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Economic Sustainability of the Australian Grain Supply Chain Post Market Deregulation

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Abstract
From a grain supply chain once supported by a statutory market scheme, poised to stabilise market fluctuations and protect primary producer financial returns, the Australian grain market has now been significantly altered through the process of market deregulation. The deregulation of the Australian grain statutory market scheme created free market conditions in order to increase competition and industry growth; however removed much of the stabilisation mechanisms for primary producers and the greater grain supply chain. In opposition to the intent of the market deregulation, productivity growth within the primary production portion of the Australian grain supply chain has been notably diminished, since the deregulation of the statutory market scheme. Through understanding the impact of deregulation on the social systems, within the primary production environment of the Australian grain supply chain, it is evident that deregulation has had a significant effect on the capacity and desire of primary producers to innovate and the subsequent ability of the supply chain and grain industry to ensure economic sustainability.

Keywords: Economic sustainability, supply chain, deregulation, grain production, risk, decision making

1. Sustainability and the Australian Grain Supply Chain

The term sustainability is the process upon which actions are taken in order to meet present needs without compromising future needs (WCED, 1987; Blattel-Mink, 1997; Bansal & DesJardine, 2014). This concept of sustainability in business translates into the ability of an entity to adequately respond to current, and often short-term, business requirements whilst maintaining the ability to adequately respond to future requirements, thus ensuring the competitiveness of the business to sustain change yet maintain value (Bansal & DesJardine, 2014).
In reference to the agricultural supply chain, sustainability can be conceptualised as the ability to enact all aspects of the supply chain to respond to changes, within the business environment, to ensure the continued optimal conversion of supply chain inputs into various desired supply chain outputs and profits. The process of ensuring that a supply chain has the ability to act in a sustainable manner, and in turn maintain competitiveness, is referred to as sustainable supply chain management (SSCM) (Zeng et al., 2016). The constructs of SSCM are inherently seeded in the process of creating a supply chain design where developments are made to ensure sustainability in reference to the environmental, economic and social aspects of the supply chain (Zeng et al., 2016). The rationale of the SSCM design is closely aligned with John Elkington's triple bottom line (TBL) concept of sustainability, which considers the social, environmental and economic aspects of the business working together to create and maintain a whole value output

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(Elkington, 2004).
The TBL and SSCM concepts both identify that when the social, environmental and economic aspects of the business or industry are working at an imbalance, value outcomes will ultimately be derived at a detriment to one or both of the remaining TBL elements (Elkington, 2004; Zeng et al., 2016). Imbalances can often be derived as the outcome of various organisational and institutional factors, system relationship structures and design issues (Elkington, 2004). Zeng et al. (2016) identify that in SSCM, supply chain design and relationships are two of the most crucial factors contributing to a sustainable supply chain.
The successful implementation of SSCM is particularly pertinent in regards to the economic sustainability of the Australian grain supply chain. Australian grain export products comprise a significant proportion of the gross national product (GNP) (ABARES, 2017). The Australian Bureau of Agricultural and Resource Economics and Sciences (ABARES) (2017) projected in the 2017 *March Quarterly Report*, that the value of export grain products in the 2016/2017 financial year would reach nearly $26.8 billion. This grain export value amounts to nearly half of the value of all Australian farm export products produced in the 2016/2017 financial year, estmitated at nearly $47.7 billion (ABARES, 2017).
With such an economically important contribution to the total national agricultural output, it is necessary to understand the genesis of grain production, in the context of the entire supply chain, to understand the financial and social motivators and pressures impacting on profitability and production. In using the lens of the primary production phase of the Australian grain supply chain, the design and relationships that are imbedded in the supply chain are critical for assessing and understanding the economic sustainability of the industry.

2. Design and Relationships of the current Australian Grain Supply Chain

The Australian grain supply chain supports approximately 22,000 primary grain producers covering approximately 13.8 million hectares of arable land (ANZ, 2016). This geographically disperse network of primary grain producers relies heavily on a range of exogenous and endogenous supply chain stakeholder relationships to ensure optimal production processes.
Endogenous stakeholders are considered to be those belonging to the system, whereas exogenous stakeholder are those that sit outside of the system yet exert significant influence (Coenen & Lopez, 2010). These stakeholder relationships can be further categorised into formal and informal institutional or organisational relationships. Formal institutional stakeholders are codified in their nature and seek to regulate behaviour and actions through the use of laws, contracts and regulations (Leyden & Link, 2014; Coenen & Lopez, 2010). Conversely, informal institutional stakeholders are often derived from existing social and business processes and requirements and provide a framework of social norms, values and responsibilities (Coenen & Lopez, 2010).
In the current supply chain design the formal relationships largely include the role of the Australian Government in regards to regulation, investment and industry coordination and the subsequent role of various statutory and non-statutory research and

development corporations (RDC) to produce and deliver appropriate industry research and improvements (GGL, 2016). The Australian Government has taken the approach of minimal market intervention, post market deregulation, and conversely has utilised various government reviews and initiatives, such as the Wheat Industry Advisory Taskforce (WIAT) established in 2013, to refine and establish policy (GGL, 2016). The government interaction within the Australian grain supply chain also allows for numerous areas of support and investment for primary producers including drought assistance, natural resource management and tax concessions, such as the Farm Management Deposits (FMD) (GGL, 2016).

The informal relationships within the grain supply chain are much more dispersed than their formal counterparts. Primary producers rely on the various informal stakeholders dependent on their production geography, ethos and social and climatic determinants. Production necessary stakeholders form a vital part of the primary producer phase of the supply chain by facilitating the ease and access of resources and inputs necessary for grain production. These production necessary relationships include organisations which facilitate the supply, production and development of production inputs such as chemicals, fertilizers and seeds, as well as agronomy and research extension services (GGL, 2016). Expanding on the production necessary stakeholders, primary producers within the Australian grain supply chain also heavily rely on relationships with primary producer advocate organisations, storage and handling services, and export and grain marketing organisations (GGL, 2016). In regards to the storage, handling, export and grain marketing organisations, the supply chain is dominated by a few key players. This oligopoly is due to a capped requirement, derived from production capacity, for grain storage and handling infrastructure, and transport and bulk shipping export facilities (PWC, 2011). However, there are multiple smaller scale transport and storage and handling stakeholders currently emerging within the confines of the grain supply chain (PWC, 2011).

The design of the Australian grain supply chain, regarding the informal and formal stakeholder relationships, is a new construct formed from the deregulation of the previous statutory market structure (GGL, 2016). As a result of the evolving supply chain design there are many current transitional strains and imbalances within the confines of the supply chain (PWC, 2011). These strains and imbalances have in recent years resulted in major fluctuations in grain prices, due to global grain production and demand trends, and the increased variability of national grain yields produced due to unfavourable climatic conditions and the insufficiency of production supplies such as chemicals and seeds (GGL, 2016; SCAI, 2016). As a result of these market and production fluctuations the supply chain has seen large scale changes in market conditions in recent years, resulting in the insolvency and exit of multiple stakeholders (Marshall, 2015; GGL, 2016). Further changes in the focus and funding of RDCs has also resulted in strains and imbalances for primary producers regarding their access to new research and innovative practices (PWC, 2011; GGL, 2016).

In understanding the transitional strains and imbalances currently evident in the Australian grain supply chain it is necessary to evaluate the construct of the previous statutory market structure.

3. The Deregulation of Australian Statutory Grain Market

The Australian grain supply chain, in specific reference to the primary production phase of the grain supply chain, has been largely shaped by the existence and influence of a collective statutory market structure (Cockfield & Botterill, 2007).

The statutory grain marketing scheme, enacted in its primitive form in 1914 as part of a war-time effort, was intended (through to its demise in the 1990's) as a stabilisation mechanism to instate control in a historically unstable market (Cockfield & Botterill, 2007). The stabilisation scheme, as it was referred to by the Australian Wheatgrowers Federation (AWF), effectively managed to protect the economic sustainability of the grain supply chain by smoothing fluctuations in the global grain markets, whilst ensuring a stable and dependable price for primary producers (Cockfield & Botterill, 2007; Whitwell, 1993). The price stabilisation mechanism meant that primary producers were paid a guaranteed fixed price, for their grain, to allow for production costs to be covered (Cockfield & Botterill, 2007). In the eventuality that, for example, export prices exceeded the prices paid to primary producers, for their grain, profits were allocated to a stabilisation fund which was used to 'top up' the guaranteed primary producer price when needed (Cockfield & Botterill, 2007). The guaranteed price for primary producers was renewed systematically to account for variations in production costs and general market trends (Cockfield & Botterill, 2007). It is widely recognised that the process of fixing the guaranteed primary producer price, and the allocation of excess export profits to the stabilisation fund, was instrumental in smoothing fluctuations in export and domestic prices thus ensuring a consistent financial return for primary producers (Cockfield & Botterill, 2007; Whitwell, 1993).

From a holistic viewpoint, the scheme had great support from the government, primary producers and key producer advocate organisations as the scheme mitigated the risk of poor financial returns and ensured the stability, and sustainability, of the supply chain to meet the current and future demands of internal and external stakeholders (Cockfield & Botterill, 2007; Whitwell, 1993). However, internal criticism increased during the tenure of the statutory marketing scheme due to rising concerns regarding matters such as the proposed reductions to the guaranteed primary producer price, and the inherent domestic and export monopoly of the scheme, which resulted in the subsequent lack of competition and market opportunities (Cockfield & Botterill, 2007). As a result of the rising opposition to the statutory marketing scheme many growers became dissident and began to operate outside of the confines of the collective structure (Cockfield & Botterill, 2007). This primary producer unrest was a key instigator for the dismantling of the statutory grain marketing scheme in the late 1970s (Cockfield & Botterill, 2007).

The deregulation of the Australian grain statutory market structure began in earnest with the initial government and industry review of the existing marketing board, the Australian Wheat Board (AWB), and the Industries Assistance Commission (IAC) inquiry (Cockfield & Botterill, 2007). As a result of the governmental IAC inquiry it was suggested that the domestic market should be deregulated (Cockfield & Botterill, 2007). Furthermore, in 1979, the *Wheat Marketing Bill* was proposed, and subsequently facilitated, a system by which primary producers could receive a license to trade independently of the collective marketing arrangement (Cockfield & Botterill, 2007).

This slow dismantling of the existing collective marketing scheme proceeded until 1989 when the Commonwealth Government passed a motion to dissolve the AWB's domestic monopoly and remove the guaranteed price for grain from Australian primary producers (Cockfield & Botterill, 2007). The Commonwealth *Wheat Marketing Act (1989)* however enabled the preservation of the wheat export monopoly (GGL, 2016).

By 1990 the Australian grain industry was a dramatically different landscape to that of the past 76 years, with more than a dozen separate organisations now established to store, handle, market and export grain (GGL, 2016). These numerous organisations continued to evolve, amalgamate and dissolve, eventually resolving themselves to the four main regional dual marketing and storage and handling organisation in operation today (GGL, 2016). With the repeal of the Commonwealth *Wheat Marketing Ac*t (1989) in 2008 the greatest impediment to the full free market structure was removed (GGL, 2016).

4. Primary Producer Perceptions Post Deregulation

Through the process of deregulation and the dismantling of the scheme's associated market risk mitigating factors, primary producers have developed understandings and perceptions regarding the current condition and future of their industry. Watson (1999) commented that the deregulation of the AWB's monopoly occurred against the wishes of the organised grains industry. This disparity regarding deregulation and the wishes and perceptions of primary producers in the Australian grain supply chain, has continued from the inception of deregulation to present day (Marshall, 2015; de Landgrafft, 2015). A national study of primary grain producers conducted in 2015, concluded that of the 450 primary grain producers surveyed 49 per cent believed that they were not better off and their financial returns had not increased post market deregulation (Marshall, 2015; de Landgrafft, 2015). A further 17 per cent stated, within the framework of the national study, that they were worse off and had received worse financial returns post deregulation (Marshall, 2015; de Landgrafft, 2015). The responses collected were relatively uniform across Australia therefore mitigating a concentration of opinion due to any one geographic location (de Landgrafft, 2015).

The competition benefits of market deregulation have been widely accepted by primary producers to have come to fruition (de Landgrafft, 2015). The survey concluded that 60 per cent of primary producers agreed that more competition existed in the market post-deregulation (Marshall, 2015). However the national survey provided insight into the rationale of primary producer perceptions regarding their financial returns and economic sustainability as a whole. Many survey participants stated that their individual views regarding the success of deregulation was clouded by unease and confusion, which was attributed to the increase in perceived marketing risks and abundance of selling options (Marshall, 2015). These primary producer risk perceptions have been compounded in recent years through an increase in financial market instability and pressures ranging from the insolvencies of multiple grain marketing companies, through to changes in domestic and international grain demands and mass fluctuation in global prices (Marshall, 2015).

5. Measuring Economic Sustainability via Total Factor Productivity

The perceptions of primary producers post deregulation, regarding their financial returns and subsequent economic sustainability, can be analysed in reference to their actual business profits and production cycle productivity (Zeng et al., 2016; Wolf, 2014; Taticchi et al., 2013). A key factor in assessing the actual profit and productivity of a primary production system, is to interpret the aggregated yield output, at the primary production phase, in reference to the costs and inputs of the production system to produce a Total Factor Productivity (TFP) value. The TFP value is derived from measuring the total output value relative to the value of measured inputs, such as labour and capital (SCAI, 2016; ABARES, 2017). The measured growth of TFP in a production system is an indicator of innovation creation and adoption.

The Commonwealth Scientific and Industrial Research Organisation (CSIRO) commented at the 2016 *Smart Farming* inquiry into agricultural innovation, that productivity in large scale grain production systems has stalled significantly, as a whole, in the last 20 years (SCAI, 2016). The Australian Bureau of Agricultural and Resource Economics and Sciences (ABARES) has produced data which concurs with this commentary. The ABARES (2017) reported in 2016 that the growth of TFP was 0.16 per cent per annum between the period of 1993/1994 and 2006/2007. This period corresponds directly with the post deregulation phase of the Australian grain supply chain. The previously noted period, between 1977/1978 and 1993/1994, had a recorded annual TFP growth of 2.09 per cent (ABARES, 2017). The TFP growth data recorded by ABARES was subject to a climate adjustment to remove variations in TFP attributed to climatic conditions, such as occurrences of extreme wet and dry weather (ABARES, 2017).

The remarkable drop in productivity growth recorded in the post deregulation era is a significant indicator of the effect that deregulation, and the intrinsic changes in the market structure, had on primary production in the Australian grain supply chain. Various studies have attempted to explain the dramatic decrease in productivity growth by suggesting that the productivity decline was attributed to a subsequent decline in agricultural research and development (R&D) expenditure (Sheng et al., 2011; Jackson, 2010). Other possible factors for the decline in TFP growth include a reallocation of research priorities, and a subsequent decreased focus on productivity improvement, as well as a limitation in on-farm skills and resources to create and adopt productivity enhancement practices and technology (Jackson, 2010; SCAI, 2016).

Although the productivity growth of grain primary production dropped significantly post deregulation, an increase in the last decade has been recorded (ABARES, 2017). The ABARES (2017) recorded that TFP growth between the period of 2006/2007 to 2014/2015 had increased, from 0.16 per cent, to 1.50 per cent. This increase in productivity growth, however, remains lower than that experienced during the operation of the statutory market structure in reference with the ABARES (2017) TFP data recorded between 1977/1978 and 1993/1994.

The notable concern regarding the suboptimal productivity growth rate, experienced in current Australian grain production, is the consideration that innovation production practices and technology are widely available and accessible for primary producers

(SCAI, 2016; GGL, 2016). The CSIRO and Grains Research and Development Corporation (GRDC) both noted in the 2016 *Smart Farming* inquiry that the current national grain yields, and subsequent productivity, are only half of what is possible in light of current technology (SCAI, 2016).

6. Economic Sustainability as a Factor of Innovation and Social Networks

Economic sustainability is commonly understood as the sustainable development of an economy, which inherently requires innovation to propagate development (Leyden, 2016; Coenen & Lopez, 2010). The relationship between economic sustainability and innovation is founded in the theory that economic, and sectoral, competitiveness is a direct product of the capability and success of the economy, or sector, to innovate (Malmberg & Maskell, 1999; Coenen & Lopez, 2010). Innovation is understood within these confines as the creation and/or adoption of goods, services or processes which bases themselves in offering a new or improved commodity to the market and its subsequent constituents (Edquist, 2005; Coenen & Lopez, 2010; Blattel-Mink, 1997).

Innovation is inherently social in its nature, thus requiring a network of social aspects to interact in its facilitation (Coenen & Lopez, 2010; Lundvall, 1992). It is understood that innovation is social due to its dependency on the social environment to enable the creation and adoption of new and improved processes and goods by those operating in the environment.

In considering the relationships and design of the Australian grain supply chain, it is evident that there is a network of formal or informal innovation drivers (Leyden & Link, 2014; Coenen & Lopez, 2010; Edquist & Johnson, 1997). The network of all social systems, formal or informal, involved in the Australian grain supply chain ultimately influence its ability to innovate. The strength of this social network is a key contribution upon which the desire, and subsequent ability, to innovate is birthed (Leyden & Link, 2014). Granovetter (1973) and Leyden and Link (2014) refer to this strength as a factor of homogeneity in the focus and perspectives of the social network. This focus is attributed to the ease and uniformity of access to a stable economic environment, the necessary resources for innovation, and, a basic commonality in knowledge and direction amongst the social network (Leyden & Link, 2014). Conversely, weak social networks mitigate the success and desire for innovation (Leyden & Link, 2014). Through an increased heterogeneity in reference to the focus and perspectives of the social network, multiple diffused ties form to weaken the strength of the social network and create disparity in knowledge and action, thus impeding the clarity and desire for innovation (Leyden & Link, 2014).

7. Economic Sustainability Post Deregulation

In considering that the strength of the social networks, within the operating environment, strongly influence innovation creation and adoption, it is possible to analyse the social network strength within the Australian grain supply chain, to evaluate its respective ability to innovate.

It is widely considered that the transition of the Australian grain supply chain to an established deregulated market is still not complete as many transitional issues continue to prevail (ANZ, 2016; GGL, 2016). These issues include an unstable economic environment due to domestic and international market fluctuations, together with climate volatility, varying availability and access to resources for innovation, and, varying levels of knowledge and direction amongst the primary producers and supply chain stakeholders due to frequent stakeholder insolvencies and market condition changes (GGL, 2016; Marshall, 2015; ABARES, 2017). These issues are generalist and do not extensively cover the entire array of business pressures currently active within the Australian grain supply chain. However, these issues provide suggestion regarding the strength, and respective homogeneity, of the social networks. In reference with the conclusions of Leyden and Link (2014) it can be determined that the multiple diffused 'ties' in the current Australian grain supply chain are impacting its desire and subsequent ability to innovate.

In utilising Total Factor Productivity (TFP) growth as a measure of productivity and subsequent innovation, it is evident that there is a relationship between the weakening of the social network and the lowering of TFP growth values for grain production. In line with this relationship, TFP growth values were greater during the 1977/1978 and 1993/1994 period of the statutory marketing scheme, when compared to the TFP growth post deregulation as documented by ABARES (2017). As suggested in the 2016 *Smart Farming* inquiry, the observed current national grain yields, and subsequent productivity, are not at the impediment of current technology (SCAI, 2016). Michael Robertson, Science Director of the Commonwealth Scientific and Industrial Research Organisation (CSIRO), notes that 'no one technology [can] be a silver bullet' in reference to increasing production productivity (SCAI, 2016, p. 45). Robertson, in turn, suggests that innovation requires commitment, in a broader supply chain sense, in order to allow for innovation to occur and adoption to follow (SCAI, 2016). The Standing Committee on Agriculture and Industry (SCAI) concur with the arguments of Robertson by further stating that potential productivity gains, through the means of innovation, require an enabling environment (SCAI 2016). This enabling environment refers to the availability of suitable infrastructure, a stable regulatory structure and a supporting market operating environment (SCAI, 2016). The enabling environment referenced by the SCAI is directly supported by the strong social network referred to by Granovetter (1973) and Leyden and Link (2014). Furthermore, by facilitating this enabling environment, many of the current issues identified to exist in the Australian grain supply chain would be addressed.

By removing the limitations of technology and in turn focusing on the enabling environment, and its inherent social network strength, it is evident that a relationship between the social networks, of the deregulated market, and innovation in the Australian grain supply chain exists. Coenen & Lopez (2010) identify that there are certain social systems that have a greater impact on innovation, when compared to the greater social network. Through the data gathered in the 2015 national primary producer survey, as documented by Marshall (2015), it can be concluded that the confusion and increased risk perceptions of primary producers post deregulation has created a significant impact on their ability to create and adopt innovation.

8. Future Research Recommendations

The deregulation of the Australian grain supply chain removed the market stabilisation enjoyed by primary grain producers and replaced it with a market design whereby stakeholders are subject to the natural volatility of the market and therefore are required to actively work to adapt to changing environments in order to remain competitive.

The preliminary findings of the current research confirm the need for further investigation in order to clarify the relationship between deregulation and the perceptions of primary producers, with specific respect to their desire and ability to create and adopt innovation in the deregulated grain market structure. With the ability to codify and develop a further understanding of the social networks it would be possible to identify available strategies for the strengthening of social networks to allow for innovation increases.

It is critical to invest in developing the understanding of social networks, and their subsequent impact on primary producers' perceptions, in addressing the productivity and economic sustainability on the Australian grain supply chain. This critical requirement is in line with the Australian Government's Strategic Research Priorities, which have set out the need to address the productivity and economic growth of key industries, such as the agricultural sector, as well as to build the capacity of industries to respond to environmental change and adopt innovation strategies (Australian Government, 2015) .

References

Australian Bureau of Agricultural and Resource Economics and Sciences (ABARES) (2017). *Farm performance and climate: Climate-adjusted productivity for broadacre cropping farms.* Australian Government Department of Agriculture and Water Resources, Canberra.

Australian Government (2015). *Science and Research Priorities.* Australian Government, Canberra.

Australia New Zealand Bank (ANZ) (2016). The Grains Muster: Infocus March 2016. Australia New Zealand Bank, retrieved on 27/06/2017 from: http://www.anzbusiness.com/content/dam/anz-superregional/AU20963_Grains_Newsletter_Mar_2016_13.pdf

Bansal, P., & DesJardine, M. R. (2014). Business sustainability: It is about time. *Strategic organisation, 12*(1), 70-78

Blattel-Mink, B. (1997). Innovation towards sustainable economy – the integration of economy and ecology in companies. *Sustainable development, 6*, 49-58

Cockfield, G., & Botterill, L. C. (2007). From the Australian Wheat Board to AWB Limited: Collective Marketing and Privatisation in Australia's Export Wheat Trade. *Public Policy, 2*(1).

Coenen, L. & Lopez, F. J. D. (2010). Comparing systems approaches to innovation and technological change for sustainable and competitive economies: an explorative study into conceptual commonalities, differences and complementarities. *Journal of Cleaner Production, 18*, 1149-1160

De Landgrafft, T. (2015). West Australian wheat growers twice as likely to pool grain says national survey. *ABC Rural News*, retrieved on 28/06/2017 from: http://www.abc.net.au/news/rural/2015-07-16/wheat-grower-survey-shows-surprising-grain-marketing-results/6624998

Edquist, C., & Johnson, B. (1997). *Institutions and organisations in systems of innovation. Systems of Innovation: Technologies,* Institutions and Organisations. Routledge, London/Washington, 41-63

Edquist, C. (2005). *Systems of innovation. Perspectives and challenges. In: Fagerberg, J., Mowery, D., Nelson, R.(Eds.).* The Oxford Handbook on Innovation. Oxford University Press, Oxford, 181-208.

Elkington, J. (2004). Enter the triple bottom line. In A. Henriques & J. Richardson (Eds.), *The triple bottom line: Does it all add up?* (pp. 1-16). London, England: Earthscan.

Grain Growers Limited (GGL) (2016). State of the Australian grain industry 2016. Grain Growers Limited, retrieved on 26/06/2017 from: http://www.graingrowers.com.au/about/publications

Granovetter, M. S. (1973). The strength of weak ties. *American Journal of Sociology, 78*, 1360–1380.

Jackson, T. (2010). Harvesting productivity: ABARE–GRDC workshops on grains productivity growth. *Australian Bureau of Agricultural and Resource Economics and Sciences*, retrieved from: data.daff.gov.au/data/warehouse/pe_abarebrs99014452/harvesting_ prod.pdf.

Leyden, D. P., & Link, A. N. (2014). Toward a theory of the entrepreneurial process. *Small Business Economics, 44,* 475 – 484

Leyden, D. P. (2016). Public-sector entrepreneurship and the creation of a sustainable innovative economy. *Small Business Economics, 46,* 553 -564

Lundvall, B. (1992). *National innovation systems towards a theory of innovation and interactive learning.* Printer Publishers, London.

Malmberg, A., & Maskell, P. (1999) Localised learning and regional economic development. *European Urban and Regional Studies, 6*(1), 5-18

Marshall, A. (2015). Grain deregulation doesn't pay. *Farm Weekly*, retrieved on 26/06/2017 from: http://www.farmweekly.com.au/news/agriculture/agribusiness/general-news/grain-deregulation-doesnt-pay/2737545.aspx

Price Waterhouse Coopers (PWC) (2011). The Australian Grains Industry: From family farm to international markets. *Price Waterhouse Coopers*, retrieved on 28/06/2017 from: https://www.pwc.com.au/industry/agribusiness/assets/australian-grains-industry-nov11.pdf

Sheng, Y., Mullen, J. D. & Zhao, S. (2011). *A turning point in agricultural productivity: consideration of the causes.* Australian Bureau of Agricultural and Resource Economics and Sciences (ABARES) Canberra.

Standing Committee on Agriculture and Industry (SCAI) (2016). *Smart Farming: Inquiry into agricultural innovation.* The Parliament of the Commonwealth of Australia, Canberra.

Taticchi, P., Tonelli, F., & Pasqualino, R., (2013). Performance measurement of sustainable supply chains. *International Journal of Productivity and Performance Management, 62*, 782-804.

Watson, A S (1999). Grain marketing and National Competition Policy: reform or reaction?. *Australian Journal of Agricultural and Resource Economics 43*(4).

Whitwell, G. (1993). Regulation and Deregulation of the Australian Wheat Industry: the 'great debates' in historical perspective. *Australian Economic History Review 33*(1).

Wolf, J., 2014. The relationship between sustainable supply chain management, stakeholder pressure and corporate sustainability performance. *Journal of Business Ethics, 119*, 317-328.

World Commission on Environment and Development (WCED) (1987) *Our Common Future.* New York: Oxford University Press.

Zeng, H., Chen, X., Xiao, X. and Zhou, Z. (2016). Institutional pressures, sustainable supply chain management and circular economy capability: Empirical evidence from Chinese eco-industrial park firms. *Journal of Cleaner Production, 155*, 54-65