Information as a Key Component of Value Chains: The Case of the Australian Pomegranate Industry

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Abstract

The Australian pomegranate industry is an emerging horticultural industry with export potential. Successful growth is dependent on an industry value chain that can effectively collaborate to generate a total chain surplus. However, the industry is currently inhibited by a lack of cohesion, knowledge and resources. This paper examines the requirements for developing a better strategic fit for the industry by focusing on information as a cross functional driver or chain good. This qualitative research used a logical blueprint method to examine eight value chain actors from across the industry. Interviews with industry participants established their current use of information, what further information or knowledge is required for industry development and what obstacles to coordination may exist. There is evidence of chain failure where information is being shared informally or in an *ad hoc* or opportunistic way, resulting in value chain participants maximising their private net benefits at the expense of the overall chain surplus. Consumer and industry profiles were prioritised as key information necessary to create a better strategic fit. The Australian Pomegranate Association can take responsibility in the role as an information chain governor.

Key words: Pomegranate, Value Chain, Strategic Fit, Information

Introduction

The pomegranate (Punicum *granatum*) is a small, deciduous shrubby tree growing five to eight metres tall with varieties bearing fruit ranging in colour from yellowy red to bright red and even black in some cases.

Pomegranate production occurs mostly in the northern hemisphere with less than 1.25 per cent of the world production in the southern hemisphere, and Australia is estimated to account for a mere 2 per cent of the southern hemisphere production[1]. The global demand for pomegranate and its products is growing dramatically. IBISWorld (2017) reported that obesity, heart disease and their links to poor diet and lack of exercise have increased popular awareness of the importance of health and wellbeing and, as a result, apparent fruit and vegetable consumption has risen over the past five years.

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[1] The absence of production data was highlighted as a major issue in the survey responses. Collecting such data is now the subject of priority work being undertaken by the Australian Pomegranate Association.

Pomegranate is not only pleasant to consume but there is scientific evidence that it has a range of beneficial effects attributed to the antioxidative properties of the phenolic compounds, tannins and anthocyanins (Akpinar-Bayizit et al., 2012; Yilmaz et al., 2007).

Australia is well placed to produce and market a counter-seasonal pomegranate product into the northern hemisphere (AgriFutures Australia, 2018) and recently the Australian pomegranate industry has been identified by Coriolis (2017) as one of the new and emerging industries with the potential to grow to $10 million or more in the next five years. Currently, the industry has a sector turnover estimate of $6 to 8 million and a projection of $10 to 15 million by 2025 (Coriolis, 2017).

Successful industry growth is dependent on an industry value chain that can collaborate to deliver a total chain surplus (profit) and therefore, provide profitability for each of the chain stages. There is an assumption that this is desirable for an emerging industry, however, this is underpinned by Chopra and Meindl (2013) who argued that the primary goal of a value chain is to grow its' overall surplus, defined as the difference between the value generated for the customer and the sum of all costs at each stage of the chain. Total chain surplus was also described by Mounter et al. (2017, p.1) as "the difference between aggregate customer value and the cost to the value chain of meeting their customers' requirements, where both costs and returns are properly priced to reflect the possible presence of chain and/or network externalities."

Figure 1 illustrates the value chain map of the Australian pomegranate industry, characterised by a small number of actors in each of the value chain stages, but dominated by several larger vertically integrated grower/processor organisations. There is another assumption that the chain orientation provides sufficient incentives for all chain actors who wish to participate. Given the domination of the vertically integrated producers, there are (potentially) two different competitive contexts in this industry, rivalry between the large firms and near-perfect competition between the smaller firms. Importantly, in this context it is the retailers (acting as gatekeepers) that are the customers that really matter.

Figure 1. Pomegranate industry value chain map
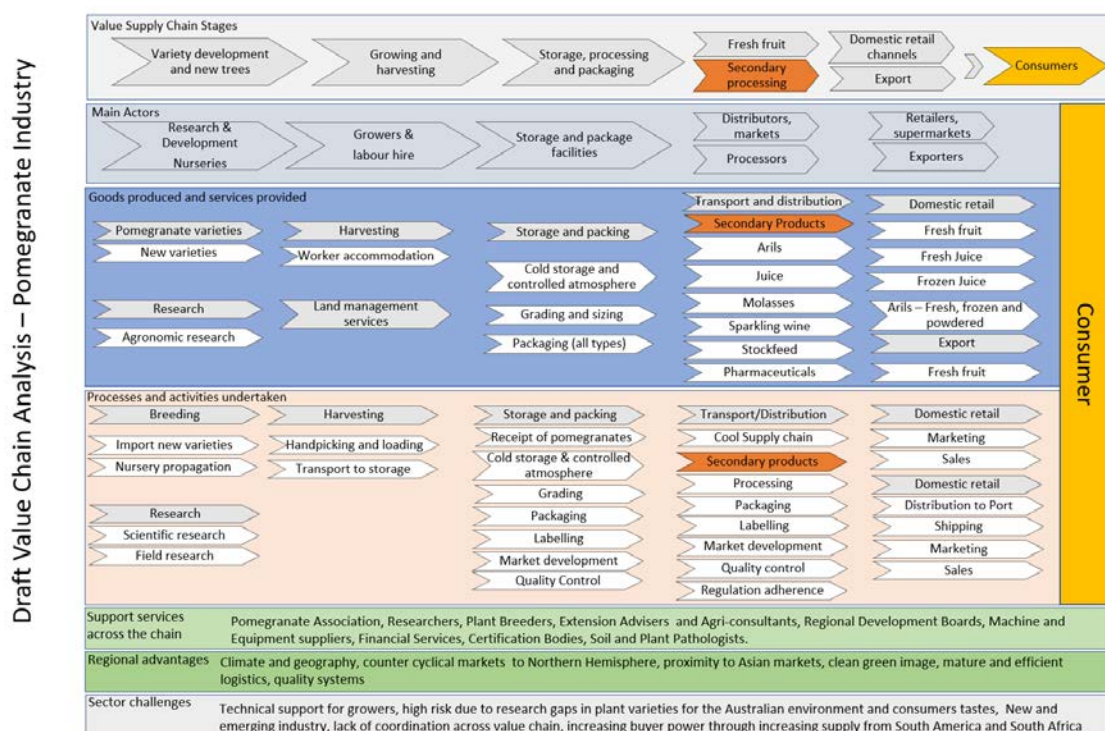
Source: Author's Own, unpublished, 2018

The value chain is principally supported by the Australian Pomegranate Association (APA) formed in 2017. The APA has the ambition to play a larger role in developing the industry (M Sandow, pers. comm., 23 March 2018), however it is constrained by a lack of cohesion between its members, a lack of knowledge and a lack of resources.

Strategic Fit

A value chain's strategic fit, as defined by Mounter et al. (2017), is how the value chain capabilities support each organisation's ability to satisfy the needs of their targeted customer segments, and that will lead to more value creation and increased chain surplus. The Australian pomegranate industry, arguably, does not currently have a good strategic fit as it is not clear who the consumers of pomegranate are and how the supply chain drivers (logistical and cross functional) should be structured to provide the desired level of responsiveness at the lowest possible cost to those customers. Figure 2 illustrates that, the better the alignment between the chain's broad competitive strategy and the sub strategy for the operation of the chain functions, the better the strategic fit will be.

Figure 2. Supply chain decision making framework
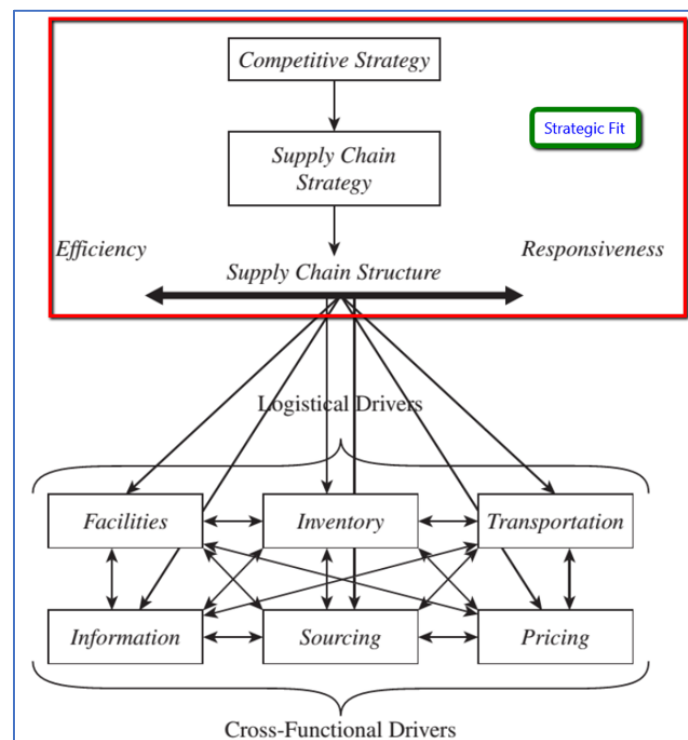
Source: adapted from Chopra and Meindl (2013)

The important role that information plays in the value chain decision making framework (Figure 2) was emphasised by Chopra and Meindl (2013, p.65) who stated that "information is a cross functional driver that enables a higher responsiveness while concurrently improving efficiency". In other words, the sharing of information can help a supply chain meet its customer needs at a lower cost. Further, information sharing needs to happen from perspectives of both the value chain linkage and from a composite view of the whole chain. There is, however, an inherent danger that there will be an increase in the complexity and transactional costs as more information is shared across the supply chain.

Information is also the factual component on which decisions about each of the other drivers (facilities, inventory, transportation, sourcing and pricing) are based. Chopra and Meindl (2013) theorised that information is the most important supply chain driver, as it is the glue that holds the entire supply chain together thus allowing it to function. Griffith et. al. (2014) described "information as the lubricant" of properly functioning value chains and as a chain good - the types of goods and services that facilitate coordination across the value chain actors. Baihaqi and Sohal (2012) concluded that information sharing can create a cohesive supply chain and allow companies to synchronise their activities with supply chain partners. However, information sharing on its own was insufficient to achieve increased organisational performance and that it was best deployed in collaboration activities with partners.

Mounter et al. (2017) reiterated that as an important initial step, value chains need to define how they will satisfy the set of customer needs with their (individual chain actor's) operational components and, at the same time, fit in with the chain's overall plan. Consequently, the industry needs to identify what information is required to operate efficiently and deliver a total chain surplus including: the willingness to share information; the quality of the information being shared; and how information is being utilised? Ultimately, knowledge gained from investigating these issues can be used to develop an industry-based competitive value chain strategy whereby the value chain capabilities support each organisation's ability to satisfy the needs of the targeted customer segments – the strategic fit.

Therefore, the three aims of the research were to establish:
1. *what information is currently shared along the value chain of the industry?*
2. *what are the gaps in this information that are necessary for industry development, and what benefits will closing them bring? and*
3. *what is the process of obtaining this new information and who has an interest in providing this information?*

Method

Qualitative research was undertaken on the Australian pomegranate value chain using an approach described by Yin (2015), whereby a 'logical blueprint' is developed by linking the research questions, data collected and overarching data analysis strategies. This method is an inductive approach using research questions to narrow the scope of the study, letting the data lead to the emergence of the concept. Table 1 provides an estimated size of the industry. Notably, there are a larger number of growers than any other chain actor category.

**Table 1. Approximate industry population**

Chain Actor	~ Number of actors in the chain
Nursery / Research	2
Grower	30
Grower/ Processor	2
Distributor/ Marketer	3
Exporter	1
Retailer	National Chain Stores, Independents and Markets

Approximately 20 potential participants were formally invited to be part of the research, with eight agreeing to be recruited. Table 2 indicates their code assigned for confidentiality. Figure 3 indicates their position in the industry value chain. Importantly, several of the interviewees have vertically integrated business providing a deeper perspective along the chain linkages.

Table 2. Interview recruitment

Coded Interviewee	Chain Actor	Vertically Integrated
1	Grower	No
2	Distributor / Markets	No
3	Research and Development / Nursery	Yes
4	Grower / Processor	Yes
5	Grower / Processor	Yes
6	Research and Development / Nursery/ Grower	Yes
7	Grower	No
8	Support Services	No

Figure 3. Chain actor legend
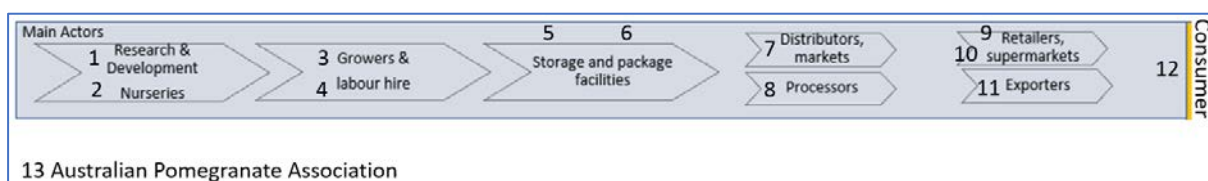
A questionnaire was developed (see the Appendix). Interviews were digitally recorded[2] and uploaded into NVivo 12 (QSR International, 2018), a qualitative data analysis software application used for organising and coding data into themes.

Results

RQ1: What information is being shared across the value chain?

The results indicate that a range of information has been collected and shared along the value chain, but it is characterised as being largely informal, *ad hoc* and opportunistic. In the two larger vertically integrated operations, however, it is more formalised and characterised by a high level of coordination supported by Enterprise Resource Planning (ERP) software systems.

The two significant data types that emerged are Pest and Disease (Operational) and Product Specification (Supply Chain).

Pest and disease

Pest and disease were a significant data type characterised by a high level of awareness and sharing with other chain actors. A higher level of collaboration could arguably be anticipated given early industry setbacks with tree dieback, and now a recently discovered (localised) fungal disease Eutypa

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[2] The University of Melbourne requires Human Ethics Approval for all research conducted with or about people, their data or tissue. Consequently, a Minimal Risk, Human Ethics Approval was obtained by the researcher (Reference 1852624.1) that included a Plain Language Statement and a Mutual Confidentiality Agreement to safeguard information of a commercial nature.

lata. in the Clare Valley, South Australia. Importantly, there are no registered products with the Australian Pesticide and Veterinary Medicines Authority (APVMA) for use on pomegranate. There was unanimous agreement by the interviewees on the role of the APA to facilitate information collection and dissemination regarding pests and diseases including the coordination of permits for "off-label" use of pest and disease products.

Overshadowing this topic was the significant concern by all interviewees over a market access request for the importation of fresh pomegranate fruit from India into Australia, and the subsequent risk of the inadvertent arrival of new pests and diseases in imported Indian fruit. A draft report of the review of biosecurity import requirements is expected to be published by the Department of Agriculture and Water Resources in mid-2019 (Department of Agriculture and Water Resources, 2018a).

Product specification

Product specification criteria are used by the supermarket chains (Coles and Woolworths) for the management of product quality. The criteria for pomegranate fruit are based on the "Wonderful" variety imported from California. This fruit is of a high quality and is colloquially known as a "Christmas Bauble", due to its likeness to Christmas decorations and consumption over the Australian Christmas period when there is high demand. However, Australian fruit is predominantly Autumn-grown fruit produced under different conditions, with a range of visual characteristics that are seasonally dependent. The issue raised by the interviewees is that the Wonderful product specification criteria are used for the Australian fruit and on occasions, this has resulted in rejection of fruit or grading being required by the chain stores, increasing transaction costs.

RQ2: What are the gaps in this information that are necessary for industry development?

The interview data have been used to establish the missing information type, where it sits along the value chain and who may be responsible for rectification (Table 3). The discussion focuses on consumer and industry profiles first, as they were reported by the interviewees as equally important, followed by market access, product specification, variety selection and pest and disease. The rationale as to who is responsible for rectifying the information gap is included in each section.

Table 3. Information gaps

Value chain linkage	Information gaps	Responsibility
Consumer	Consumer profile	Australian Pomegranate Association (APA)
Australian industry	Industry profile	APA
Export	Market access profile and prerequisites	APA
Retailers / supermarkets	Product specification	APA
Growing	Variety selection	Researchers/ Nursery, Growers, Retailers and Supermarkets
Growing	Pest and disease	Grower, South Australian Research and Development Institute (SARDI,) APA

Consumer profile

The interview data reveals that the current pomegranate consumer profile can be broadly divided into three distinct categories that underpin the consumption of pomegranates - multiculturalism, food consumption trends and health benefits. Interviewee 2 provided examples of specific cultural traditions in Middle Eastern, Indian and Jewish consumption of pomegranates. Interviewee 7 provided examples of new food trends driven by international chefs, demonstrating in-store how fresh arils (the edible part inside the fruit) are used for gourmet summer salads, and Interviewee 5 provided examples of how pomegranate juice is used for health benefits such as prostate health. These examples provide an insight into consumer behaviour. However, specific research is required to develop a comprehensive profile of the Australian consumer of pomegranate, establishing key demographics and questioning how, when, in what form and in what quantity are pomegranates and their value-added products consumed? There is also the need to establish how much prior knowledge consumers have in selecting, preparing and consuming pomegranates.

A comprehensive consumer profile can be used to develop a strategic fit for organisations within the industry and the value chain itself, avoiding the need to undercut a competitor's price by lowering quality standards, paying lower wages and defying compliance. Arguably, it will allow the industry to understand what demand uncertainty is present for the range of pomegranate products; in other words, to understand accurately what the demand is from the consumer for each of the different type of products.

The key to achieving strategic fit and delivering a chain surplus is to structure the supply chain drivers appropriately to provide the desired level of responsiveness at the lowest possible cost. The goal is to achieve high responsiveness to a wide range of quantities demanded, meet short lead times and handle supply uncertainty for a supply chain facing high implied uncertainty, or high efficiency for a supply chain facing low implied uncertainty (Chopra and Meindl, 2013, p.39). Mounter et al. (2017) explained that a compromise is required: if demand uncertainty is low then a low-cost value chain is the best strategic fit, but if demand uncertainty is high then a responsive value chain is required. Moreover, the challenge is that achieving strategic fit in food value chains, which are by their nature inherently uncertain, is not straightforward. The traditional microeconomic framework of the production possibilities frontier and the iso-revenue curve can be used to determine the best combination of these attributes (Mounter et al., 2017).

The responsibility to facilitate this research and disseminate information along the value chain lies with the industry and, by default, the APA that represents the industry and whose constitutional objectives include: "advance and protect the interest of pomegranate producers by seeking and disseminating information on matters of interest, concern or assistance to pomegranate producers, and the Australian pomegranate industry."

Interviewee, 2 who is the major distributor/marketer of pomegranates into Coles and Woolworths, has recently invested significantly in purchasing data that includes consumer profiling on the global pomegranate industry including Australia. This organisation is willing to share selected pieces of information to the APA but not the actual data itself, given the cost of the data and that it is considered a key organisational asset.

Australian industry profile

Equally as important as the consumer profile is the requirement for a comprehensive profile of the existing industry. Several reports have been published by the Rural Industries Research and Development Corporation (RIRDC) (2008a, 2008b, 2014) but they are dated or missing key details. An up-to-date industry profile is required to build on the previous work as suggested in Table 4.
Table 4. Industry profile category and data types

Profile category	Data type
Agronomic	No. of varieties
	Total ha per variety
	Yield per variety
Geographic	Production per State and region
	Production periods per State and region
Demographic	Domestic consumption:
	• per State
	• per value added products e.g. aril, juice
Operational	Production volume total
	Production volume per variety
Financial	Gross value of production
	Consumer market value
	Farmgate value

This should be facilitated by the APA.

Export market

Australia currently has formal agreements with Indonesia, Tonga, Fiji, Papua New Guinea, Nauru, Qatar, United Arab Emirates and Singapore for the export of pomegranate fruit (Department of Agriculture and Water Resources, 2018b). Pomegranate can be exported directly without market access agreements, through Singapore and Hong Kong, to a third country (J Canturi 2018, pers. comm., 2 October). However, developing formal market access to countries directly requires a proposal and a comprehensive business case to be submitted to the Trade Assessment Panel (Horticulture Innovation Australia, 2018). Table 5 details the information required for the business case but the issue is that, for the pomegranate industry, the information either does not exist or is inaccessible.

Table 5. Market access data

Market access proposal	Data required
Target country	• Size of the market in terms of volume and value
	• The per cent of the market that Australian product will secure
	• Pest and diseases and treatment
	• Potential barriers - legislative, cultural, trade agreements
	• Evidence of Australian products competitive advantage
Australian producers	• The number of Australian growers that can access this opportunity
	• Current production capacity
	• Capacity to meet demand from target markets
Australian pomegranate industry	• Export strategy plan
	• Industry Business Plan
	• Evidence of commitment from all actors within the value chain

Product specification

As noted earlier, product specification criteria used by the major chain stores (Coles and Woolworths) as a quality control instrument are based on the variety Wonderful, imported from California. These imports are of a consistent high quality. The research data from Interviewee 4 reported that, on occasion, fresh local pomegranate fruit has been rejected due to not meeting these criteria, specifically relating to blemishes on the skin of the fruit due to 'wind rub'. However, the blemish does not affect the quality of the arils. The pomegranate growers interviewed argued that there is a need

to amend the product specification to reflect Australian grown fruit. This would include a grading system catering for premium and lower quality fruit developed from a comprehensive consumer profile. Further along the value chain, this argument is being rejected by the distributing/marketing linkage. Their viewpoint is that the current criteria reflect the quality required by the marketplace. The overarching issue is that the organisations and the industry do not fully understand the pomegranate consumer profile. Understanding customer needs and segmenting them accordingly is required prior to establishing quality instruments (Kotler et al., 2013) such as product specification criteria and a grading system.

The responsibility of managing this process should be facilitated by the APA.

Variety selection

It is estimated there are over 500 cultivars of pomegranate around the world (Kahramanoglu and Usanmaz, 2016). In Australia the two largest growers in the industry predominantly use the Californian variety Wonderful with a small number of other varieties selected for their earlier ripening times (O Rad 2018, pers. comm., 31 July). Wonderful has been developed from different stock and can be quite variable in its characteristics (AgriFutures Australia, 2018). There is significant local production knowledge but some research gaps in Australia to understand what varieties grow where and in what conditions (RIRDC, 2014). Access to new varieties and their importation is significantly hampered by Australian quarantine and biosecurity protocols that insist on treatments that render the imported material unusable (Department of Agriculture and Water Resources, 2018c). The development of strategies to address and coordinate these issues is required with the responsibility being shared by three chain actors: researchers/nurseries; growers; and supermarkets and other retailers.

Pest and disease

There are gaps in the information available about pests and diseases. Existing pomegranate orchards have suffered a range of tree conditions described as dieback. Formal research has not been undertaken on this dieback condition but, increasingly, growers are considering that there may be complex nutrition issues, particularly missing micronutrient requirements. Further research is required to specifically explore the interaction between soil types, irrigation practices and nutrition (Rural Industries Research and Development Corporation, 2014).

A more recent discovery in the Clare Valley, South Australia by the South Australian Research and Development Institute (SARDI) is that the pomegranate can be infected by Eutypa dieback, a disease caused by a fungus (*Eutypa lata*) which grows slowly through the wood of infected grapevines and other woody host plants. The host plants become infected through fresh wounds such as those made during pruning. Toxins produced by the actively growing fungus cause stunting of the shoot (Sosnowksi, 2018). More data are needed for analysis to understand whether *E. lata* is being experienced in other pomegranate production areas.

The responsibility of managing this process should be with the APA and SARDI.

Registered products

There are currently no registered pest and disease control products for use in the pomegranate industry by the APVMA. Off-label use permits can be obtained from the APVMA through an application process except in Victoria where State legislation caters for minor crops by allowing off-label use without a permit (Agriculture Victoria, 2018).

The responsibility for establishing off-label use is the growers', with the APA making a single application to the APVMA.

RQ3: What is the process of obtaining this new information and who has an interest in providing this information?

The APA is a newly-formed industry association drawing its membership from within the industry, with each part of the value chain, except for the consumer, represented. The APA has a mandate through its constitutional objectives to undertake a range of activities along the value chain, to develop and grow the industry. The interviewees considered that the APA has the major responsibility and primary role for obtaining the information necessary for industry development. Malcolm et. al (2017) explained that effective coordination in a value chain requires collective action to meet common objectives and that, if organisations are to be aligned, they need to enter a coalition or alliance. In this case it is argued that the APA can act as an informal chain governor to coordinate information as a chain good, defined by Mounter et al. (2017, p.5) as "those types of goods and services that allow effective coordination across value chain members, internalising transaction costs and any negative externalities".

Another description by Fleming et al. (2018) stated that the chain governor acts on behalf of all the participants, spending time and effort designing and planning how the chain will be structured and operated, with the benefits derived from these activities contributing to a total chain surplus. Notwithstanding, interview data suggested that there are several significant weaknesses and challenges for the APA to be successful in this role. The APA has:

- a small number of members with unequal organisation sizes;
- no resources as it collects a minimal flat fee levy regardless of the members organisational size;
- a minimum level of experience in managing an industry association;
- no formalised vision or mission statement;
- strong personalities as is often characteristic of industry pioneers;
- low levels of trust between members; and
- a reliance on voluntary effort and in-kind support.

For a new organisation this is not unusual given that the APA is in the first stage (Existence) and is seeking to move into the second stage (Survival), of the five stages of an organisation life cycle as described by Lester et al. (2003). Other research by Carman and Nesbit (2012) suggested that there are four stages of organisational growth: the idea; start-up; growth; and maturity phases. Another way to conceptualise where the APA is within its lifecycle is to use the collaboration continuum framework described by Hager et al. (2014) and adapted for use by ACT Youth Network (2018) in Figure 4. The illustration uses Trust and Turf (i.e., the sharing of benefits and resources, and not being self-centred) with Time, demonstrating how the dynamic forces work together to form a degree of collaboration. The results of this research suggest that the APA is located between Acknowledgement and Exploration, defined by a low level of trust and a high level of turf. Arguably, the organisation is protecting and guarding its behaviour where there is an "imbalance, perceived or real, linked to the benefits of the collaboration" (ACT Youth Network, 2018).

Figure 4. Collaboration continuum
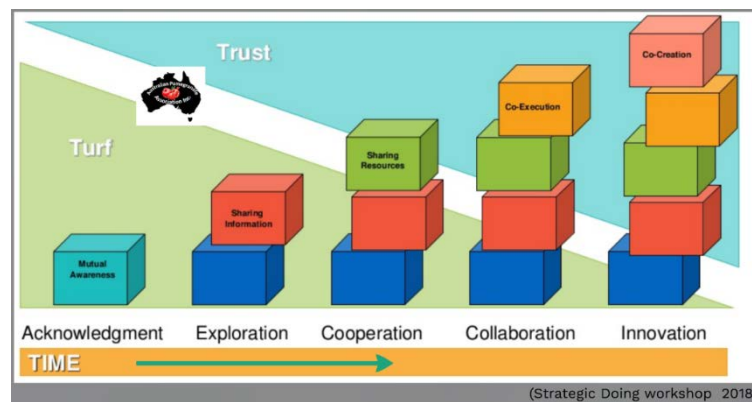
Source: ACT Youth Network (2018)

Obstacles to Coordination

The research results indicate that the interviewees perceive that three main obstacles to coordination are present in their value chain: behavioural; information; and incentive, as defined in Table 6. A lack of trust among the actors and chain partners is also likely to be prevalent (Kwon and Suh, 2004). This results in chain failure whereby the "value chain fails to maximise chain surplus because it supplies a suboptimal level of throughput and value" (Griffith et al., 2017, p. 5).

Table 6. Majority agreement on obstacles present in the industry value chain

Behavioural	Myopic focus and organisational learning	Each stage of the supply chain views its actions locally and is unable to see the impact of its actions on other stages.
		Different stages of the supply chain react to the current local situation rather than trying to identify the root causes.
Information	Lack of information sharing	The lack of information sharing between stages of the supply chain magnifies the information distortion.
Incentive	Local optimisation	There are incentives at the local level that maximise self-interest at the expense of benefiting the whole chain.

The findings from the research are important as they provide a practical framework with pragmatic steps for the development of the Australian pomegranate industry. The results are aligned with current research on effective supply chain management and the creation of value chains in the food and agricultural industry. The simple act of undertaking this research has initiated a discourse on trust and collaboration with actors of the industry. Furthermore, this research has provided the basis for future studies that could investigate what economic benefits the coordination of the value chain could bring, using the microeconomic framework of production possibilities frontier and isorevenue curves as described by Griffith et al. (2017).

Conclusion

The aim of this research was to establish what is required to develop an improved strategic fit for the emerging Australian pomegranate industry by focusing on information as the key cross functional driver or chain good. The research provided evidence that information is collected and, shared in an informal, ad hoc and opportunistic way. It also found that there are significant gaps in the information

required to develop the industry. This is a chain failure as there is a disconnect between the organisations in the industry and their ability to satisfy both the needs of the targeted customer segments and the capability of the overall value chain to support them. The result is that the value chain participants are maximising their private net benefits at the expense of the overall chain surplus.

The critical action to be undertaken as a priority by the APA is the development of the customer and industry profiles. Understanding and knowing who the customer is, and how they are selecting, preparing and consuming fresh pomegranate fruit and its value-added products is paramount. It is the first stage of any organisation's ability to satisfy the needs of the targeted customer segments, that will lead to more value creation and increased chain surplus. Similarly, the development of an industry profile is the first strategy in understanding the value chain capabilities and creating an alignment of its actors. However, further work is required in two other key areas for the development of the chain's broad competitive strategy: research and analysis of the other cross functional and logistical drivers; and a better understanding of the product specification of Australian grown fruit.

The pomegranate industry value chain has started to engage in collective action, but this research indicates that the chain actors are still acting as independent entities that will not take action that is privately unprofitable. The APA, of which its membership is the industry, has been determined as the entity playing a primary role as an informal chain governor, in a whole-of-chain membership arrangement. The APA can facilitate and empower chain participants to act together to capture chain goods (information), internalise chain externalities and thereby expand chain surplus. It can also act on behalf of all the participants, spending time and effort designing and planning how the chain will be structured and operated.

With the critical information (consumer and industry profile) completed and the APA acting as an informal chain governor, a better strategic fit can be developed for the industry. Notwithstanding, there are significant challenges for the APA to relinquish areas of responsibility and build trust within itself and with its members.

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Appendix. Interview Questions and Data Collection Template

1. Describe the purpose of your organisation and its role in the pomegranate industry?

Context: Also, to understand what the motivations have been to grow pomegranates. Why are you doing this and not something else?

2. Do you know the term supply chain and its meaning?

Context: A supply chain refers to a network between a company and its suppliers to produce and distribute a specific product and the supply chain represents the steps it needs to take to get the product or service to the customer. In the pomegranate industry it ranges from nurseries, growers, processors, marketers, retailers to the end consumer. The management of the chain (or linkages) is crucial because an optimised supply chain results in lower costs and a faster production cycle.

There are products, information and funds flowing backwards and forwards along the supply network

Qu: what do you know about this and what is your experience in supply chain management?.

FIGURE 1-2 Supply Chain Stages
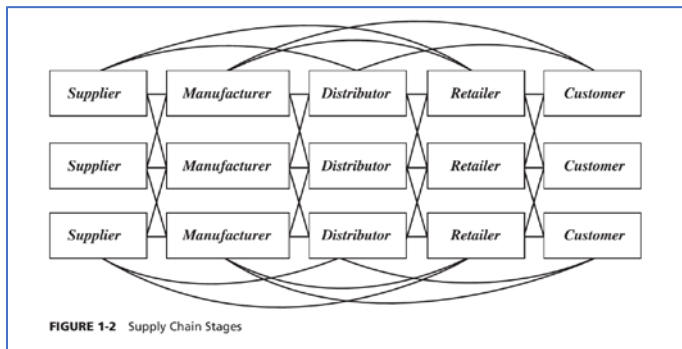
3. Do you know the term value chain, its meaning and its difference to supply chain?

Context: A value chain is a high-level model used to describe the processes by which business receive raw materials, add value to the raw materials through the various process and create a finished product that is then sold to the customer. Companies conduct value chain analysis by looking at every production step required to make the product and identify efficiencies whereby the overall goal is to deliver maximum value for the least possible total cost and create a competitive advantage. When an organisation takes into account its value chain, it needs to consider its value proposition, or what sets it apart from its competitors. Value chain analysis is designed to improve profits by creating a product or service that is so superior that customers are willing to pay more than the cost to create it.
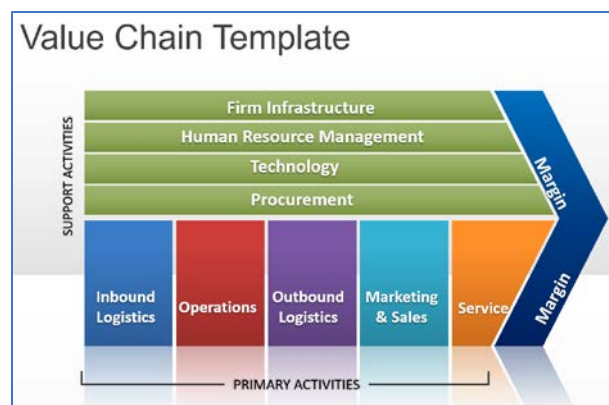
Qu: what do you know about this and what is your experience in value chain management?

4. *Each organisation needs critical data to manage its business. This can be categorised into Operational, Financial, and Supply Chain. From the table below select the data that your organisation:*
   a. *currently uses*
   b. *shares with another organisation*
   c. *would like to use in the future?*

5. *What other information would you like to have that would be beneficial to your organisation? What are the barriers for obtaining this information?*

Data category	Data type	In use	Shares with organisation	Would like to use in future	+ / - effect	Other information required	Barrier / Challenge
Operational							
	Yield - record						
	Seasonality						
	Labour and its availability issues						
	New technology						
	New varieties						
	New planting						
	Capacity utilization rate						
	Productivity goals						
	Disease						
Financial							
	Price						
	Cost of goods sold per unit						
	Activity based costing						
	Point of sale						
	Return on capital employed						
	Profit structure						
Supply chain							
Product characteristics	Shape						
	Colour						
	Size						
	Smell						
	Taste						
	Impurities / blemishes						
	Sales data						
	Sales forecast						

	Forecast error						
	Order status						
	Tracking and tracing						
	Production schedule						
	Delivery schedule						
	Capacity						
	Quality						
	Lead time						
	Variance from plan						
	Ratio of demand variability to order variability						