

BLOCKCHAIN ADOPTION IN AUSTRALIAN GRAINS

DON GUNASEKERA, DEAKIN UNIVERSITY
ERNESTO VALENZUELA, FEDERATION UNIVERSITY
AUSTRALIAN CONFERENCE OF ECONOMISTS, 10-13 JULY 2018, CANBERRA



FORMAT

- **Background**
- **Rationale for our work**
- **Methodology**
- **Findings**
- **Next steps**



BACKGROUND: WHAT IS BLOCKCHAIN?

- **A distributed database**
 - All participants have access to database
- **Peer-to-Peer transactions**
 - Directly between participants, no central node/authority
- **Transparency**
 - Transactions/values visible to all users
 - All transactions are linked (chain)



OTHER ELEMENTS OF A BLOCKCHAIN SYSTEM

- **Irreversibility of data records**
 - All records are chronologically ordered
 - Only available to users on the network
 - This is ensured using computational algorithms
- **Computational logic**
 - Cryptographic and digital nature of database

Source: Iansiti & Lakhani (2017)



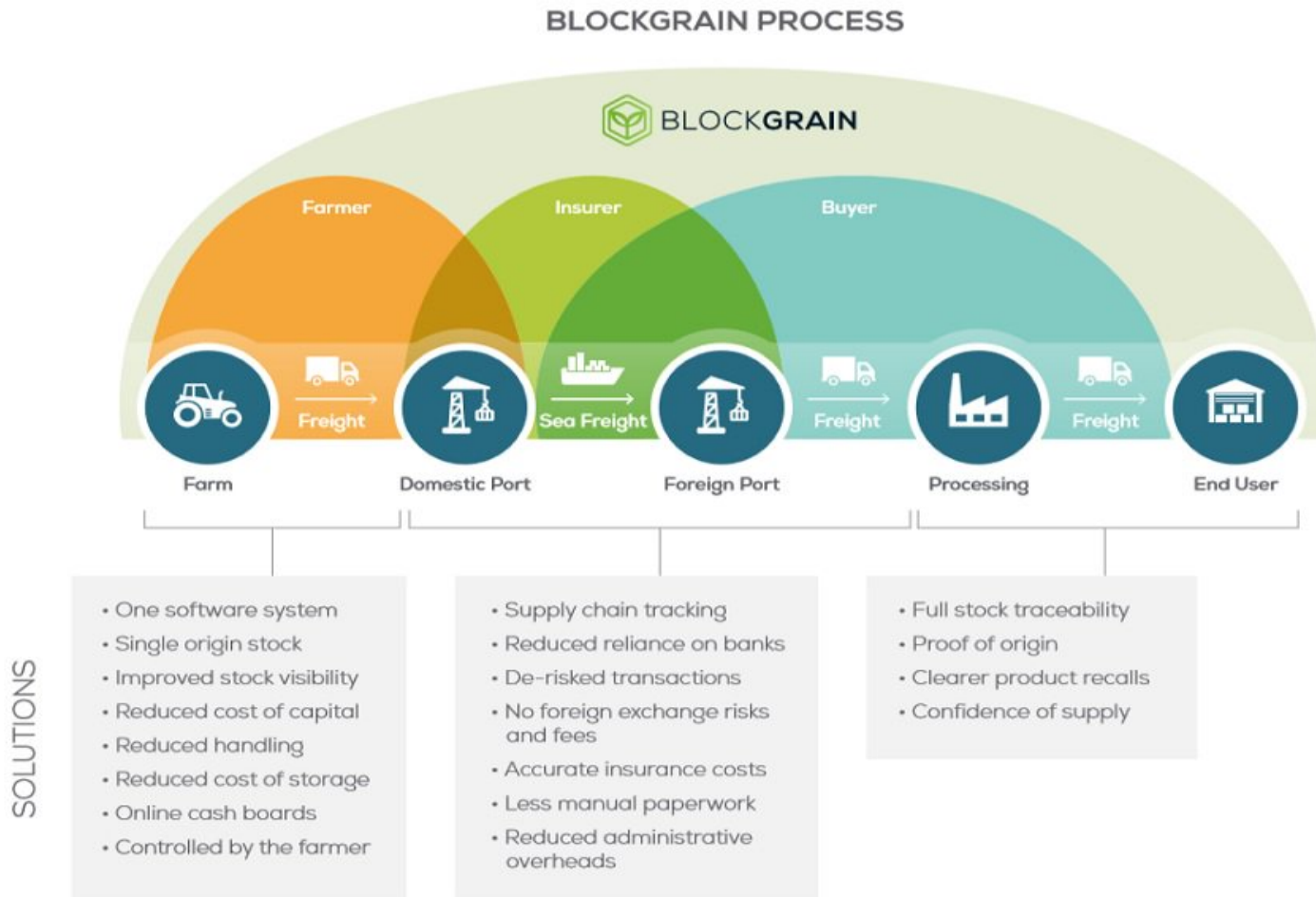
RATIONALE FOR OUR WORK

- **Adoption of blockchain in the Australian grains industry:**
 - 2016: a wheat grower delivered a consignment of wheat to an exporter in Dubbo, NSW, using Blockchain technology and received payment promptly
 - 2017: a delivery of oats by a grain grower cooperative (CBH) to a buyer took place using Blockchain technology

Source: Agridigital & CBH (2017), AFR (2016)



Paddock to Plate ([HTTPS://BLOCKGRAIN.IO/](https://blockgrain.io/))



ECONOMICS OF BLOCKCHAIN

- **Two schools of thought:**
 - Innovation centred approach (Davidson et al, 2016; Catalini & Gans, 2016)
 - Blockchain (ICT) --> productivity gains
 - Fall in transaction costs
 - Governance centred approach (Davidson et al, 2016; Suikkanen 2017)
 - New organisational/institutional forms of economic governance



ECONOMICS OF BLOCKCHAIN

- **Two types of transaction costs are affected by blockchain technology use**
 - Verification cost (fall)
 - Networking costs (fall)
 - These are costs of intermediation which buyers and sellers incur when they can't verify the authenticity of a transaction



DIGITAL TECHNOLOGY: PRODUCTIVITY GAINS

- 0.1-0.2 % annual MFP gain: Australian economy-wide (Parham, 2000)
- 0.02 % annual MFP gain: Australian finance & insurance sector (PC 2004)
- 10-15% productivity gain: in Australian cropping systems (Keogh & Henry, 2016)
- There are other overseas estimates



METHODOLOGY: MODELLING FRAMEWORK

- **GTAP (Global Trade Analysis Project) model version - projected world economy and agriculture to 2030:**
 - 9 regions (Australia –a separate region)
 - 7 sectors (Grains and Finance etc - separate sectors)



METHODOLOGY: SCENARIOS

- **Due to gradual adoption of blockchain technology in Australian grains and finance sectors (over 10 years to 2030)**
 - 5% productivity gains in Grains
 - 5% productivity gains in Financial services
 - relative to a baseline case (with out blockchain adoption)



PRELIMINARY FINDINGS

Scenario	Change in Australian grains output (%)	Change in economic welfare (US\$ m)	Change in GDP (%)
5 % productivity gain in grains	8.68	432	0.03
5 % productivity gain in finance sector	1.01	58 782	2.53
5 % productivity gain in grains and finance sectors	9.68	59 651	2.55



NEXT STEPS

- **Further improve/update our input data for modelling**
- **Disaggregate the finance etc. sector**
- **Extend the analysis to key developed country grains producers and exporters**
- **Assess the trade impacts including effects on grain importers**



BLOCKCHAIN ADOPTION: CHALLENGES

- **Technical and regulatory issues**
- **Scalability: moving from pilot projects to large scale applications**
- **Data privacy and governance issues**
- **Needs substantial computational power due to validation processes**
- **High demand for data storage**
- **Interoperability issues**



REFERENCES/ ACKNOWLEDGEMENT

- **Agridigital and CBH Group (2017)**
- **Aust. Financial Review (2016)**
- **<https://blockgrain.io>**
- **Catalini & Gans (2016)**
- **Chris Pash (Business Insider 11, April 2018)**
- **Davidson et al (2016)**
- **<https://edge.alluremedia.com.au/uploads/businessinsider/2018/04/blockchain.jpg>**
- **Iansiti & Lakhani (2017); Keogh & Henry (2016)**
- **International Finance Corp (2017)**
- **Parham (2000); Productivity Commission (2004)**
- **Suikkanen (2017)**
- **DHL/Accenture trend research (2018)**

Don.Gunasekera@deakin.edu.au: Ernesto.Valenzuela@federation.edu.au

