that IK provides in delivering market returns for the supply of various types of goods and services.

Conclusion

This chapter has considered a number of case studies relevant to assessing the market value of IK. In each case study it was argued that a particular share of the value created through production could be attributed to IK, although the exact attribution suggested varies between two percent (in the case of a manufacturer, some of whose products do not rely on IK much at all) and 30 percent (in the case of ranger heritage protection, who draw directly on IK). Overall, there is significant value resting with the IK embodied in the commercialisation of the examples explored through this chapter, including Indigenous Protected Areas and associated ranger programs, IK in commercialising plants, CORE cultural learning, and Indigenous traditional healing and Kirrikin and Koskela fashion and homeware design. These case studies demonstrate the *sui generis* nature of embodied IK in the provision of this range of goods and services and the need to consider the full set and varying mix of factors used in their production and what percentage IK is likely to contribute. Tying down the IK attribution to a more reliable and precise percentage goes beyond the scope of this study and would require specific accounting information on the allocation of expenses to the full range of factors of production, including those identified as related to IK. Added to this recommendation, undertaking a macroeconomic assessment of the IK contained in the broader economy of goods and services, may present an alternative method in future research, however the case study analyses provide important nuance that would need to be accounted for in such an approach. Such an approach may also prove beneficial in predicting the growth in the future market value of IK embodied in the macroeconomy and the opportunity for IP Australia to support this growth through the modification or adaption of its protective instruments.

⁶⁴ However, just because a business is Indigenous does not mean it uses IK in delivering its goods and services. Likewise, non-Indigenous businesses can use IK to deliver their goods and services. IK may be held by both Aboriginal and Torres Strait Islander Peoples and non-Indigenous Peoples.

5. Valuing Indigenous Knowledge in current and future markets: possible methods and their viability

Authors: Boyd Blackwell, Boyd Hunter, James Stratton and Kaely Woods

Chapter summary

This chapter presents four possible methods for estimating the monetary value of Indigenous knowledge (IK) embedded in goods and services provided in markets. The first method draws from accounting profession guidance on the valuation of intangible assets, combined with an economic production function approach to valuing IK. This approach is particularly suitable to microeconomic needs for IK values such as for the firm's financial accounts and IP portfolio decision making. Within this first approach, the chapter outlines a series of direct questions that could be asked of specific producers, by combining cost and income-based accounting valuation approaches, to help obtain a case-specific and refined measure of the percentage of IK attribution in future research. The second approach involves using macroeconomic assessments of the Indigenous sector in national economies by again making a relatively arbitrary attribution for IK. The assessment is macroeconomic in that it takes into account the broader economic impact of IK on other sectors (e.g., through its impact on aggregate demand and aggregate supply). The third method involves attributing IK to commercial and market values estimated for specific industry sectoral cases. The fourth method surveying people to assess their willingness to pay (demand) for the IK embedded in goods and services. All methods require further research to solve the attribution problem in specific settings. The attribution problem involves obtaining estimates of the percentage of contribution made by IK amongst other competing inputs into production. The fourth method can incorporate IK as a specific attribute to be valued relative to competing attributes. Related to this final method, are the revealed preference methods of travel cost and hedonic pricing which would use econometrics to isolate the contribution made by IK between goods and services of similar types (substitutes) while controlling for all other factors of difference. An additional method involves ascertaining the differential value for IK between the market prices for goods of a similar type but one with IK and another without. This could prove cost effective where data is available to ascertain the differential value attributable to IK. As a research plan, microeconomic studies should begin in earnest, to ascertain the percentage of IK attribution in sectoral contexts. Once a sufficient number of sectoral attributions can be estimated, then macroeconomic assessments can begin. These suggested approaches are not without limitation, particularly given the complex communal nature of IK and the need for socially contextualised valuations. Consulting with Indigenous peoples in this regard would be necessary.

1. Introduction

This chapter presents four possible methods for estimating the monetary value of Indigenous knowledge (IK) embedded in goods and services provided in markets. The economic nature of IK is complex and context dependent and can take on the various forms of quasi-private, quasi-public goods. Table 5.1 outlines a simple matrix to explain the four main types of goods or services in economics. In a traditional peoples' context such as in any given Aboriginal and Torres Strait Islander community setting, IK especially exhibits club good characteristics (cell 2 in Table 5.1), shared (excludable) amongst the members of a specific group in the community and non-rival – even a group size of one or a few. Where the knowledge is shared with the entire community it exhibits the traits of a pure local public good (cell 4 in Table 5.1) – non-rival and non-excludable – being shared amongst all the members of the community. Where IK is used by the producers of a good or service, it can command an additional premium value as noted in Chapters 2, 3 & 4 of this Report.

Table 5.1: Economic four good matrix

	Rival	Non-rival
Excludable	Private good (1)	Club good (2)
Non-excludable	Open access common property (3)	Pure public good (4)

‘For knowledge itself is a power whereby he knoweth’ (Bacon & Montagu, 1825, p. 219) and the beholder then determines how that knowledge is used to provide benefit (or detriment) to themselves or others. How the knowledge is shared or not shared (others are excluded) including whether it is protected, such as through the western institutions of IP instruments, comes within the beholder’s power. In Indigenous cultures, cultural processes and norms guide the transmission of IK including selection of people to whom it can be transmitted. People can also steal knowledge without free, prior and informed consent (FPIC) from the creators or custodians of it, which is considered unethical (Gupta, Gabrielsen, & Ferguson, 2005); such behaviour, rather than creating an engine for economic opportunity (Breidlid, 2009; Dockery, 2010; Radcliffe & Laurie, 2006), can create social, cultural and economic turmoil for generations to come. FPIC is a norm in a full range of industries including mining (for a discussion of the latter see Blackwell and Fordham, 2018).

A complicating factor for this study is that market value takes a broad definition including any transaction where money changes hands and can extend to transactions where government, NGOs or community groups are parties. Such a definition goes beyond the narrow view of a market being in the private sector. This broader definition naturally includes elements of complex social goods, overcoming to some degree the tendency for simple individual goods (through conventional IP instruments) to crowd-out these complex social goods (Stoeckl et al., 2018).

As articulated in Chapters 3 and 4 of this report, there is a large literature on IK and some initial attempts to estimate the value of goods and services which rely on the use of IK have been estimated. However, there is no documentation of the economic value of IK or the market value of IK contained in IP instruments *per se*. There is however a vast grey literature on valuing IP generally (e.g. Antonipillai & Lee, 2016; APEC, 2018; Helpdesk, 2015; Shapiro & Hassett, 2005; Stiroh & Rapp, 1998; WIPO, 2010) including a number of key websites (e.g. King, n.d.; Vincents, 2018). These are predominantly centred on individual firm valuation of IP in the financial accounts, with the exception of Antonipillai and Lee (2016) which is based on a broader economic assessment of the contribution to the economy of industries and employment that harness IP, not necessarily a value for the contribution made by the IP itself.

There is also an accompanying formal literature on valuing IP. Greenhalgh and Rogers (2007b) state that the value of IP can be measured using a production function. In a related study, Greenhalgh and Rogers (2007a) find that trade marking adds significantly higher value, by between 10 and 30 percent, to firm value. Trade mark activity ‘proxies a range of other, unobservable, firm-level characteristics including innovation that raise productivity and product unit values’ (Greenhalgh & Rogers, 2007a, p. 2). Interestingly, Hall, Helmers, Rogers, and Sena (2014) find that firms in the majority, for good reason, use a combination of informal measures, like secrecy, as well as formal IP instruments to protect their innovations, with a general leaning to the informal. For example, after the expiry date of a patent,

competitors can simply copy the innovation to gain market share. Munari and Oriani (2011) have an edited collection of book chapters, *The Economic Valuation of Patents: Methods and Applications* in various contexts including patent portfolio management, licensing agreements, litigation, and accounting and finance. They identify that there are qualitative and quantitative measures of the value of patents, though for this chapter, the latter is our focus, with monetary value being the sole focus. These methods for monetary valuation, which are not mutually exclusive and should be used to provide comparison and contrast include: cost, market, income, real options and rule of thumb approaches as outlined in Table 5.2.

Table 5.2: Methods for valuing IP instruments

Name	General approach	Considerations
Cost approach	Quantify costs of obtaining IP instrument by internal development or external acquisition	Variants include historical accounting costs, optimised replacement or reproduction costs No correlation between costs of creating IP instrument and benefits that flow
Market approach	Value obtained by secondary sale market for comparable IP instruments	Market for IP instruments is not yet well organised, nor transparent making estimation difficult
Income approach	Value of discounted cash flows from the IP instrument over its economic life	Variants include incremental income analysis, the residual value method; the relief from royalty method; and profit-split analysis While it takes account of risk and time, accurate forecasts of incremental cash flows are less likely
Real options approach	Captures value embedded in the flexibility of IP instruments under high uncertainty	Most sophisticated and advanced of methods Analogous with financial security options and methods used to value these Hurdles remain in transferring methods from financial options markets to IP instruments
Rules of thumb	These are bench mark estimates that are used to value IP	Used in IP instrument licensing or damages No theoretical rationale or justification

Source: Adapted to IP instruments generally from a treatment of patents by Munari and Oriani (2011, pp. 14-16)

Munari and Oriani (2011, p. xi) also identify that

...the rigorous assessment of the economic value of patents and the identification of patent value drivers still represent key challenges for inventors, entrepreneurs, managers and external investors. Indeed, in spite of the growing awareness of the role of patents innovation development and business success, the issue of patent valuation is still affected by several specific problems, linked to the lack of generally accepted methodologies for the valuation, the difficulties of understanding the potential commercial value of the underlying technologies, the high level of uncertainties characterising the valuation and the need to involve a combination of economic, legal and technical considerations.

The value of an IP instrument of course that may cover IK (or technology) is in addition to the value of IK (or technology, as noted by Munari and Oriani, 2011) itself, that is, the IP instrument adds value to the value of IK by protecting it. Thus, approaches to valuing IP, even where the IP protects IK, do not necessarily direct us to an appropriate method or measure of the value of IK.

Furthermore, the paucity of literature on discrete measures of the value of IK embodied in goods and services in markets is ultimately because of what we have coined the 'attribution problem'. This is the problem of being able to reliably ascertain the proportion of total value of a good or service that is attributable to the IK that was used to deliver the good or service to market. Tying down the attribution of IK requires a deep and thorough appreciation of all the factors of production that go into making a given good or service and a forensic identification of the contribution that each factor makes. Some people may argue that the attribution problem is what makes estimating the market value of IK intractable – a mission impossible! The danger however of not attributing some value to IK is that it could be overlooked and not considered in decision making about the development and delivery of goods and services to market, not giving due consideration to the appropriate governance of the use of IK in society. Indeed, Towse (2010) identified the problem with attributing the value to the economy from creativity through copyright.

Given this background, this chapter addresses two salient research questions: 1) *What are the main methods that could be used to estimate the market value of IK?* 2) *Of these methods, and given current data constraints, which of these methods are most viable?*

In order to answer these questions, this chapter reviews the viability of four main approaches to the market valuation of IK:

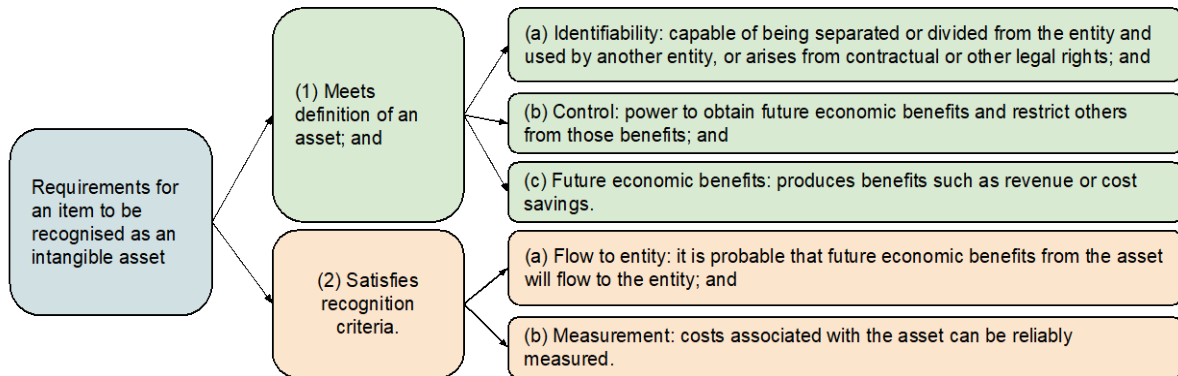
- Approach 1: Accounting Standards and the Valuation of Intangible Assets
- Approach 2: Valuations of Indigenous Business Sector
- Approach 3: Valuation of the contribution to a specific sector
- Approach 4: Assessing willingness to pay by surveying affected people

The remainder of the chapter consists of six sections. Sections 2-5 cover the above four approaches. Section 6 further assesses these approaches in the context of the above criteria, particularly with a focus on data. The chapter ends with a discussion of the key methodological considerations coming from this review and the chapter ends with some concluding comments.

2. Approach 1: Accounting standards and the valuation of intangible assets

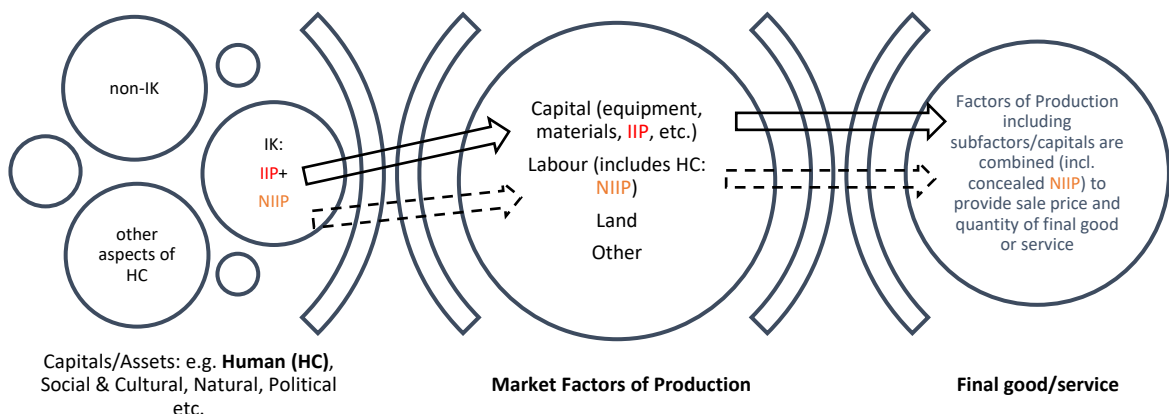
IK is indeed an intangible asset and as noted by Chapter 3 of this report can be further divided under the Australian Accounting Standards AASB138 Intangible Assets (see Figure 5.1) into identifiable and non-identifiable assets through a production function approach to valuation. Such an approach would be a cost-based approach but then apportioned according to the demand or income for the final good as depicted in Figure 5.2.

Figure 5.1: AASB138 Accounting Standard Requirements for Recording of Intangible Assets.



Source: Chapter 2 of this Report

Figure 5.2: Factors of production in the supply of a good or service, including IK



Notes: IIP=identifiable intellectual property, NIIP=non-identifiable intellectual property. IIP is formally costed in the accounts of the supplying organisation, while NIIP is not likely to be costed and may not be realised until the good/service is sold but its separate value is concealed in the congealed final price of sale of the good/service.

Source: Chapter 3 of this report.

This approach could be adapted through interviews and survey work in given contexts to establish the range of possible percentages of attribution given to IK amongst the range of other competing inputs into the production process. For example, when combined with surveying people’s stated preferences (SP), as per Approach 4 (Section 5), producers and their accountants could be given a sheet to identify the value or likely percentage that each factor of production provides in the cost and final price of the good or service. Box 5.1 provides an example.

Box 5.1: Example of set of questions provided in an interview or survey for a particular type of good or service

a. What is the **main good or service** you provide through your business?

..... (please state)

b. What is the **typical unit** of this good or service?

..... (please state)

c. How many units are typically sold **per year**?

..... (please state)

d. What is the typical **unit price** of this good or service when it is sold in the market?

..... (please state)

e. What **percentage of contribution** do you believe that IK makes to the **final good's price**? (Please circle your best guess at the percentage)

0-10% 21-30% 41-50% 61-70% 91-100%
11-20% 31-40% 51-60% 71-80% 81-90%

f. What **percentage of contribution** do you believe that IK makes to the **final good's quantity** sold?

(Please circle your best guess at the percentage)

0-10% 21-30% 41-50% 61-70% 91-100%
11-20% 31-40% 51-60% 71-80% 81-90%

g. Please indicate the **value** and/or **percentage** that the following inputs provide in producing a unit of the main good or service that you provide through your business?

Input	\$ cost/unit	Percentage of cost/unit
Labour		
- IK & skills (i.e. not covered by an IP instrument)		
- Other knowledge & skills (which may include scientific knowledge)		
- Other labour factors		
Land		
Capital – equipment, tools, machinery, assets etc.		
- Non IK Equipment etc.		
- IK equipment e.g. identifiable IK e.g. IP instruments containing IK		
Finance		
Other factors not included above (Please state)		

While such an approach is not without some hurdles, the questions above provide a starting point for designing a suitable questionnaire to investigate the attribution problem further.

3. Approach 2: Valuations of the Indigenous business sector

Table 5.3 summarises three studies from Australia, New Zealand and Canada, colonised countries, that estimate the contribution that the Indigenous Business Sector makes to their national economies. The table shows the approaches used, the types and measures of economic value estimated and the overall percentage of contribution to the national economy. PwC (2018) suggested that Australia develop an Indigenous Business Number (IBN) to help identify Indigenous Business within the Australia economy amongst those with an Australian Business Number (ABN). This is not without its problems (See Chapter 3 of this Report). Te Puni Kōkiri (2013) identified the need for official Maori statistics to be recorded by the responsible statistical agency so as to improve the accuracy of the contribution of Maori enterprises to the national economy. Over and above the other studies, Te Puni Kōkiri (2013) also assessed the asset base and net household savings to provide a broader assessment of the economic wellbeing of Maori enterprises in New Zealand. Unlike the Australian and New Zealand studies, the Canadian study included the government sector in their assessment of the contribution of the Indigenous sector. As can be seen from the sixth column in the Table, the percentage contributions in Australia are below those in Canada with New Zealand's contributions being the greatest.

Table 5.3: Contribution of the Indigenous business sector to the national economy

Source	Location, population	Approach	Economic value	\$ value, billions	% of national income	Issues
PwC (2018)	Australia, Indigenous business	GDP Value Add	Income	AUD 2.2-6.6	0.1-0.4%	Including non-Indigenous employees, IBN or identification of Indigenous businesses
Te Puni Kōkiri (2013)	New Zealand, Maori enterprises	GDP Value Add	Production, income & expenditure	NZD 11 NZD 16 NZD 18	6% 8% 11%	Need official statistics as well
		Market	Asset base	NZD 43	6%	Wellbeing is broader concept
		Household = income - expenditure	Net Savings	(4)		
Gulati and Burleton (2015)	Canada, Aboriginal economy	Total = business + households + government	Income	CAD 31	~2%	Includes government sector

While these studies present the contribution made by the Indigenous sectors to their national economies (for more detail see Chapter 3 of this report), there is no attribution made for IK. Therefore, these macroeconomic-style analyses could be used to then estimate the proportion of economic activity from Indigenous business that is attributable to IK. However, IK can be used in non-Indigenous businesses as well, so adjustments or recognition of the limitations of this approach would need to be made.

As noted in the introduction, a similar study has been conducted in the United States, but for the contribution that IP intensive industries make to the national economy, rather than the

contribution of IP itself, again a similar type of attribution problem to that of IK. Moreover, as noted in the introduction, IP instruments add value to an innovation above the actual value of the innovation *per se* (Munari & Oriani, 2011) and therefore do not represent the value of the innovation or embedded IK. Given these additional complexities, attributing the percentage of IK across sectors of the economy relying on the microeconomic case inquiries of the style briefly outlined in section 2, could help address the attribution problem and go some way in allocating a more refined or ‘true’ measure of contribution of IK to the various sectors of the broader national economy.

4. Approach 3: Valuation of the contribution to a specific sector

There are a range of studies from the literature that include the valuation of a specific sector for which there is an obvious, though not accounted for, link with IK. Syntheses of these studies are documented in Chapter 4 and with case specific and attribution attempts in Chapter 3 of this Report. Here we segregate these into two types: (3.a) Value of sectors in which IK is embedded and (3.b) Case studies where IK is explicitly embedded but monetary values for IK are not explicitly attributed.

4.1. (3.a) Value of sectors in which IK is embedded

Table 5.4 outlines the commercial values of sectors in which it is explicit that IK is important to the production goods and services supplied to the market. However, the studies do not quantify how much of the total value of the sector is attributable to IK. The value of the industries or sectors which explicitly have relied on IK to produce their monetary values include: global genetic and natural resources, USD 500 to 800 billion (including in medicine and health care, USD 43 billion and agricultural seeds USD 15 billion), traditional rice crop varieties in India USD 6.1 billion, bush food in Australia AUD 6-125 million depending on the number of native foods and whether value add is included, Arts in Australia between AUD 100-500 million (with remote art being AUD 53 million), and OECD country pharmaceuticals worth USD 61 billion for plant based medicines sold in 1990 (with global herbal pharmaceuticals of USD 5.1 billion).

Table 5.4: IK embedded in the value of specific sectors

Sector(s)	Author (date)	Region	Methodology	Value (USD) millions
Genetic & natural resources: medicine & healthcare	Daes (1993)	World	Annual market value - upper bound estimate	43 000
Genetic & natural resources	Kate & Laird (2000)	World	All markets for IK: -agriculture (55-60%) -pharmaceuticals (15-19%) -biotechnology (12-15%)	500 000-800 000
Genetic & natural resources agricultural seeds	Posey (1990)	World	International seed industry	15 000
Traditional rice crop varieties (landraces)	Evenson (1996)	India	Use and value of landraces contribution to India’s rice yields	6 100
Bush food	Robins (2007)	Australia	Sum of farm gate and value add	AUD 14
	Foster & Bird (2009)	Australia	Farm gate value 11 native foods	AUD 6.28

	Clarke (2012)	Australia	Gross value at farm gate Covered 13 native species Value Add could be 5 times this interval	AUD 15- 25
Arts	Myer (2002)	Australia	Total Indigenous arts & crafts: Indigenous individuals receive \$50m	AUD 200
	Altman, et al. (2002)	Australia	Indicative only, limitations	AUD 100-300
	DesArt (2007)	Australia	No methodology provided	AUD 200-500
	Woodhead and Tucker (2014)	Remote areas of Australia	Estimate based on surveys of artists, both in Art Centres and freelance	AUD 52.7
Herbal pharmaceutical products	Market Research Future (2018)	World	Not provided	5,100
Pharmaceuticals	Principe (1998)	OECD countries	Market value of plant-based medicines sold in 1990 ^a	61 000

Notes: See Table 3.2.

Source: Trimmed from Chapter 3 of this report.

While in Australia there has been a focus in the literature on the commercial value of bush foods, the significantly larger global commercial markets for genetic and natural resources and pharmaceuticals could be lucrative for identifying and quantifying the embedded IK. As for approach 2, this would require that the attribution problem be solved with some well-designed case specific studies, including surveys as per Box 5.1 of Approach 1 in Section 2.

4.2 (3.b) Case studies where IK is explicitly embedded

Table 5.5 outlines the areas where IK is used to provide commercial returns through a description in the literature of the importance of IK in the production of their goods and services. It also provides an indication of those IP instruments which are used in these sectors. As noted in Chapter 3, confidential information and trade secrets including the use of non-disclosure agreements as instructions also allow for protection of IP and thus could help protect IK.

Table 5.5: Major commercial uses of IK, IP instruments and indicative IK attribution

Field	Summary of contribution of IK	Directly relevant IP instruments to protection of IK	Conservative initial IK attribution percentage ^a
1. Natural and genetic resources	IK around the properties and processing of natural and genetic resources widely used in medicine, cosmetics and food industries	Plant breeder's rights, patents, requirement for benefits-sharing agreements	Low (3.3-12.5%)
2. Healthcare and medicine	IK in production of traditional medicines and use of traditional healing practices	Patents, trade marks	High (13.3-20%)
3. Bush food	IK in production of traditional foods	Patents, trade marks, copyright	Requires further research
4. Environmental management and preservation of biodiversity	IK in environmental services delivered by Indigenous and non-Indigenous Peoples	Patents, trade marks.	High (8.3-28.5%)
5. Tourism	IK in marketing of goods and services to domestic and international tourists.	Trade marks, copyright	Medium (11.2-16.8%)
6. Designs (architecture and construction, fashion, furniture etc.)	IK used in designs in a variety of industries.	Designs, copyright	Low (1.7-12.5%)
7. Research and education	IK in research methodologies, or in imparting research to students.	Patents, copyright	Low 5.7-8.5%
8. Culture	IK in traditional and contemporary cultural expressions	Copyright, trade marks	Related to 6 and 7 above

Note: Given the number of assumptions needed to generate these estimates, the results are expressed in ranges to ensure that the reader does not wrongly conclude that the findings are in any sense precise. They are at best indicative of being broad contributions of IK to the overall value.

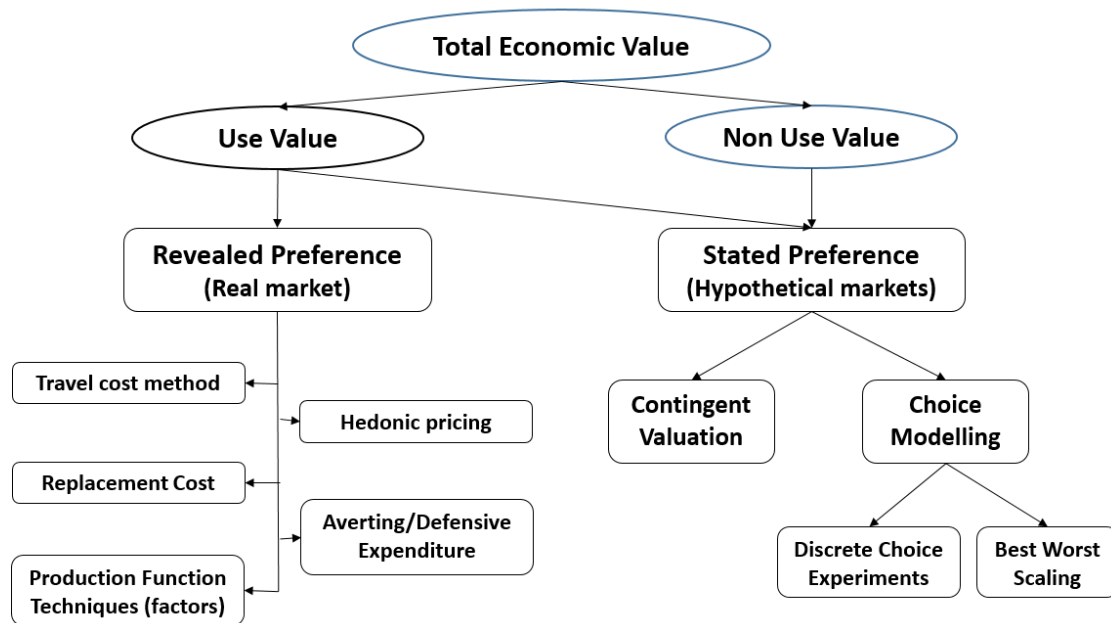
Source: Synthesis of Chapters 3 and 4 of this report. These initial attribution percentages are conservative, hence their descriptions of low, medium and high.

As documented in Chapter 3 of this Report there is no specific attribution of value to IK in these areas of the literature, however Chapter 4 began to quantify the value in specific cases of the sectors concerned and then provided a percentage of possible attribution by accounting for knowledge other than IK being used in the production process and then accounting for other factors of production as well. This involves a whittling of the sector's total value down to a more refined indicative measure of the possible value of embedded IK. Chapter 4 of this Report therefore provides a direct example of how this method could be implemented but with using the information gained through Box 1, this methodology could be refined more on a case-by-case and industry sectoral basis.

5. Approach 4: Assessing willingness to pay by surveying affected people

One group of methods that ascertain people's willingness to pay for a given good or service is called Stated Preference (SP) methods. SP methods involve the researcher asking respondents about their preferences for a range of situations including their preference for the cost of changing a given situation to one that is preferred. The absence of direct markets for some goods (including IK) requires non-market valuation approaches, including SP techniques, such as choice modelling (CM), to estimate the total economic value of a good or service including its use and non-use values as depicted in Figure 5.3.

Figure 5.3: Cultural valuation approaches



Source: Woods 2019, adapted from Figure 1, Choi et al 2010.

In exploring emerging markets in IK, use and non-use values may be relevant where the preservation of the good requires bounding of the market. The task of valuation may then comprise a specific estimation of the boundaries and resultant value to the producer, as well as a general market evaluation, with the market value determined by the composition of attributes that can be put into the market and the price point(s) that would support it. Such controlling of attributes would be well attuned to capturing the value attributable to IK contained in given goods and services in question.

CM involves asking about preferences between discrete alternatives, which supports more deliberative thinking thereby reducing behavioural biases. The bounded choices in particular reduce hypothetical bias that can result in overstated WTP values in contingent valuation (CV), a method that asks respondents directly their WTP typically using dichotomous choices of prices.

CM evolved from the works of psychologists Thurstone (1927) and Luce (1959) and economists Hotelling (1929) and Lancaster (1966) brought together by McFadden when he applied a multinomial logit model to random utility theory and then applied the model in a transportation study (D. McFadden, 1974; D. L. McFadden, 1974). One of the original

intentions of CM was to help ascertain values for attributes of a new good or service prior to its release on the market such as in marketing and transport contexts (J.J. Louviere, Hensher, & Swait, 2000). It therefore lends itself well to ascertaining the value of particular attributes of goods and services including embodied IK. CM includes techniques variously described as "discrete choice experiments" (DCEs) and best worst scaling (BWS).

CM has developed significantly since that time moving from multinomial logit with clear probabilities to numerical integration with simulation techniques. Its application is well established in transportation, health economics, marketing, environmental economics, political science, engineering, and to a lesser degree cultural economics. Relevant developments in CM include the development of BWS by Louviere and others as an effective means of obtaining high quality rankings in choice sets from small samples (Finn & Louviere, 1992; Flynn, Louviere, Peters, & Coast, 2007; J. J. Louviere, Flynn, & Marley, 2015).

CM, and BWS in particular, could be useful in determining the value of product attributes like embedded IK. A case study using this pre-market CM could also inform estimation of economic value for the product market as a whole.

The application of CM in a cross-cultural context raises particular challenges in terms of relevance and applicability when there are fundamental variations in worldview and value systems among respondents or between the researchers and respondents. In the context of Indigenous viewpoints, BWS has been successfully applied in assessing culturally relevant indicators of Indigenous wellbeing (Yap, 2017). That research involved qualitative and quantitative methods to establish and analyse suitable surveys and instruments that took into account the Yawuru's concept of wellbeing, 'liyan'.⁶⁵ The importance of Yap's research is that it provides one example of how BWS can be conducted in a cross-cultural context. Given the variation in culture across Australian tribes and language groups, BWS may need to be adapted in each local Indigenous context.

Furthermore, CM, and BWS in particular, could be used to test consumer desire for 'authenticity' by including IK as an attribute of a particular class or type of good in which IK is embedded. For example, a case study on bushfoods might have attributes that include use of Indigenous Knowledge, Indigenous production, and a price point (amongst other attributes).

Similarly, using CM could possibly be used to test Indigenous willingness to share IK, although the process by which these decisions are made are more likely to be a joint decision managed by a relevant body – such as a native title organisation - in relation to collection or cultivation of bush foods. Yawuru (2018) have been undertaking cultural mapping work where decisions on what is and isn't shared are made by the collective (Matthews, Dorran, & Parker, 2018), and this could serve as an example.

⁶⁵ Yawuru community from Broome in the Kimberley region of Western Australia.

There are a number of challenges for using CM in Indigenous cultural settings and these could be borne in mind when preparing a choice modelling experiment. Table 5.6 summarises some potential limitations of CM.

Table 5.6: Potential challenges in using choice modelling in Indigenous settings

Challenge	Issues
1. Eliciting individual valuation responses from Indigenous people	-lack of substitutability between goods -the property rights regime perceived by the respondent - low satiation limits for some Indigenous people
2. Aggregating responses of Indigenous people	- the cultural diversity of Indigenous groups -the different cultural and political decision-making system in Indigenous communities -gender, generational and other demographic effects on values attributed to cultural heritage
3. Aggregating Indigenous and non-Indigenous responses	-the use of different numeraires to value cultural heritage -systematic differences in income levels -differences in political structures and law

Source: Adapted from Adamowicz et al. (1998)

Note: These challenges were identified in the context of NRM and may not be generalizable in other contexts faced by Indigenous people.

Despite these limitations, Chapter 3, the literature review of this report outlines a number of studies that use CM to estimate WTP for cultural values with studies spanning Australia and New Zealand predominantly in the context of water resources. A number of the Table 5.6 challenges were hurdled but no doubt a number remain – one needs to consider whether ‘some number is better than no number’ in weighing up the pros and cons of using these methods. We argue that some number is better and these studies could be used to help guide the design of a choice experiment to estimate the value of IK embodied in a good or service. Of particular note in addressing a number of the concerns in Table 6 is the New Zealand study by Miller, Tait, and Saunders (2015).

Finally, in addition to CM there are also hedonic pricing and travel cost methods that, when used with econometrics, may be able to control for IK and the other factors that determine the differences in market prices for goods and services. Such an approach would require sufficient secondary or primary data to implement.

6. Data considerations

Where primary data is not available, using secondary data may prove fruitful. For example, an additional method related to Approach 4, involves using secondary data from markets using econometrics. This could prove cost effective where data is available to ascertain the differential value attributable to IK while controlling for other factors that may determine price differentials between substitutes.

At the outset of the overarching project of which this chapter forms a part, it was apparent that the number of data sources available to assess the market value of IK is circumscribed.

Survey data from recent National Aboriginal and Torres Strait Islander Social Surveys (NATSISS) collected information on the extent of cultural activities associated with customary practices, such as fishing, hunting and gathering, but the information contained in those surveys was not consistent over time and highly conditioned to social context and indeed the way the question was asked (Altman & Biddle, 2014).

In all NATSISS data, the highest levels of ‘cultural activities’ associated with customary practices are where people have relatively unconstrained access to their land or to the coastal zone and seas. Over 74 percent of the working-age Indigenous population across most of northern Australia engages in hunting, fishing and gathering in 2014–15. In these areas, where the market sector is limited, the customary sector is economically significant, and bush foods can make an important contribution to people’s wellbeing. Hunting, fishing and gathering are least common in major urban areas, but even there, over one third of Indigenous adults say they engage in such activities.

Relatively few Indigenous people in the 2014–15 NATSISS report income from ‘cultural activities’ associated with IK such as: Sale of paintings and art works; Sale of weaving, dyed cloth, sculptures, pottery, wooden art and craft; Growing, collecting, making native fruits or herbs into food or ointments; Arranging or participating in cultural dancing or performances; Providing or participating in cultural tourism ventures/ activities; and Payment for interpreting or translating Australian Indigenous language. Only eight percent of Indigenous adults reported any income from such activities. While the ABS attempts to capture income from cultural activities, NATSISS data clearly does not capture income from all cultural activities and hence it is a partial measure.

Even if the focus is confined to those who participated in selected cultural activities, only a minority of Indigenous people obtained some income from such activities (e.g. those receiving income where they Fished: 10%; Hunted: 16%; Gathered wild plants/berries: 23%; Made Aboriginal and/or Torres Strait Islander arts or crafts: 26%; Performed any Aboriginal and/or Torres Strait Islander music, dance or theatre: 27%; Written/told any Aboriginal and/or Torres Strait Islander stories: 25%).

This report has explored the challenges for estimating the market value of IK. Each set of challenges is associated with data requirements for information that would be required to address such challenges. For example, the discussion about the economic size of the Indigenous (business) sector revealed that PwC (2018) estimates were extrapolated from all Australian businesses, that is, the value-added identified for Indigenous businesses was not based on value and cost information associated with Indigenous businesses. Te Puni Kōkiri (2013) collected input and output information from New Zealand Maori enterprises, which provides a more adequate insight into the actual value add from the Indigenous business sector as a whole. However, even if Indigenous-specific information of the Indigenous business sector were collected, the question of attribution of value to IK would still be contestable. Nonetheless, in our judgement it is easier to make claims about the association of economic activity with the market value of IK where estimates are considered by industry and subsector and hence where assumptions about the contribution of IK is more contextualized.

Valuations of the contribution of IK to a specific sector are less abstract than an average estimate for the overall Indigenous business sector. The detailed description of value of some industries is likely to provide more credible data than economy-wide aggregation and readers

are more likely to understand the production processes that will be common within the sector. This microeconomic methodology may be able to be extended to a broader approach to capture the value of IK.

Accounting standards related to intangible assets and IK could potentially be used to value IK, but there is a need for some consensus in the accounting profession about what constitutes an intangible asset before data collection could conceivably be operationalised.

Given the tradeoff between the level of abstraction of the data and the limited ability to interpret aggregated data, it is tempting to recommend that information be collected directly about the consumers' willingness to pay and the producers' willingness to accept a certain price. Future collection should occur from both Indigenous and non-Indigenous consumers and producers to appreciate the market value of IK.

However, ascertaining people's willingness to pay for a particular product has historically been and is currently used to value private goods prior to their release on the market to set an *ideal* price point. There is a role for these non-market valuation techniques in establishing the market valuation of IK, but unless carefully designed, they are likely to largely abstract from the costs side of production. It is important to note that the future market prices may encapsulate the value to consumers who take into account positive externalities in consumption and production (*inter alia*, depending on the structure of the market). If Indigenous people are working together to use IK in production, this could reinforce Indigenous culture and local community. The positive benefits of marketing goods and services that embed IK, including the price or economic value received, needs to outweigh the risks of the loss of control of Indigenous cultural programs from the economic transaction. We argue that such risks are best managed by Indigenous businesses who have substantive control over production (and hence inputs, including IK).

There are several data sources on Indigenous organisations and businesses that might use IK. The Office of the Registrar of Indigenous Corporations (ORIC) supports and regulates corporations that are incorporated under the *Corporations Aboriginal and Torres Strait Islander (CATSI) Act* 2006. ORIC provides a tailored service that responds to the special needs of Aboriginal and Torres Strait Islander groups and corporations and strives for national and international best practice in corporate governance. Details of every Aboriginal and Torres Strait Islander Corporation under the (CATSI Act) are listed in a register maintained by the Registrar and each is identified by an Indigenous corporation number (ICN). The ICN is not related to identification numbers used by some corporations for other purposes (e.g. ABN, ACN, ARBN or ARSN). It is possible that an Indigenous corporation may trade under a business name, instead of its registered name under the CATSI Act. One can find the trading name of a registered Aboriginal and Torres Strait Islander corporation by accessing the Australian Securities and Investments Commission (ASIC) website, or through the individual websites for each state and territory jurisdiction. Some larger Aboriginal corporations may also be registered with ASIC rather than ORIC.

At this stage ORIC's online register shows a list of the key public documents held by ORIC for any corporation. Some of these documents can now be accessed online (<http://www.oric.gov.au/catsi-act/about-public-register>). This may give a sense of the types of activities and stakeholders but gives no direct insight into the market value of IK.

Furthermore, many Indigenous organisations are incorporated under different statutes, including ASIC and State or Territory legislation, meaning that ORIC is an insufficient basis for

identifying Indigenous corporations that might be relevant to this issue. It will also not include privately-managed Indigenous businesses or Indigenous sole traders.

One promising development is the Business Longitudinal Analysis Data Environment or BLADE, which the Department of Industry, Innovation and Science developed in partnership with the ABS. BLADE combines several years of Australian Taxation Office administrative tax data with ABS business survey data (Business Characteristic Survey, Economic Activity Survey and the Business Expenditure on Research Development) to provide detailed information on the characteristics and finances of Australian businesses. BLADE provides an integrated data environment and enables analysis of businesses over time and includes the micro-economic factors that drive performance, innovation, job creation, competitiveness and productivity. It is an ideal data set to assess Indigenous and other businesses associated with IK, but the trick will be in accurately identifying such businesses.

BLADE has an 'integrating spine' that uses a company's ABN to uniquely identify businesses. It is possible to identify Indigenous businesses using ABNs provided by Supply Nation, IBA or Indigenous Chambers of Commerce. This will be contingent on consent, which will partially depend on the assurances of confidentiality provided.

Two important limitations to note in using BLADE. Firstly, it is not compulsory for all businesses to have an ABN if their turnover is less than \$75,000 per annum. Even where an ABN is provided by organisations (i.e., Supply Nation etc.), it is limited to businesses associated with that organisation. Hence the coverage of businesses that can be included in an econometric analysis of BLADE is limited. In order to provide econometrically useful data, there is a need for a substantial number of businesses in 'analytical categories' to ensure both the reliability of the analysis and the confidentiality for the businesses included.

Once a suitable sample of businesses is identified, other government program data can potentially be added via a link with the ABN. Particularly relevant in the context is the linking with IP instruments data. IP Australia may be able to provide information on patents or other instruments associated with IK that could be used in an econometric analysis.⁶⁶

Greenhalgh and Rogers (2007b) survey the available literature on patents, trade marks, and copyright to assess the value of IP to firms and the costs to firms of acquiring and defending their rights. They provide several methods for encapsulating the value of IK within the value of production/productivity or the equity value of the business. To the extent that IK is encapsulated by such instruments, the techniques survey provides a suitable econometric manner for identifying the value of IK. For example, the acquisition of a trademark for generic 'Wandjina' by local Kimberley tribes may have been associated with increased production or turnover for local groups. However, that particular IP right may have been a more defensive position to protect IK rather than generate income for any Indigenous organisation. Nonetheless the point is that information on production and equity of individual businesses provides insight into the market value of IP, and if the object is to measure such value, then relevant data would need to be collected or collated.

Expenditure on effective defensive instruments could be argued to reveal minimum value of the IK. Collecting data on defensive expenditure would require detailed and specific information on the intention of business expenditure that may be open to interpretation. For

⁶⁶ One relevant regression technique to demonstrate the policy impact of the acquisition of an instrument may be difference-in-difference regressions.

example, it may not be immediately clear to an outside observer that the expenditure was 'defensive'. Also managers may want to rationalise the expenditure in terms of anticipated future revenues.

Another potential source of data in prospect is the likely development of Linked Employer-Employee Datasets in the near future. If IK is associated with the human capital of Indigenous peoples, then businesses with a larger number of Indigenous employees could be used as a proxy for IK. A Linked Employer-Employee Dataset opens up a source of new insights into employment and can potentially identify where the employees of a business work and can indicate the economic benefit to a local area or community. However, the assumed link of IK with Indigenous human capital may be analytically weak.

Probably the best or clearest way to attribute value to IK is to use individual level data, and to collect quantitative and qualitative survey responses. Detailed case studies at a sectoral level may be appropriate. The use of secondary data to identify the market value of IK is inherently constrained, in that such data is not collected with this objective in mind. Hence, the ultimate solution to the attribution problem discussed in this report is likely to involve primary data creation or direct interviews with producers or consumers who will have better information on the actual or perceived contribution of IK to the good or service being sold in the market. Qualitative interviews provide one promising avenue for collecting primary data, however even they are somewhat constrained in terms of data quality and confidentiality that is appropriate for any 'commercial-in-confidence' activity.

7. Discussion and conclusion

As noted throughout the approaches and data outlined in this chapter, the attribution problem looms heavily on an ability to explicitly ascribe economic value to the IK embedded in goods and services. Our overall suggestion is to use a combination of approaches depending on the scale and scope of monetary valuation required. For specific microeconomic and firm level valuations, the accounting approaches outlined in Approach 1 seem appropriate but the identification of likely attribution percentages for IK embedded in specific goods and services needs to be determined on a direct questioning basis (as per Box 5.1 in section 2). This type of questioning can then be scaled to subsectors and sectoral basis, to build a matrix of possible attribution percentages for sectors across the entire economy. Therefore combining methods appears to be the most fruitful, particularly where macroeconomic indications of the value of IK are required. However, until a reasonable matrix of attribution percentages is obtained, it would be difficult to attribute IK in any given sector (in the case of Australia there are over 720 subsectors in the national economy but IK may not be used in all these sectors). Beginning at the micro-level is a first step and would need to involve direct questioning of the producers and suppliers of these goods and services.

Given that a start would need to be made at the micro-level, stated preference methods of non-market valuation, such as CM, would suit this approach well, particularly, where for a given good or service, the study is attempting, as has traditionally been the case, to ascertain the value of good or service attributes (like IK) before being released to the market.

Furthermore, combining the cost and income approach of factor share analysis from Box 5.1 in Approach 1 (section 2) with Approach 4 would be the natural coalescence of supply and demand factors in order to strike an appropriate shadow price for IK, as would be the case for any input into the production process.

Where budgets are limited then econometric and hedonic pricing and travel cost methods of economic valuation may prove useful in estimating the price differences for IK across similar products. These approaches would be limited by sufficient market data on prices and the other important factors that affect price difference.

There are also two further factors to bear in mind in interpreting the insights from our analysis. Firstly, Stoeckl et al. (2018) identify how economic valuation approaches, institutions and behaviours have tended to focus on the individual valuation of simple goods, leading to the omission or crowding-out of the socially constructed valuation of complex social goods in natural resource management deliberations. Stoeckl et al. (2018, p. 65) therefore call for institutionalisation of socially constructed ecosystem service values in 'international conservation, development and policy-making discourses'. This insight from environmental conservation, is relevant to the study of IK, because of (i) IK's complex good nature, taking various forms and being used in a multitude of ways, not just for commercial 'individual' gain as may tend to be the case through traditional western IP instruments; and (ii) direct questioning to ascertain the economic value of IK will, under current settings and methods, be biased towards the value attributable from commercial IK applications.⁶⁷

Secondly, implementing these suggested methods in a mixed methods approach, involves more research funding and the budget for such will be the ultimate limiting resource. However, the guidance provided in this chapter presents a way forward in implementing such a suitable research plan should further funding be secured.

⁶⁷ That said, this point (ii) is exactly the scope of IP Australia's (2018) terms of reference.

6. Conclusion

This project has sought to provide guidance to IP Australia on approaches to estimating the market value of IK now and in the future, along with consideration for IK's value in the context of patents, trade marks, design and plant breeder's rights.

We have done this by developing a preferred approach to being in a position to place a market value on the use of IK by directly addressing the IK attribution problem as outlined in Chapter 5 (Methods, drawing on Chapter 4 Case Studies). We have come to the findings for methods in Chapter 5 by undertaking the key activities from IP Australia's TOR.

Given the paucity of existing research on measuring the market value of IK in existing and future markets, we have attempted to build up the analysis from first principles. We have described the existing and potential legal instruments and institutions that could protect IK and capture the value, should Indigenous communities choose to use that knowledge to produce goods and services for the market.

Given that some of these instruments are emerging and untested in the marketplace, we cannot be definitive about the efficacy of these instruments in capturing the value of IK in production and consumption for the owners of that knowledge.

Accordingly, any conclusions about the relative merits of various instruments and institutions should be treated with caution and monitored to ensure that the owners of Indigenous knowledge are appropriately rewarded for its contribution to the value creation process in the market.

If the suggested legal instruments prove to be unenforceable, then policy makers need to pay due attention to the development and facilitation of institutions that appropriately remunerate Indigenous owners or custodians of IK. The research of Janke et al. (Janke 2009a, b, 2018; Janke and Dawson 2012; Janke & Sentina 2018; Sentina et al. 2018) points to the development of suitable protocols, however authenticity labels may be another option.

If it remains problematic to enforce legal instruments, the ultimate strategy would be to facilitate the use of IK within culturally safe environments such as Indigenous community organisations or Indigenous businesses (see appendix C).

We found from our literature review in Chapter 3 that the literature attempts to conceptualise how IK fits within the production processes for goods and services that would be sold on the market. We outlined a taxonomy of general approaches to the valuation of IK in Chapter 5. Here we found that while accountancy perspectives on the value of IK may seem promising, they highlight the fundamental problem, the attribution of IK problem, for measuring the value IK in markets. The attribution problem can best be described as precisely knowing the relative contribution in percentage terms of each factor of production, and of most concern to us, the percentage contribution that IK makes to this value in any given good or service context. This requires further research beyond the scope of this project through direct questioning of the producers (and consumers to gain their willingness to pay or demand) of goods and services that use IK in specific sectors. Once some key measures of the percentage of IK attribution have been more precisely estimated through this additional research, these could then be used to estimate the contribution made by IK to these sectors. It will take some time and some investment in this future research to ensure that reasonable IK attribution percentages are ascertained for a reasonable and representative sample of sectors across the economy. Once this is achieved, a macroeconomic assessment of the market value that IK makes to the national economy can be

undertaken. Importantly for IP Australia, this broader national information will then help inform how much IK may be captured through the current (and any future scenarios of) arrangements of IP instruments (outlined in Chapter 2).

In addition to using Accounting standards to value IK through 'intangible capital', the report identified several other areas in the literature where arguably researchers could attempt to value the contribution of IK but ultimately become stuck on the attribution problem, unable to get to a 'true' measure of IK: valuations of the contribution of IK to specific sector, valuations of the Indigenous business sector and valuing the commercial use of IK. As Chapter 5 demonstrated, these avenues for measuring the value of IK are also constrained by the existence and coverage of relevant data. This is either partial or incidental in nature (that is collected for other purposes and doesn't necessarily adequately capture the value of IK).

Because of the abstract nature of IK valuation and the challenges in estimating market values, Chapter 4 provided evidence from a range of Australian case studies that illustrated the relevant issues for policy makers. While such case studies provide a suitable level of contextualisation, all must deal with an almost insurmountable challenge of attributing some portion of the measured value to IK: the attribution problem.

Given the challenges of measuring the market value of IK in the case studies, Chapter 5 discussed the possible methods that might allow for the greatest insight into the value of IK in market goods and services. Again, in this chapter, we found that direct questioning through non-market valuation methods, such as CM, which has historically been used by marketing researchers to estimate the price or value of attributes for new products prior to their release into the market, may be useful. This method was found to be well aligned to capturing the value of IK embedded in specific goods or services using targeted case examples. Good examples of where this approach could be developed in future research include the use of species, health, and fashion, design, homewares and lifestyle (See Appendix A for a full listing of cases where IK is used to market goods and services along with Chapters 3 and 4). Our guidance suggested a mixture of methods, combining CM questioning of consumers with questioning of producers to tie down the attribution problem for specific sectors as a first step. Concurrently, price differentials for similar products, where IK is used and not used controlling for other factors could also prove fruitful (hedonic pricing, travel cost approaches and differential market pricing econometric analysis).

Where resources are allocated to targeted research to help solve the attribution problem for specific goods and services in specific markets through surveys, interviews and direct questioning, a unique opportunity then unfolds. This opportunity will enable the identification, through precise quantification, of the value add of IK in contributing to sustainable Indigenous economies.

Notwithstanding the challenges identified in this report, the Indigenous business and community sector is extremely dynamic and creative and has the scope to add significantly to the Australian economy. The fundamental challenge is ensuring that IK is both adequately rewarded, and that the owners or custodians (Aboriginal and Torres Strait Islander peoples in the Australian context) of that knowledge are primary beneficiaries. The adequate protection of IK is a substantial challenge that needs monitoring by both the Indigenous community and IP Australia. The policy challenge extends well beyond the remit of IP Australia. Ultimately, policy may need to facilitate capacity and governance of Indigenous organisations within the community and business sectors to monitor and protect IK to optimise the value added to aid the growing economic success of Indigenous peoples.

Appendix A: Case study scoping exercise

Table A.1 presents a list of potential case studies that was prepared early in the project period through a series of workshops. These workshops included drawing from the experience of Janet Hunt, Boyd Hunter, Terri Janke, Boyd Blackwell, James Stratton, and Kaely Woods. The table was presented to IP Australia for comment, who identified that topics 5, 6 and 9 were of most interest to them.

Table A.1: Possible case studies to focus project attention

Case study topic	Meaning	Specific case	Methods	Data
1. Non-living ⁶⁸ substances	Carbon: Potential market value (MV) of carbon dioxide equivalent (CO ₂ e) reduction from traditional knowledge and practices	Aboriginal Carbon Foundation (AbCF) – Reducing Carbon Building Communities Fund (RCBC Fund) (also see Case Study 6 in Boyd Dirk Blackwell and Fordham (2018))	Price of CO ₂ e * amount of CO ₂ e saved (demand side – carbon credits: Ochre, Black & Gold)	(Aboriginal Carbon Foundation, 2019)
	Ochre	(I) Cultural Emerson programs: Initiation into Aboriginal Culture (Ways of Knowing): (II) All manner of use in education, art, healing, wellbeing, etc.	(I) Proportion of program experience attributable to 'face-painting' from local ochre*value/person/visit of program*annual visits for program*growth of program*number of years into the future*100% attribution to IK	(I) Iga Warta – Terrence Coulthard – annual visits and growth of program – cost per head (with and without 'face-painting')
2. Heritage Protection	The processes and related value (costs) of ensuring sacred sites and the like are protected during a development project	Resource development in key mining state where heritage protection strong (e.g. WA may not be ideal)	Cost of undertaking clearance work into the future (supply side – not demand) How sacred site and its associated goods and services become commercial	Consultants and heritage agencies Various sources: see 3 & 4
	Related to previous: Indigenous Protected Areas (IPAs)	Indigenous rangers on country	IK, in part, through contracting of TOs by Australian Government to work on country; time spent working on country 'increases social return on investment'. Could use growth of the estate to estimate future market value component	Social Ventures Australia (2016); DPMC (2018) area of estate change across years, increasing levels of employment – proxy for embodied IK conserved (value in labour)

⁶⁸ Non-living substances is partially an oxymoron when thinking of the cosmos and Indigenous views of the connectedness of all things. For example, reducing carbon in the atmosphere will help more species survive such that non-living things have a natural connection to living things. Ochre like soil is an ecosystem so while this substrate may be non-living it provides a structure for living things (Thorn, 2014). Furthermore, when it is used in face-painting-cultural initiation it can also help connect people and connect them to country.

Case study topic	Meaning	Specific case	Methods	Data
				market/contracts even where Govt co-funded)
	IK of water holes and aquifers in remote and arid Australia that can sustain human populations	<i>Iga Warta</i> transfer of knowledge of drilling through hard rock to access water in arid zones of Africa	Volume of water * value/ML in remote Australia due to IK (creation of a market for water in arid zones?)	Boyd D Blackwell et al. (2014)
	Museums and Galleries	British Museum/Rome Blockbuster exhibits	Marginal change in visits compared to normal exhibit * value of a visit*total annual person-visits	?
3. Indigenous Tourism	Complete bundle of goods and services not yet marketed relating to tourism	Indigenous Tourism (needs refinement) including	Potential additional visitor person-days * spend/person-day	Aboriginal Tourism Australia (ATA)/Voyages Indigenous Tourism Australia of Indigenous Land Corporation (ILC), Tourism Australia WAITOC (2017) & NSWATOC (2019)
	Fun park experiences	Ex-situ: Dreamworld corroboree	As above	Dreamworld (2018a) overlaps with education (Dreamworld, 2018b), 7 below .
		Souvenirs – patent and ‘genuine’ protection	See 4 below.	
	High end Indigenous restaurants	e.g. Orana, Adelaide	Business value – no. of annual patron visits*average spend per patron-visit OR Growth in recent market – no. of new businesses*sale price of business (or value of trade)/ *proportion attributable to IK	No show fee=\$240/person (Zonfrillos, 2019) ⁶⁹ & could call and ask: <ul style="list-style-type: none"> • seating plan • average weekly patronage & • what % of business attributable to IK?

⁶⁹ Zonfrillo, Chef and philanthropist at Orana, has collated a database of 700 indigenous ingredients as part of The Orana Foundation (McCabe (2017)) a not-for-profit, which has a philosophy to ‘revolutionise Australian food culture through combining the preservation of indigenous knowledge and practice with contemporary methods and innovation’ (The Orana Foundation (2016)). The University of Adelaide, South Australian Government (\$1.25m grant) and Lipman Karas law firm are partners in the foundation which ‘(a)ssists Indigenous communities by stimulating Indigenous enterprise through supporting communities to research, document, commercialise and promote native Australian foods’ (*Ibid.* & McCabe 2017). The foundation has a three pronged strategy to form a (i) National Australian Food Database; (ii) Australian Food Culture Enterprise, and (iii) Innovation & Enterprise Hub (The Orana Foundation 2016).

Case study topic	Meaning	Specific case	Methods	Data
	Home chefs (may sit in a separate food section)	Mark Olive – The Outback Café series for TV (Black Olive, 2014)	Ratings (population of viewers) for shows * factor of length * factor for time when showed * value per viewer * proportion to account for growth of shows over times to estimate market potential OR value of TV rights sold	TV ratings and rights information?
4. Cultural Expressions (see also 9 below)	Music Festivals, including Indigenous instruments etc.	Saltwater Festival Garma Festival	Growth in recent market – visitor person-days* spend/person-day + funding from various sources	Festival companies/groups + e.g. Mining company contributions
	Cave & Rock Art	See 2 and 3 above	Potential value of similar to Australian and international market (P*Q)	
	Artefacts, souvenirs	Maori GI's, Tiki etc.	Value of patents etc. traded in the market	IP Australia? Who records trades?
	Locational indications	Chillagoe/ 'Wakaman' Brilliant Marble	Proportion of business value attributable to Indigenous brand	Boyd Dirk Blackwell, Woodward, Stephen, and Winter (2018)
	Visual Art	Fake art could provide a proxy value (though underestimate) of value of real market	Estimates of fake art trade – volume times quantity and growth – provides a growth path to estimate benefits from protection	Current data poor or non-existent (House of Representatives Standing Committee on Indigenous Affairs, 2018, p. 73) but could be mirrored by growth in fake non-indig art
	Film	Numerous	Proportion of value of film revenues attributable to IK	
5. Health	A. Pharmaceutical knowledge of range of products – related to 6.	Northern Kaanju people of Australia (Brewer, 2014)	See 6.	See 6.
		Western Samoa Latent HIV Activator Prostratin from Mamala tree (<i>Homalanthus nutans</i>) to help flush HIV from lymph nodes (Gupta et al., 2005)	1989: Benefit sharing agreement payment 2001: NIH & ARA licensing agreement + agreement with Samoan govt 2004: UCB & Samoan gov't agreement – cloning of prostratin genes, its mass production by genetic engineering	1989: >\$480k to village 2001: 20% of commercial profits with Samoa (12.5% Samoan govt, 5.7% Felealupo village, 0.4% each to two healers' descendants who identified,

Case study topic	Meaning	Specific case	Methods	Data
				formulated and used <i>H. nutans</i>), 2004: 50% commercial development share with Samoan govt (& UCB)
	B. Psychological & physical health improvement from, in part, connecting to country & family through 1-6	Traditional healing - Ngangkari	Health cost savings from integrated traditional healing (inherently requires IK) – assuming gets people well sooner, at less cost and with less relapses (also in some locations no other health service)	(Greives, 2018; Korff, 2018; McCoy, 2008; Oliver, 2013; Panzironi, 2013)
	Aged Care	Yuendumu Old Peoples' Program	Growth in program*growth in communities adopting*value of aged care business*attribution to IK	Box 1, Morley (2015)
		Salons and beauticians using IK or with Indigenous specialisation		
		Face creams, wrinkle creams, emu oil, food bars etc.		
6. Species	Range of plants and fruit that can be marketed	Spinifex gum Daisy yam Kakadu plum Native orange (<i>Iga Warta</i>) Teas	Growth of these markets to forecast future growth of additional species at estimated future price	Current market data and historical growth – Mitchell and Becker (2019) >6,500 Indig. Food types, with only 13 that are FSANZ certified for markets.
	Genetic resources	Range of goods that provide specific benefits including health – see 5 above.		
7. Education (overlap with other areas including 3)	Full range of Aboriginal and Torres Strait Islander knowledge that forms part of formal & informal education (teaching and research) (languages, craft,	CORE cultural awareness programs (& would include in-depth tours as part of tourism)	Growth of CORE program across organisations from increase in price and increase of volume of sales	CORE contacts (Jeff Richardson CAEPR), (AIATSI, 2014)

Case study topic	Meaning	Specific case	Methods	Data
	stories, symbols, music & history)			
		SA Museum		Howard M..., John Mc....y?
	Ways of Knowing (see 2 above)	National Museum of Australia <i>Songlines: Tracking the Seven Sisters</i>	(I) Catalogue sales – normal catalogue sales (II) Visitors/yr*price/visit for Songlines versus standard exhibit	(I) National Museum of Australia (2019) – Songlines Catalogue \$69.95 -Rome City & Empire \$59.95 = margin \$10/copy sold (II) Contact with National Museum of Australia (2018) officers or annual report?
		Seasonal and Astrological ways of knowing	Increased productivity/wellbeing due to knowing – versus comparable non-Indigenous systems of knowing e.g. seasons in knowing when to burn (AbCF)/collect and forage (see Orana) for species	Seasons: Many and varied e.g. see Orana and AbCF. Astrological?
		National Curriculum – IK in Science has created a market		CAL?BUSCOPY? Copyright agent: Statutory collects \$ on behalf of Ab. art centres & educational commercial licensing, 40% of m'ship is Indig.
		NSW NESAs		
8. Justice and wellbeing	Diversion theory	Koori courts and circle sentencing, <i>Backtracks</i> (Armidale, overlaps with 7)	Is there learning here that is creating new law markets and specialisations? Yes – value creation of new businesses in justice (which are not yet protected)	Law Societies, Indig. Justice Committees NSW and other states, Kimberly Arts and Law Centre? Valuation of reduction in second offenders, i.e. cost saving.
9. Fashion, design, homewares & lifestyle	Indigenous design and knowledge creates the attraction to these things	Koskela – art works, books, deep commitment to social enterprise of Indigenous communities	Proportion of sales being returned to communities to encourage development of more of these products, i.e. growth in volume and diversity of products and price	Koskela (n.d. a)

Case study topic	Meaning	Specific case	Methods	Data
			over time to determine potential market	
		Kirrikin – luxury resort wear featuring contemporary Australian Indigenous Artists to Europe and US (revitalisation of Wonnarua nation language, TOs Hunter Valley – Director Wonnarua women)	Growth in products and value over time to indicate market potential in the future. % of sales of given product are returned to individual artist	Website claims there is a shortage of authentic Indigenous products (Kirrikin, 2019) – estimating the shortage, reciprocal is market potential.
		Wynya – majority owned Wiradjuri furniture profit for purpose business supplying large corporate furniture fit-outs to support Indigenous training and employment goals	As above	Certified B Corporation that helps solve social and environmental problems, member of First Australians Chamber of Commerce and Industry, Supply Nation Partner (Wynya, 2019)
10. Governance	Culturally ‘centred by design’ & locally controlled services	a) Yuendumu Old Peoples’ Programme (see 5 above) b) Accreditation of Aboriginal Controlled Community Organisations (ACCOS) c) Dhimurru Land Management Corporation d) Warlpiri Education and Training Trust (WETT)	Proportion of value created from IK compliment of governance systems resulting in stronger economic development/growth as compared with programs which are not culturally centred (typically fail and cost further public burden) – MV proxies by private sector comparable providers	See 5 above (Box 1, Morley 2015) Box 2, Ibid Box 3, Ibid Box 4, Ibid

Notes: GI=Geographical indications. NIH=National Institutes of Health. ARA=Aids Research Alliance of America.

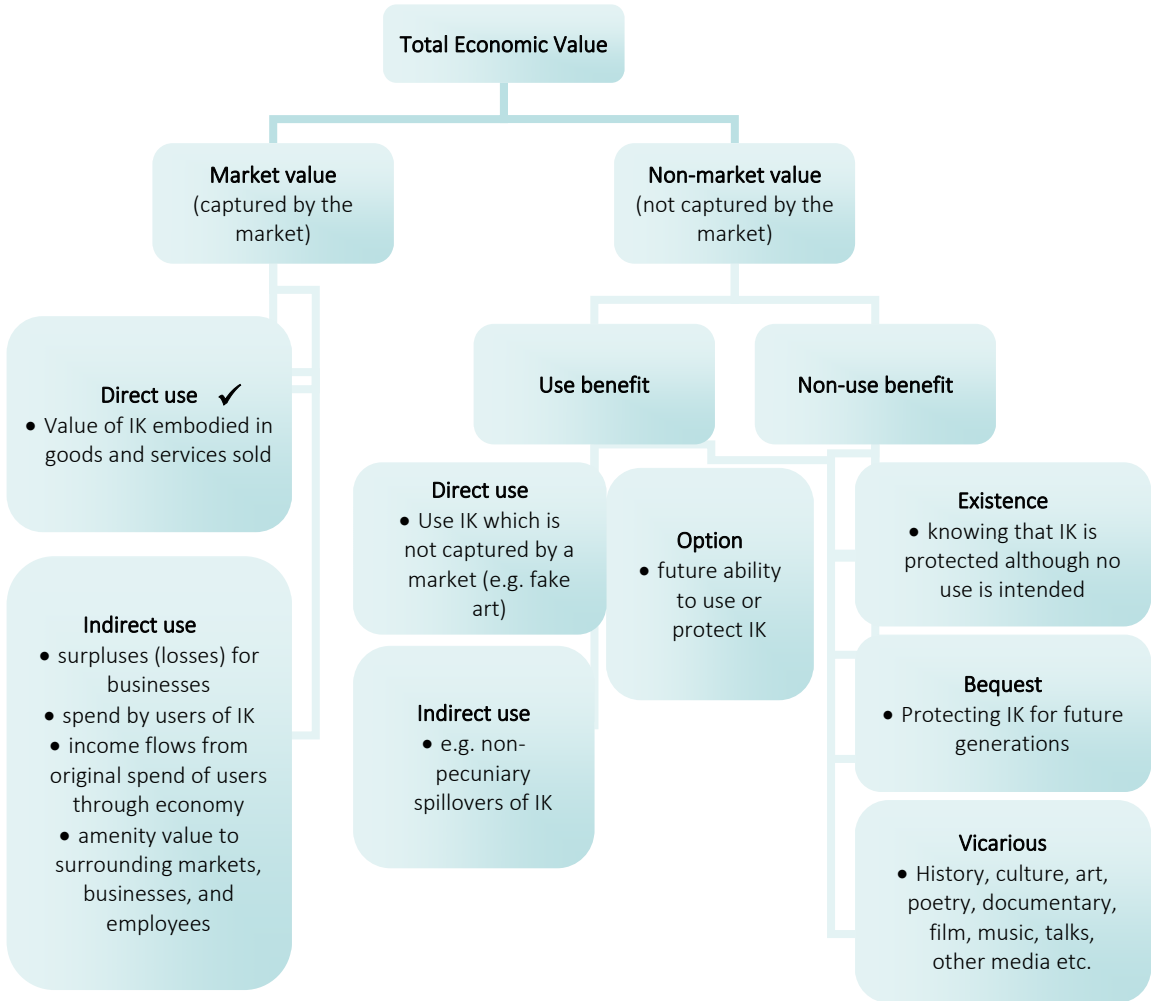
Appendix B: Market value types, calculations and the importance of vicarious value

1. Introduction

This appendix of the report provides some important definitions and calculations for market value. Vicarious value is also considered given the innate nature of IK and its use in creating market value.

First however, the various market and non-market values are simply conveyed in the following schematic in Figure B.1. The total economic value of IK consists of its market and non-market value. In this study we are focussing on the market value, the value of IK captured by markets. However, no doubt, a large proportion of the value attributable to IK is shared and is not necessarily captured by markets. However, given time, some of this value will be captured by markets, particularly with the growth of Indigenous Peoples’ business in Australia and the growth of legal instruments that IP Australia have jurisdiction for which can be used to protect IK in a legal sense and thus create a market for. By creating a formal legal protective measure, IP Australia provides the benefit of helping to articulate market value.

Figure B.1: Market and non-market value of IK



Note: Tick=assessed in this study; Unticked=not assessed in this study and left for future research.

There is a broad range of economic values from IK. A tick in Figure B.1 provides an indication of those benefits that are likely to be captured by market value, while those that are not captured by markets, that is, those that are non-market values and not ticked.

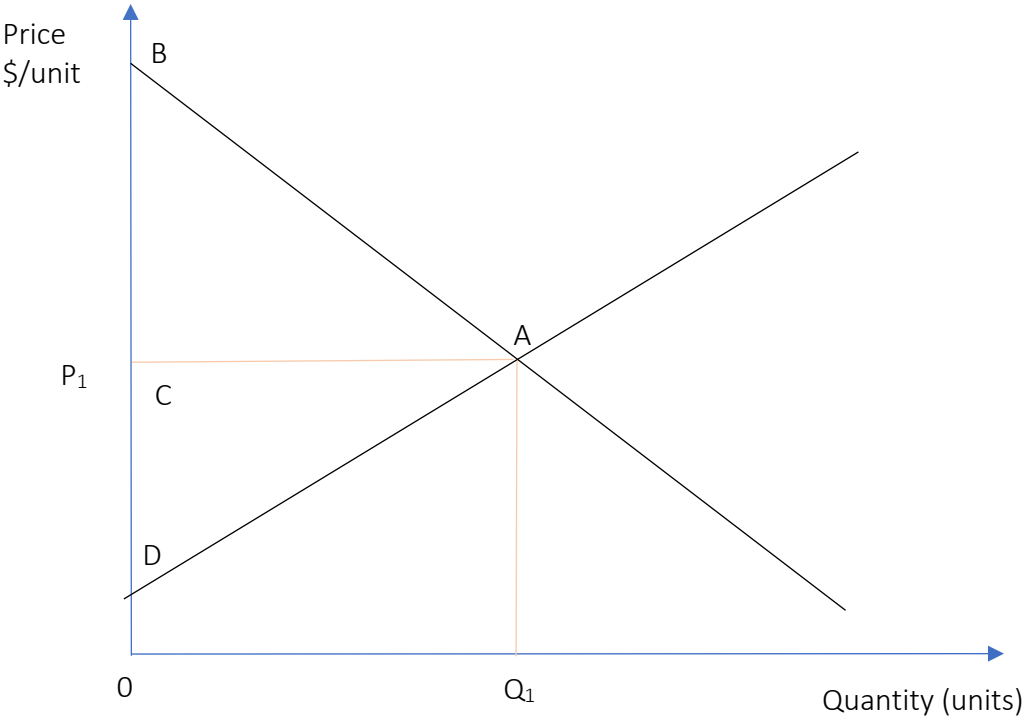
2. Types of market value

There are a range of market values, some of which are depicted in Figure B.2, to consider and each is different:

- Profit which equals total revenue less total costs
- Total revenue equals price of the goods or services times the volume of the goods or services sold
- Total costs is the marginal cost of production times the volume of the goods or services sold
- Value-add is the value added to the total revenue that results from the income from these sales being used to purchase other goods and services in the economy and this in turn becoming income of others to spend on further goods and services in the economy and so on.

For the final dot point, the extent of value-add depends on how this multiplier effect plays out in the economy and how much of the income escapes through leakages such as from the propensity for taxation and imports. Exports of course bring new income to the economy outside that of its residents and add to the multiplier effect. Also, labour mobility can add to labour income leakage, typically for those workers whom commute to the economy in question for work and return home outside the economy to spend.

Figure B.2: Market surplus measures and calculations



Consumer surplus is area ABC and producer surplus is area ACD. Together the welfare gain to society from the market is ABD. This is different to the total revenue from the sale of the good or service of $AC0Q_1$, or the cost of the goods sold of $AD0Q_1$, or the total benefit from sale of the good or service of Q_1AB0 . The total surplus or welfare gain from sale of the good or service may also be described as total benefit less the total cost, i.e., $Q_1AB0-AD0Q_1$.

For measuring the welfare in the market, which many would argue is the most important concept to assess if a net gain is provided to society from the provision of a good or service, there are two main concepts of surplus value:

- Consumer surplus – the excess value to consumers from their willingness to pay (WTP) or demand exceeding the cost of production.
- Producer surplus – the excess value to producers from total revenue from the sale of goods or services exceeding the total cost or production of these goods or services sold.

Adding consumer and producer surplus together estimates the total welfare gain from a market to society (including any external costs and benefits where these are relevant or non-pecuniary). Figure B.2 depicts these concepts and explains the various possible calculations for market values.

In this study and in economic modelling including regional economic analysis, total revenue most closely represents the assumed concept of market value (McFarlane et al., 2016, 2017).

3. Market Value Calculations

The total revenue or current market value (MV_c) of a final good or service attributable to Indigenous knowledge can be calculated using the following formula:

$$MV_c = P_1 \cdot Q_1 \cdot IKA \tag{1}$$

where

- P_1 =Price in first period
- P_2 =Price in second period
- IKA =percentage of Indigenous Knowledge attributable.

Typically, businesses sell more than one good or service. The total revenue would therefore be the sum of all the markets (value chains) associated with the Aboriginal economic activity such that:

$$E(MV) = MV_1 + MV_2 + \dots + MV_n \tag{2}$$

Where

E =(epsilon) sum of across all n final markets associated with the given business.

For the future market value we can use the following formulae to estimate the growth of the market from historical data:

$$dMV = (P_1 \cdot Q_1 - P_2 \cdot Q_2) \cdot IKA \tag{3}$$

where

- d =(delta) change in
- P_1 =Price in first period
- P_2 =Price in second period
- Q_1 =Quantity in first period

Q_2 =Quantity in the second period

IKA=percentage of Indigenous Knowledge attributable.

The future MV (MV_f) in any given period k is therefore:

$$MV_f = dMV * MV_1 * (k-1) \quad (4)$$

Where abbreviations are as before except that:

MV_1 =market value in period 1 = $P_1 \cdot Q_1$

As discussed above, on top of these market values we can consider the multipliers of economic activity (much like Keynesian consumption multipliers) as part of input-output or regional economic modelling approach including value-add like that used by PwC (2018) in valuing Indigenous Peoples' business in Australia. In this case, the total economic value (TEV) of a good or service including value-add would be:

$$TEV = MV_c * m \quad (5)$$

Where abbreviations are as before except:

m=multiplier.

4. Indigenous peoples' knowledge and vicarious economic value

Vicarious economic value is the value or benefit (& cost) obtained by someone from IK being translated to them through some other medium, such as through books, music, art, poetry, talks, seminars or lectures and other media. The term vicarious value is derived from the term vicar – meaning conveying the word of God. In other words, God's word gets conveyed to the congregation through the Vicar or Priest and hence vicarious value is the value that people receive from the indirect use of the good or service through some other media.

There is no doubt that some value conveyed through indirect means of use of the given resource such as poetry, music, art, books, documentary and film etc. and this is argued in fact to be the primary value attributed to IK.

5. Conclusion

There are a range of market values which could be considered in this report but the fundamental value considered is the total revenue from the sale of goods and services that is attributable to IK. Where a multiplier effect of a given good or service can be identified the value-add of the IK embodied in a good or service is also included. There are however other market values that can be estimated and the role of this report will be to be explicit about the particular market value of obtained through the application of the suggested methodology using the available data. Vicarious value is an important non-use value associated with IK but in-fact IK is conveyed through various means and media and by doing so is usually captured in associated markets.

Appendix C: Selected theoretical perspectives on cultural valuation, market structure and the formation of Indigenous business

1. Introduction

Morphy (2005) describes the process of value creation in economic transactions in a cross-cultural context, specifically in the process of creation of Indigenous art and artefacts for sale in a market. Morphy insists that Indigenous art is different from many other commodities because it is the centre of multiple discourses over value (p.19). However, while this report largely ignores Indigenous art, which is covered by the Copyright Act that is beyond the scope of this project, the focus on goods and services that use IK means that the research needs to be mindful of the potential for multiple discourses over value.

Munn (1986) describes a value creation process that is more than its commodity value or market value. In her view the 'cultural' value is produced or located in objects in the context of social action and through the socialisation into regimes of value associated with objects. Morphy (2005: 21) encapsulates

Objects in any culture gain value by their use for certain purposes, by their association with particular groups, by their gendered nature, on the basis of the **technical knowledge and skills associated with their production** and so on. All material culture objects become indices of, or are objectifications of, social value (emphasis added in bold)

The social context of the traded commodity is central to goods produced using IK. This characterisation of value is not at fundamental odds with the economic methodologies which routinely characterise the value of non-market value. Not only do Morphy and Munn remind us that market value is not the only source of value, but social value is external to an individual and embedded in the production processes that involve IK. In the language of modern economics, cultural goods can involve positive externalities in production. The importance of social context in consumption of cultural goods raises the prospect of positive externalities in the consumption of cultural goods that could reinforce and extend the social value of that good. This appendix will return to a conventional economic model of externalities to assist the reader in conceptualising the role of externalities in the value of cultural goods and services transacted in the market.

The economics of culture is a relatively new field of economics that has evolved over recent decades. Many of the issues for the economic evaluation of cultural goods and services arise from the fact that cultural products are a product of society or community rather than the individual around whom marginal utility theory revolves (Snowball 2008: 25). Both Throsby (2003) and Klamer (2003) refer to the way society values cultural goods collectively rather than individually. Indeed many goods and services associated with culture and the arts can be considered as a common good rather than a public good because non-members can be excluded from the group in a number of ways (Klamer 2004). However they are not completely private goods and services either in the sense that individual ownership make no sense where the values are socially constructed. The social 'construction' of value of these goods is the crux of the matter that we need to understand or conceptualise.

The important thing to realise in the context of the social 'construction' of value in the context of Indigenous Australia is that there is no single Indigenous culture. Yap (2017) uses qualitative research with the Yawuru people of Broome in the Kimberley to establish suitable

surveys and instruments that take into account the Yawuru's concept of 'liyan' which encapsulates the distinct worldview of local cultures. Given the variation in culture across Australian clans and language groups across the continent, it is arguable that methodologies for valuing IK need to be adapted in each local Indigenous context.

The fact that this project seeks to think about how to measure the market value of IK does not avoid the issues of the social construction of value. Markets provide an arguably impersonal (price) mechanism to identify value in exchange but before this can happen the IK has to be converted into a cultural good or service that is appropriate to be traded, and to protect IK and the culture from which it is derived. Tradable cultural products may be generated in a number of ways but not all modes of production will ensure that IK will be protected and generate appropriate remuneration for the owners of that IK.

The emphasis on construction of social value means that particular emphasis will be paid to the supply-side of IK or associated cultural goods. The latter part of this appendix will briefly reflect on some stylised representations of the production processes and putative effects on the cost structure and the formation of Indigenous businesses that may operate in potential and even existing markets. The discussion does not focus on details of production but to ensure that IK is protected within the market institutions that produce the cultural goods and services.

Before briefly elaborating on another Indigenous perspective of value of culture, it is useful to remember the nature of the trade in material culture between Indigenous and European societies. Morphy (2005: 22) argues that trade in material culture in markets (or even through barter), 'must be seen in the context of the articulation between different systems of valuing material culture and different value creation processes'. Objects produced still have a value quite different from that of the producing society. The traded goods play a role in the post-colonial dialogue between Indigenous and non-Indigenous Australians. Altman (2000: 86) argues that the trade is predicated on the reproduction and commercialisation of contemporary Indigenous culture. Crucially he also argues that there is substantial concern in Indigenous communities with industries that are ambivalent to the IP of Indigenous people. Insights from cultural and economic anthropologist such as Howard Morphy and Jon Altman are useful to help other non-Indigenous people understand the intercultural aspects of market transactions. It is particularly important for people who primarily focus on the individual level of analysis (such as neoclassical economists) to have the intercultural aspects of economic exchanges explained in a manner they may understand. However in the context of this report it is important to articulate some Indigenous perspectives. The next section does this in the context of a recent attempt to analyse Indigenous valuation of water resources in the Lower Murray Darling River system.

Of course Indigenous people have a core interest in protecting and defending their IK for themselves and indeed future generations of Indigenous people. Janke (2018), *IK: Issues for Protection and Management*, articulated that IK is linked to the nature of the people and the communities, and their underlying value systems. Thus the definition of IK we would need to work with must be Indigenous-defined and we note that this is a concept that is constantly evolving. Janke (2018) builds on long running research that discusses the accepted definitions of these concepts and current international and national mechanisms and attempts to protect IK (Janke 1999; 2003).

2. Indigenous cultural values and the economics of culture

Birckhead et al. (2011) provide a Report to the Commonwealth Scientific and Industrial Research Organisation (CSIRO) on the 'Economic and Cultural Values of Water to the Ngarrindjeri People of the Lower Lakes, Coorong and Murray Mouth'. It is noteworthy that that publication was a collaboration of Indigenous and non-Indigenous people, but it clearly specifies that all Cultural Knowledge in the report shall remain the property of Ngarrindjeri. This position resonates with this report that is attempting to understand the theoretical issues of value in markets and potential markets, but NOT trying to describe specific IK. Indeed, it is of paramount importance to ensure that the control of IK remains with local Indigenous communities. The penultimate section of this appendix returns to this issue in describing potential institutional structures, and a theoretical rationale for institutions, that can protect IK and ensure local community control over such knowledge in market transactions.

This research by Birckhead et al. (2011: vii) documents the social, cultural and economic values that Ngarrindjeri people derive from a water-based ecosystem and the physical and spiritual connection of Ngarrindjeri people to country. The creation of water markets in the Murray Darling may partially capture the scarcity of water and the value in alternative uses where water rights are established and traded, but focusing solely on the markets may cause the interests of Ngarrindjeri to be ignored due to a failure to take IK into account:

Water is central to Ngarrindjeri existence. It has socioeconomic and cultural value and is critical for physiological, material, community and cultural aspects of Ngarrindjeri life. The Ngarrindjeri wish to retain their connection with their lands and waters to retain and regain wellbeing. Ngarrindjeri know and take for granted, at a deep level, the cultural value of water to their lives and wellbeing.

Human-induced, environmental and institutional activities have almost obliterated some traditional food sources and degraded fresh water sources. However this has not diminished the cultural and spiritual significance of the animals as Ngarrindjeri (totems) and the obligation that Ngarrindjeri people have towards caring for country.

Strategies developed through this project will improve Ngarrindjeri wellbeing by increasing non-consumptive uses and cultural values of 'ruwe', as well as the consumptive use benefits. Any program must be holistic and long-term, and include research, employment, education/training, planning, cultural and spiritual processes.⁷⁰

If we confine our attention to existing markets for water, then these cultural and environmental values are either ignored or heavily discounted. The over-allocation of water rights means that the market prices do not even capture the scarcity of water, let alone the quality of that resource. Marshall (2017) documents how Indigenous rights in water are systematically ignored across the continent.

If Australia were to aspire to a socially optimal management of its water, then there is need to pay adequate attention to both the environmental and cultural values. In developing future markets, government policy must develop equitable long-term partnerships and pathways with Indigenous nations to rehabilitate country and establish sustainable management of lands and waters. Birckhead et al. (2011) argue for the 'foundation for Ngarrindjeri wellbeing, based on a just and productive relationship with the broader Australian community, economy and government systems of management, but aware of the cultural and spiritual dimensions

⁷⁰ The concept of 'ruwe' encompasses all country, including both lands and water.

of wellbeing' (p.viii). In order to create an efficient and just water market, Indigenous people need recognition of ongoing property rights in water or full compensation for the property rights lost through colonisation. The point that needs to be recognised is that the existing market value is not socially optimal and government intervention is required for a just, sustainable and environmentally healthy river system.

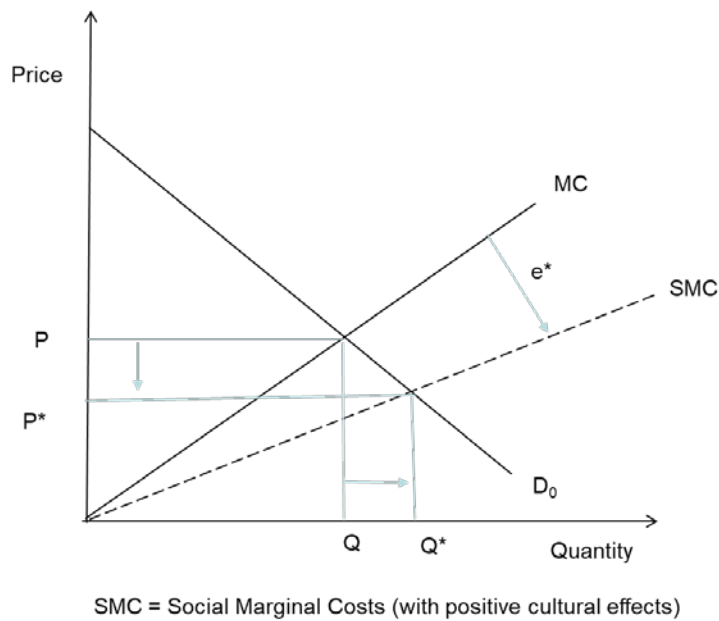
Given that this project is trying to identify the value of IK and culture in a market context, we need to also understand how markets work. Also, given that markets are an inherently intercultural phenomenon it would provide an incomplete and not holistic perspective to focus solely on Indigenous value of culture, however characterised. If we are attempting to identify the potential value of market activity with a view to facilitating Indigenous economic development, then we must also understand the theoretical perspectives and insights from non-Indigenous participants in the market, especially the non-Indigenous demand for cultural goods and services. Economics is a diverse discipline and an important emergent field is the economics of culture, which can be integrated more easily into our understanding of the way markets work than Indigenous notions of wellbeing. The very nature of potential markets is a highly speculative endeavour, so invariably the following review is highly selective. Nonetheless the following attempts to provide a basic framework that will help readers understand salient issues for identifying the value of IK in both current and existing markets.

3. The microeconomics of cultural markets: externalities and markets

Neoclassical economics is modelled on the basis of 'rational' self-interested agents who do not take into account externalities and only make their decisions on the basis of marginal costs (MC in Figure A1—See The Economy: www.core-econ.org). While this is at odds with the above description of cultural goods and services, it is important to understand the standard economic arguments, if only to appreciate why they may not apply in this case.

However, the discussion of culture above has identified that commodities that include IK are likely to involve a positive production externality (cultural services provided to other members of the Indigenous community when individual agents produce a commodity). In the language of neoclassical economics, the social marginal costs (SMC) is lower than the MC and hence if you only take into account individual agents' interests, then too little of the cultural good will be produced (Figure C1). In this situation, public policy could enhance social welfare by subsidising the production of cultural goods with a cash payment to lower the costs of production to the SMC.

Figure C1. Positive externalities in production of cultural services



The use of IK to produce goods and services, and the cultural maintenance associated with such goods, could be considered a positive production externality for the Indigenous community and even the national identity. With respect to the latter, marketing of tourism campaigns for Australia routinely uses Indigenous people ‘performing’ their culture on country. Associated IK embodied in goods and services transacted in a market can be thought of as providing additional value over and above the price or value received for that good in a market. If that were an appropriate characterisation of the market transactions, then policy could improve economic efficiency by designing a Pigovian subsidy (e.g. per unit value of e^*) to reduce the marginal costs of production (MC) to the social marginal costs (SMC).

In Figure C3, the externality or rather the optimal Pigovian subsidy, e^* , increases with the production of cultural services as the more people involved the increase in awareness and skills in IK will benefit everyone in the community. Note that the functional form of the externality in this example means that it is arguably harder for the government to identify the optimal Pigovian subsidy unless it has plausible and accurate information as to the extent of the positive externality on the community or culture. Internalising the externality within a community-controlled business or another organisation working with the Indigenous community may minimise this ‘transaction cost’.

Ronald Coase suggested that a lack of established property rights, and high transaction costs, may stand in the way of using bargaining to resolve externalities.⁷¹ Transaction costs are the costs of reaching an agreement between buyers and sellers in the market (also known as bargaining costs). They include costs of acquiring information about the good to be traded, and costs of enforcing a contract and may prevent the achievement of a socially efficient outcome (Economists call this Pareto efficiency, where it is not possible to make someone better off without making someone else worse off).

⁷¹. Coase’s Theorem can be more formally stated: Where there are complete competitive markets with no transactions costs, an efficient set of inputs and outputs to and from production-optimal distribution will be selected, regardless of how property rights are divided.

Once you realize that various parties can take actions to eliminate an externality, it turns out that Pigovian subsidies/taxes could actually lead to a worse outcome (especially if monitoring costs are high or they fail to use local information).⁷² There are several policy alternatives to Pigovian solutions to the existence of market failure associated with externalities: Regulation that may involve high monitoring costs; and property rights solution, but rights must be well-defined, divisible, separable and tradeable, and defensible/enforceable.

Coase's solution is unlikely to obtain in this situation as property rights in IK are at best evolving. This report argues that many potential instruments are not clearly defined and may be unenforceable. Furthermore IK is owned by the collective local Indigenous community and is hence is not divisible, separable or tradable. Some of the legal instruments may act as a partial defence against people using IK without permission.

The microeconomic analysis of externalities may appear to have relatively little insight into the valuation of IK, however it allowed us to revisit the potentially crucial role of IP rights. More importantly, it allowed us to introduce the notion of transaction costs which is central for the design of efficient and sustainable Indigenous institutions (see next section). The information/monitoring/enforcement costs would be higher for markets involving IK unless the people involved are Indigenous. The market solution for trading and bargaining commodities involving IK is unlikely to work, as a monetary subsidy is less important than the relationships between Indigenous people producing the cultural goods. The main issue for Figure C2 is that it abstracts from the institutional structure of the firm producing the goods and assumes relatively impersonal relationships between agents.

An Indigenous organisation in British Columbia, Tulo (2014: 13), wrote a textbook on Indigenous economics that defines a 'market' as a voluntary exchange between a buyer and a seller that takes place and this exchange is facilitated by informal or formal rules and infrastructure. They identify markets as social institutions that facilitate and support voluntary exchanges between parties and hence Tulo's analysis is closely aligned with Douglas North's *New Institutional Economics*. The next section revisits the insights of Institutional economics. However, the remainder of this section briefly considers the microeconomic implications of market structure.

Altman et al (2002) describe the role of market structure in the context of the visual arts industry. In conventional economic theory, competition is valorised over monopoly. However, in the context of marketing goods and services associated with IK, some vertical integration may allow for greater control of IK. Also, arguably there is a natural monopoly for local Indigenous community organisations in knowledge that is held in local culture. Another role for a local community monopoly over the transactions of commodities associated with IK is that it may facilitate the internalising of the putative positive externalities in production and consumption alluded to above. As local Indigenous organisations are more likely than non-Indigenous organisations to have information on any externalities, they are more likely to allow economic activity to achieve a socially optimal level of production and consumption. The next section focuses on transaction costs in Indigenous and non-Indigenous businesses to make some further points about optimal institutional structures for Indigenous people to manage their IK.

⁷² Pigovian taxes and subsidies were named after Arthur Cecil Pigou who introduced the idea into neoclassical economics.

4. Indigenous business and the market

The valuation of market potential is inherently complex and involves speculation into the future supply and demand for goods and services produced by IK and the potential transaction costs of any exchange in the market. Transaction costs encompass information, search, bargaining and enforcement costs, which are associated with various market institutions including the legal frameworks and organisational structures of businesses (North 1991).

Janke (1999) argues the goods and services involving IK must be supplied within an Indigenous enterprise, if Indigenous control is to be guaranteed over that IK. Indigenous enterprises can take a range of institutional forms (sole trader, commercial/non-commercial enterprises with employees or even a trust). The institutional form adopted in markets, both actual and potential markets, should minimise transaction costs to ensure that Indigenous stakeholders retain control and maximise the value received by members of the Indigenous community. While this principle is a matter of equity, it also is necessary for ensuring sustainability of market institutions. Therefore, in addition to estimating economic value within markets, this Appendix briefly reflects on potential transaction costs associated with likely institutions in those markets. The future demand for goods and services produced by IK is driven by both ongoing uses and perceptions of authenticity of the IK, which will be influenced by the institutional context.

Coase (1937) discussed transaction costs in his path-breaking article on the nature of the firm. The basic insight is that agents in a market have costs when transacting with other agents. If those transaction costs in the market become too high then either the economic transaction does not take place, or the transaction can take place within other institutions. Agents can band together to form a collective 'firm' or an agent may choose to forgo their autonomy and take direction from the firm's manager. In Coase's model economic firms form to minimise transaction costs in the markets and within firms. Note that the optimal institutional arrangement is the one in which the costs of all transactions are minimised (i.e., the costs internal to the firm and the costs of external/market transactions (Figure C2).

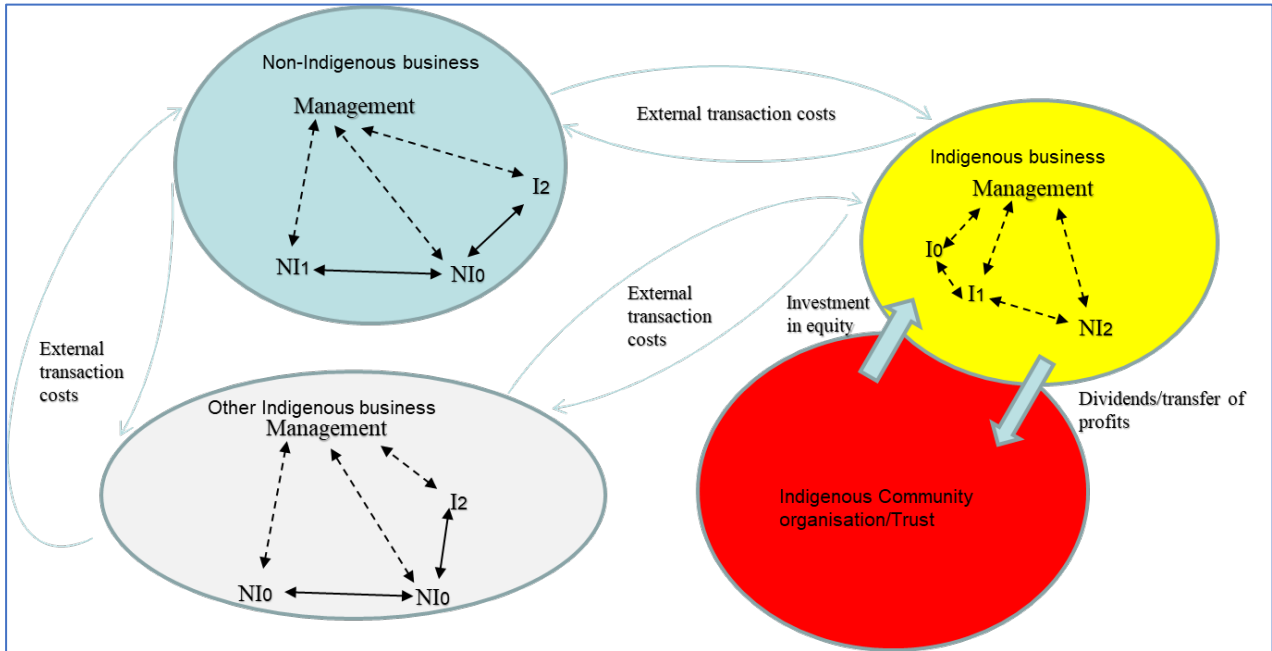
This may seem a bit abstract, so we discuss the context of an Indigenous business producing commodities using IK. If Indigenous workers use their IK in production there is more trust between those workers and an Indigenous business than there would be in an impersonal market transaction with potentially non-Indigenous agents/businesses. The higher level of trust means there is less need for firms to monitor workers. If Indigenous people work together in the use of IK to produce goods and services, then there is a shared understanding which in turn could lead to lower costs for the Indigenous business.

One of the defining features of Indigenous businesses is that they have 50% or more equity held by Indigenous stakeholders and have business objectives that are substantially influenced by the broader interests of the local Indigenous community (Foley and Hunter 2013). Furthermore Indigenous businesses are much more likely to employ Indigenous workers—the highest estimate is that Indigenous businesses are up to 100 times more likely to employ Indigenous workers (Hunter 2015). Hence the transaction costs in Indigenous businesses producing goods and services are likely to be substantially lower than that for other businesses using IK (i.e., lower information costs, monitoring costs and even enforcement costs when IK needs to be protected from improper uses). Indigenous management and control of the company (in addition to Indigenous ownership measured in

terms of equity) would further engender trust and lower transaction costs of the business. The recent changes to the certification processes for identification of Indigenous businesses within Supply Nation are indicative of the importance of Indigenous management and control for ensuring objectives of the Indigenous community are realised within a business.

Figure C2 illustrates that the transaction costs for goods and services that include some IK are likely to be particularly low in Indigenous businesses, especially those with close links (or overlap) with Indigenous community organisations. Transaction costs between Indigenous workers and management in Indigenous businesses are likely to be lower, especially with respect to lower monitoring costs and enforcement costs associated with a shared cultural and community understanding. These lower transaction costs are likely to be particularly important where IK is involved, however it may also be true for any Indigenous business given the disproportionate level of Indigenous employment in such businesses (see Hunter 2015).

Figure C2: Transaction costs, Indigenous businesses and goods and services that include IK



Notes. Transaction costs are indicated by the distance between economic agents. Indigenous people are indicated with an 'I', and non-Indigenous people indicated with a 'NI'. Thick arrows are not transaction costs but represent flows of resources between institutions (i.e. transfers and investments represented)

Altman et al (2002) also point to other institutional arrangements, such as authenticity labels, that may protect and add value to goods and services that use IK as an input. Such arrangements can also be interpreted through the lens of transaction costs in making it easier for consumers to ensure that they are getting goods and services that are in some sense authentically 'Indigenous' and hence reducing the cost of searching for such authenticity.

5. Implications for this project

This Appendix does not attempt to give a comprehensive overview of the economics of culture and goods and services that include IK. Rather it is a tentative exploration of some economic issues that need to be addressed going forwards.

A simple economic model of supply and demand used in microeconomic textbooks is woefully inadequate, because it fails to take into account the relationship between Indigenous agents producing the goods and services and using their IK.

The fundamental problem for this report is the lack of clarity about property rights in IK and how they should be best protected. The instruments, institutions and protocols that are evolving in this space need to be designed to minimise transaction cost between economic agents. The best prospect for doing this seems to be facilitating Indigenous businesses to develop innovative processes that optimise economic independence whilst at the same time protecting IK. The failure to minimise transaction costs is likely to lead to economic agents circumventing the arrangements. The failure of earlier authenticity labels to be sustained or adopted by a sufficient number of economic agents may reflect the lack of incentive compatibility amongst various parties.

It is the fate of many economic analyses, that a general reader would claim that the insights are obvious. In a sense, the economic analysis above simply confirms the insights provided by Janke's ongoing research—that IK is best protected within Indigenous organisations and the local Indigenous communities. Nonetheless this Appendix provides support for this position from a mainstream economics perspective that is utilised by many policy makers (who are non-Indigenous and may need supplementary rationales for supporting best practice institutions). Furthermore the authors have a shy hope that the more people who understand what makes sustainable economic institutions, will lead to better institutional design.

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