Best Practices in the Barley Value Chain
Matthew Hamill
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SCHOLAR PROFILE

I grew up on a grain farm near Penhold, Alberta that was first established by my Great Grandfather in 1929 after moving his family from Ireland. I went to school in Red Deer, Alberta graduating from Notre Dame High School and continuing my education at Red Deer College. I’ve been in the agriculture banking industry for over a decade which has allowed me to see interesting and innovative farms all over Alberta.

A few years ago I started a small malt house with my parents, and my brother and his wife. Starting this company required a ton of learning, and I found that I learned the most when I was out meeting people in the industry and touring their place of business. Being a new entrant in a new industry, I knew that the more I could learn the quicker we’d be able to get to where we wanted as a business. My Nuffield Scholarship has accelerated my learning and opened doors I didn’t even know existed. The experience has been a great extension of my education after recently finishing my business degree. The benefits were farther reaching than just lessons learned for the malt house. The experience has re-injected me with a passion for agriculture, making me take more of an interest in the family farm than I had growing up, and getting involved in more industry events. It also gave me an appreciation for all of the entrepreneurs in the intricately interconnected industry.
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in many cases could be viewed as a competitor. Your honesty and openness is truly appreciated.

To my friends that helped with logistics and provided entertainment and enriching cultural experiences, Jamie Ast, Berni and Jodie Harrison, Brendan Finlayson, Kolby & Jesse Dickens, Jack & Marit Nielsen, you make the globe feel smaller and my world fuller.

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SPONSORSHIP

Thank you to the sponsors who made everything possible. The Western Grains Research Foundation is a farmer-funded organization that invests in agricultural research that benefits Western Canadian producers. They have a long history of returning excellent value to stakeholders. I’m grateful to the Western Grains Research Foundation and all of the farmers who fund the organization, thank you for seeing the value of Nuffield Canada. I am honoured to be a part of the work returning value to Western Canadian grain farmers.

I would like to gratefully acknowledge the additional support that was provided by Syngenta, both financial and in providing a tour of their barley breeding program in Colorado and Malt Masters presentation in Alberta.
EXECUTIVE SUMMARY

Objective: The rise in popularity of all-malt beers has caused shifts and created opportunities in the barley value chain. The speed at which the change has occurred has left a gap in readily available and updated information regarding the barley value chain. The objective of this report is to provide an accurate and concise analysis of the barley value chain in Western Canada as it is today, and then to identify best practices in New Zealand, Australia, the United States of America and Eastern Canada, that can be applied to competitive advantages of the barley value chain in Western Canada. Findings are sorted by stakeholders that come before the maltster (farmers, input suppliers, government), maltsters, stakeholders after the maltster (brewers & marketers), and the value chain as a whole.

Research: To provide a better baseline of understanding, an analysis was done of the malt barley industry in Western Canada. Research included stakeholders, external forces, strengths, weaknesses, opportunities and threats. From this, competitive advantages for the following groups were identified:
- Pre-Maltster: Being situated in Western Canada offers a good supply of high quality barley, existing infrastructure, a supportive government and a growing market.
- Maltster: Smaller size allows for more homogeneous supply of barley that can be used to make more consistent malt.
- Post-Maltster: The maltster’s close tie to the farmer provides a compelling, marketable story that resonates with brewers and consumers.
- Whole value chain: The maltster can develop close relationships with all members of the value chain allowing trust to grow and innovation to occur more quickly.

With a better understanding of the industry in Western Canada, and thanks to Nuffield Canada, I was able to start looking around the world to see if there are lessons that we can learn from strategic and operational differences that are being used successfully. The second phase of research summarizes some of the best practices observed while travelling through New Zealand, Australia, the United States of America, and Canada, interviewing members of the barley value chain and other industries that are adding value to primary agricultural products.

Conclusions:
- Pre-Maltster: For Huon Aquaculture, being transparent in how they farm and where they farm is a key part of their marketing and that has led to trust and sales growth.
- Oregon State University sets an example of how barley variety development can benefit the industry and should continue to be supported.
- Maltsters hoping to follow the growth trajectory of Gladfield Malt will benefit by following Doug Michael’s lead in creating a consistent and superior product, and being able to defend its quality.
Post-Maltster: New Belgium has differentiated itself in the crowded beer market through a highly visible organizational culture that consumers identify with and feel good about supporting.

Whole value chain: New Zealand (NZ) Hops provides an example of the whole value chain working together to shift from commodity bittering hops to premium priced aroma hops. MillerCoors, and their more vertically integrated value chain, provides benchmarking for introducing new barley varieties to market, which is frequent enough to keep agronomics high for farmers, and not so frequent that it causes challenges for stakeholders further along the barley value chain.

Recommendations:

Pre-Maltster: Farmers should focus on maintaining and increasing social license by inviting consumers to visit their operations and explaining their farming practices. Government should make assisting the strategically important barley industry a focus of their legislation.

Maltsters: Develop or improve processes with safeguards and high standards to make sure quality is always high. Explore technologies like blockchain to provide increased value to brewers/consumers.

Post-Maltster: Attracting loyal customers requires more than just making a good product, as consumers attribute value to products and companies that make a social difference. Companies can demonstrate their social benefit by focusing on their culture and their purpose.

Whole value chain: Small scale maltsters can be a part of the solution to the problem of slow adoption of new barley varieties.
DISCLAIMER

This report has been prepared in good faith but is not intended to be a scientific study or an academic paper. It is a collection of my current thoughts and findings on discussions, research and visits undertaken during my Nuffield Canada Agricultural Scholarship. It illustrates my thought process and my quest for improvements to my knowledge base. It is not a manual with step-by-step instructions to implement procedures. Neither Nuffield Canada, nor my sponsor, nor any other sponsoring body guarantees or warrants the accuracy, reliability, completeness or currency of the information in this publication nor its usefulness in achieving any purpose. Readers are responsible for assessing the relevance and accuracy of the content of this publication.

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1.0 INTRODUCTION

Canada is a resource rich nation that ships raw commodities around the world for further processing. It then buys back finished products, thus missing out on capturing added profit throughout the value chain. This is particularly true in the agriculture industry, with the barley value chain being no exception. In Western Canada, seeded acres and total production of barley is decreasing, with annual production having just dipped to below eight million tonnes (Canadian Grain Commission 2017). About 60% of the barley of Canada is grown in Alberta, and half of the acres are seeded with a malting variety of barley. However, a lot of this will still not make malting specification, and, as a result, up to 80% of barley grown in Alberta ends up as feed barley (Alberta Barley n.d.). Some of the feed barley is exported, but most is used in producing feed for animals, another raw commodity that is often exported with little or no value adding being done. Of the barley that does meet malt specifications, about half is exported as raw barley and half is malted. About half of the malted barley is then exported (Palermo 2016). The added value, that is not being captured, is of importance and interest to the Canadian Government who has set a goal of increasing agri-food exports by 50% by 2025, an increase of $25 billion dollars annually (Johnson 2017).

My interest in the barley value chain comes from having started a small scale malt house in Alberta. When our company started, there was a notable absence of resources available about small scale malting in Western Canada. I am often approached by aspiring entrepreneurs about the industry. My Nuffield Scholarship allowed me to travel around North America, Australia and New Zealand to better understand the barley industry, and the opportunities that might be available to members of the barley value chain. I have observed how consumer values are shifting with an increase in importance on food safety and provenance. I have also seen an increase in interest in craft brewing and distilling. These trends are creating opportunities for value added activities.

The objective of this report is to offer industry information that is relevant to all of the barley supply chain’s stakeholders to help improve efficiencies and capture additional value. The report will include:

- An overview of the industry as it is today;
- Identify competitive advantages;
- Review best practices from countries with a more developed independent\(^1\) beer industry;
- Draw conclusions about which best practices can be adapted for Western Canada; and
- Make specific recommendations on actions that can have a large impact and good return on investment.

The findings of the report can be used by policy makers to better understand the industry, how decisions might impact the barley value chain, and to see how helping the industry can help Canada reach its goal of increasing agri-food exports. It will also help explain the decline in seeded barley acres, why that’s an issue, and what can be done about it. Excitingly, it will show how all-malt beer can be part of the solution. Entrepreneurs can identify problems that they might be able to resolve profitably, by understanding how members in different points of the value chain interact and how it can be improved. For the beer makers and beer drinkers, it can provide information on why the buy-local movement has caught on, and how the barley value chain is evolving to meet these requests. It can explain where beer comes from in terms of whom and where and why that’s important.

In writing about the whole value chain, I anticipate some readers using this report with a specific area of interest. To help navigate this report, and in line with my perspective of the value chain, I have grouped stakeholders into three main groups. The first group includes those that come before the maltster. I have included government, along with research institutions, breeding programs and seed companies in this classification. While government can yield significant influence at any point in the value chain (with tax on beer being a great example), their interest, especially the agricultural ministries, often focuses on the farmer and food security. The second group is the maltsters. A lot of focus was spent here due to my personal experience, and the maltster’s central position within the barley value chain. The third group is stakeholders who come after the maltster, mostly the brewers and distillers, marketers and consumers. Finally, looking at the supply chain as a whole provided some of the most profound discoveries and allowed best practices from related industries to be included.

\(^1\) The terms ‘independent’, ‘craft’, and ‘all-malt’ will be used throughout the report, and are mostly interchangeable. ‘Craft beer’ is the most popular term, but also one that has been adopted and exploited by some of the large, multinational brewing companies, who mostly produce light lagers with adjuncts used as cheaper sugar sources. ‘Independent Brewers’ is a term that the Brewers Association has promoted to refer to beer produced at breweries with caps on production levels and outside ownership (Brewers Association n.d.). ‘All-malt’ is a less common term, but the most relevant in most aspects of this report, referring to beer that is produced using grain as the source of fermentable sugars.
Throughout the report, the following symbols indicate which section is most relevant to a specific group of stakeholders:

- pre-maltster

- maltster

- post-maltster

- whole chain

2.0 BARLEY MALTING IN WESTERN CANADA AND AROUND THE WORLD

2.1 Overview of Small Scale Malting in Western Canada

Having a good understanding of small scale malting in Western Canada as it stands today and how it fits into and interacts with the rest of the barley value chain is a crucial first step that provides a base to make comparisons to malting on different scales and in different parts of the world. I have used a variety of analysis tools that help provide a more comprehensive understanding of the industry. The overview of members of the value chain and a SWOT analysis provide internal analysis for a look within the value chain. Porter’s Five Forces and the PESTEL analysis take a look outside the value chain to see external forces that can influence the malt industry. In most cases, analysis comes from the viewpoint of a small scale maltster, however, in places it made more sense to expand the scope to malting on any scale.

2.1.i Internal Analysis – Value Chain

The barley value chain has benefited from some appealing monikers of late: ‘combine to craft’, ‘paddock to pint’, and ‘grain to glass’, to name a few. These taglines represent the journey from the farm, to the maltster, to the brewer and ending with the consumer. This report goes back one step further and also looks at the stakeholders that come before the farmer in terms of barley breeding and policy. There are changes occurring at each level that impact the entire chain.
An overview of each of these major stakeholder groups will help provide the foundations for the balance of the analysis. The pre-maltster and post-maltster groups have been split into more specific groups (as outlined in Figure 1) so that conclusions and recommendations remain more focused, and to make the report more relevant to readers with a more narrow interest. Even with the further distinctions, the groups remain broad. The section below provides additional clarity on which stakeholders are addressed in this report.

Figure 1 - Major Stakeholders of the Barley Value Chain

**Pre-Growers**

Value chain members in this category can include government, researchers, plant breeders and seed companies. This includes organizations that conduct research to create the varieties adapted to Western Canada through applying genetic principles, and that work with germplasm to start identifying desirable traits in barley. New varieties are needed as a response to new diseases, market demands, international competition and even climate change. Plant breeding programs create, and then grow out the new varieties to sufficient quantity to do further testing, and eventually carry out pilot malting and brewing. A new malting variety can take 12 to 14 years to be created, and several more years to be accepted and integrated by industry. Historically, in Canada and many other parts of the world, public institutions have provided the investment to develop new varieties.

Canadian Nuffield Scholar Crosby Devitt wrote extensively on research funding models with a focus on wheat, but many of the key findings still apply to barley (Devitt 2014). One key lesson that I pulled from his report was the difference in goals of the various sources of funding for research: government, growers, and commercial industry. To summarize, government funding has a goal of creating jobs and/or reaching social ends (sustainability, food security). Grower groups (check-off dollars) want to improve agronomics and profitability for growers through higher yields, marketable characteristics, standability and disease resistance. Funding from private industry seeks to create new varieties with characteristics that get more farmers to
purchase certified seed, resulting in more profits that can be distributed to shareholders or used to fund further research (Ibid, p21.).

In Western Canada, the majority of barley research and breeding is funded by federal and provincial government, universities and producer groups. Producer groups (i.e. Alberta Barley & Western Grains Research Foundation) collect funds from producers when they sell a commodity (often called a check-off) and allocate these funds to research projects. Government support includes providing facilities, employing researchers, and funding grants.

The Canadian Malt Barley Technical Centre is also an important organization providing direction on what varieties are likely to be marketable, support to growers (Combine to Customer), training for maltsters (i.e. Malt Academy, see Picture 1), harvest analysis, information for brewers (brew trials, variety info), in addition to market development activities. Most stakeholders in the pre-grower stage have taken notice of the impact of craft beer on domestic malt barley usage, but have not yet made significant adjustments to their business models.

![Picture 1 - Matt Hamill & Canada Malt Barley Technical Centre's Malt Academy classmates](image)

**Growers**
The pre-maltster group also includes barley farmers who are typically diversified with other types of crops and sometimes with livestock or other agri-businesses. The majority of barley grown in Canada is concentrated in Alberta and Saskatchewan, as the warm summer days with cool nights provides ideal conditions for high quality malt barley (Syngenta n.d.). It is also subject to less (but increasing) pressure from Fusarium Head Blight. For barley that doesn’t meet malt specifications, farmers can sell the barley as feed into the livestock industry.
Maltsters

Up until the last decade, the malt industry was feeling pressure from a global decline in beer consumption. This led to some excess capacity, intense competition and a consolidation of major players to the point that the top eight malting companies controlled fifty percent of the global market (First Key 2018). In Canada and the United States of America, the major players are Canada Malting Company (GrainCorp) and Rahr Malting Company. They each own distribution companies that import specialty malts for small breweries (Country Malt Group and Brewer Supply Group). The other major malt companies are Prairie Malt (Cargill) and MaltEurope.

The large malt companies are supportive of the entire value chain sponsoring events targeted at farmers, brewers and consumers. With the rise in popularity of all-malt beers, maltsters have found an increasing domestic and export market as the higher proportion of malt outpaces the decline in beer sales. This has also created an opportunity for some small scale malting companies who are able to provide a more local product in areas rich in small breweries (e.g. Colorado, Oregon, California), or are able to appeal to a wide range of breweries through unique offerings (e.g. floor malting, gluten free grains, organic, or other specialty malts). Meeting maltsters was a driving motivator for my travels, and the insight from these interactions led to some of the key lessons that I was able to apply to my business. Maltsters Doug and Grant (shown below in Pictures 2 & 3) provided some of the best practices identified later in this report.
Dead West Productions created an excellent three-part history of beer in Alberta. The documentary reveals how Alberta, and the rest of North America, at one time had many small breweries. Changes in laws led to consolidation to a few regional and national brands. Then there was further consolidation as international brands looked to expand. Following this era, there was a period of stagnation as the antiquated laws remained in place limiting interest of entrepreneurs to start new breweries. As craft beer gained popularity around the world and especially in the United States of America, these laws were eventually removed opening the door for entrepreneurs and leading to rapid growth in the number of breweries (CBC News 2017). This has resulted in a rapid shift from a few, very large, often foreign-owned breweries to a large number of smaller independently owned breweries (Estabrooks 2016).

Consumers
There aren’t a lot of statistics specific to Western Canada; however, based on my observations, trends are in line with the rest of Canada, which follows trends from the United States of America.
America (Beer Canada n.d.) (Financial Post 2015). Shown below in Figure 2, beer consumption overall is declining, however, the percentage of craft beer being consumed is increasing (Brewers Association 2018). In 2017, the growth rate of craft beer decelerated, however, this trend is likely different in Western Canada as legislation delayed the start of the craft beer movement. A recent article in the Vancouver Courier provides a good overview of trends: notably small, community-based breweries, and a focus on the ingredients for quality and social impact (Mangelsdorf 2018). The increase in popularity of all-malt beers has already had, and will continue to increase the demand for malt barley. This increased demand for malt barley, paired with breweries looking for ways to differentiate themselves, creates opportunities for small scale maltsters.

2.1.ii External Analysis – Porter’s Five Forces

Porter’s Five Forces is a tool used to help understand what drives profitability in an industry, and identify how strong the opportunities are. The tool can be used to develop more accurate predictions and better defined strategies that are more likely to lead to higher profits (Harvard Business Review 2014). It will help show which members of the value chain have the most negotiating power and why. Below, I have applied the tool to the barley value chain, based on my observations of the industry.

**Rivalry among Existing Competitors**

Currently, Western Canadian brewers, like the rest of their North American colleagues, purchase the vast majority of their specialty malt from two distribution companies: Country Malt Group (CMG) and Brewers Supply Group (BSG). CMG is owned by Canada Malting Company, in turn owned by Grain Corp, while BSG is owned by Rahr Malting Company, an American company. Both companies push their own base malts and import specialty malts. They benefit from being a single stop solution for brewers by also offering hops, yeast and other supplies required by brewers. Rivalry between the existing companies in the industry is very high, this results in aggressive pricing on base malt, as large companies compete with each other for the business of large breweries.

**Threat of Substitute Products**

Several base malts are virtually interchangeable with each other. Brew masters can make minor alterations to recipes to accommodate a change in supplier. Larger breweries even substitute barley from the recipe in favour of adjuncts: cheaper sources of sugar like corn or rice. Smaller breweries tend to focus on all-malt beers. There is also a small, but notable, other option for brewers to use raw barley and add enzymes, eliminating the maltster altogether. At this time, there isn’t enough of a benefit to brewing with enzymes in place of malt to attract many brewers for this methodology. With brewers viewing base malts as similar enough to be substitutes, malt becomes a commodity and malt houses are forced to compete aggressively on price.

**Bargaining Power of Suppliers**

Malt houses depend on farmers as suppliers of malt-quality barley. However, even with the elimination of the Canadian Wheat Board, farmers have a limited amount of bargaining power when dealing with malt companies. Malt companies control supply by contracting acres with farmers prior to the growing season. Contracts are tilted in favour of the malt companies, as they don’t include specific parameters for what malt quality is. These vague standards allow malt companies to reject barley, nullifying the contracts.
Farmers’ leverage in negotiations is based on their ability to choose whether to grow barley at all, and choosing varieties based on agronomics and what suits their operation.

**Bargaining Power of Buyers**
Brewers are concentrated and knowledgeable on price of all available options, and can be swayed by promotions. Cost of switching suppliers is minimal and can be done quickly. Bulk pricing and long term relationships can improve loyalty. Overall buyers have a large degree of power, and malt companies are required to cater to their needs and demands.

**Threat of New Entrants**
While the total amount of beer in Canada being drunk is level to declining, the amount of all-malt beers in comparison to barley and adjunct beers is increasing. This creates a greater demand for malt. In addition, as the overall number of breweries is increasing, this presents an opportunity to forge new relationships with new maltsters. One significant advantage that existing malt companies have is that they have water rights for their plants. Difficulty in obtaining water rights would be a significant barrier to entry for new entrants.

Looking at Porter’s Five Forces, you can see why there is an old saying in the malt industry that ‘you don’t make money making malt, you make money buying barley’. Farmers have the weakest negotiating position in the value chain, and maltsters compete fiercely over existing and new customers. Brewers have the benefit of having numerous choices of suppliers for all grain options, and the ability to substitute cheaper sources of sugar from other commodities like corn and rice to reduce costs.

2.1.iii External Analysis – PESTEL
PESTEL analysis is a tool that leads to a more complete look at factors that can impact an industry. Many of these are factors that organizations have little control over, but that can impact them to a large extent, making it important that they are not overlooked. I have applied this analysis tool, based on my observations, to the barley value chain to see what factors are most relevant to Western Canadian maltsters.

**Political**
Trade disputes have already surfaced at multiple levels with the potential to impact the value chain. North American Free Trade Agreement negotiation breakdowns could lead
to increased tariffs or restrictions on export of malt and malt barley creating a glut inside of Canada.
Provinces, and breweries selling between provinces, have disputed the fairness of incentives given to internal breweries and restrictions on providing access to external breweries.

**Economical**
The breakdown of liquor consumption is correlated to a region’s overall economic status. During slower times, consumers will often move towards beer, however it would likely also slow or reverse the growth rate of craft beer overtaking macro brews (Lewis 2009). The price of malt is also tied closely to the price of barley, which can be impacted by a wide range of economic factors.

**Sociocultural**
Craft beer, and in turn craft malting, benefit from current consumer trends like locavores, and the demand for more sustainably sourced ingredients. Consumers are increasingly swayed by the provenance story of the product, and traceability is easier to track on smaller batches. Beer, being an intoxicant, could also be subject to shifts in how alcohol is viewed. For example, when the balance of opinion moved away from tobacco, there were more restrictions put on advertising and marketing, like the ability to sponsor sporting events. People are increasingly becoming aware of the benefits of small breweries in their communities as they increase employment, can act as a real estate anchor in attracting investment to older industrial / commercial areas, and often support local charities (Arbel 2013).

**Technological**
As craft malting becomes more common, the barriers to entry will drop notably the availability and cost of equipment. This is already starting to become evident, as there are several North American options for turnkey, small scale malting equipment (Newlands, Intelligent Malt, etc.). As each of these equipment manufacturers build more units, they will need to recoup less research and development dollars, and will improve on efficiency and effectiveness of the equipment making it easier and cheaper to produce consistent product.

**Environmental**
Agriculture is highly dependent on the climate, with weather able to cause substantial fluctuations in yields and quality. Also, growing barley, producing malt and brewing beer are all water intensive activities. Changes in regulations could impact supply and cost of
barley. Changes to water treatment options at municipal levels could also impact how the water needs to be handled with the greatest impact on brewers and a decreasing impact as you get further away from the finished product. Climate change can also change the overall conditions in the long run.

**Legislative**

In places in Europe, beer is seen as a staple and not taxed as heavily as in Canada, where taxes are used to discourage consumption and offset expected related health care costs. Members of the barley value chain interact with numerous levels of government and must adhere to several different rules, regulations and laws. Most notable, and with the greatest potential for impact if changed, are:

- Alberta Gaming and Liquor Commission – The growth in new breweries in Alberta has been partially fueled by the Small Brewers Grant that allows smaller brewers to be more cost competitive with larger breweries (who often benefited from laws that existed to protect them from new entrants but were abandoned after national companies were purchased by international buyers). Other provinces have made similar changes. Changes to local taxation levels, tariffs or import controls would impact breweries, and in turn, could impact the demand for malt.
- Occupational Health and Safety – Canadian Food Inspection Agency – Currently treated as an ingredient and not a food product, malt falls outside the scope of the Canadian Food Inspection Agency, this reduces some requirements for compliance such as the requirement for Hazard Analysis and Critical Points procedures and inspections.
- Local Ingredient Inducements – places like the State of New York and the province of British Columbia provide some incentive for manufacturers to include a certain percentage of local ingredients. In New York, this has led to a disproportional amount of small scale maltsters popping up (Thomas n.d.).
- Plant Breeder Rights - the government can encourage or discourage investment in research with policies that allow for various value-creation models where investment costs can be more easily recouped.

Based on the above observations, Western Canadian maltsters should be mindful of, and ready to adapt to changes of, sociocultural trends. Other areas, like legislation, are more effectively addressed by working together with others in the industry and through existing industry bodies.
2.1.iv External Analysis – Strategic Overview

In a typical beer recipe, there are two main categories of malts: base and specialty. Understanding the purpose of each is useful in understanding how the industry has naturally segmented itself.

Base malts are the malts that provide the sugar that gets fermented into alcohol, and the enzymes that are required for the chemical reactions that make beer. Base malts usually account for 80% or more of the grain that goes into a beer. The base malt market is dominated by international players (GrainCorp, Rahr, Cargill), with new entrants trying to carve out niches based on barley varieties, malting processes (floor malting), and provenance stories. Large breweries are the biggest customers for base malts. All-malt brewing uses more base malt as it does not use adjuncts as a cheaper, alternate source of fermentable sugars. This means that, collectively, craft breweries (more likely to produce all-malt beers) are a major purchaser of base malt.

Specialty malts are the malts that add colour and flavour to beers, and constitute a smaller proportion of the malt bill. Specialty malts often require specialized equipment and are produced in smaller batches, since their uniqueness makes them less interchangeable. There is a concentration of specialty malt companies in Europe and a small number in the United States of America, Canada, Australia, New Zealand and elsewhere. In Western Canada, brewers obtain imported specialty malts primarily through the two main distribution companies.

2.1.v Internal Analysis – SWOT

A SWOT Analysis is a very common tool that combines internal and external factors to help determine strategic moves or positions of an organization by looking at strengths, weaknesses, opportunities, and threats. Below, I’ve created a SWOT Analysis for small scale malting in Western Canada based on my observations and analysis.
**Strengths**
Looking internally at positives, small scale maltsters are small enough to be agile in their business moves, and able to quickly implement decisions and new strategies. They are able to adapt their product offering quickly to better fit specific customers. Strong, close relationships exist between them and their clients.

**Weaknesses**
One of the biggest disadvantages of a small scale maltster is the economies of scale they need to compete against. The labour cost and equipment cost per unit of production are substantially higher than a malt plant. The smaller scale also means less of an ability to blend barley coming in, or malt being produced to meet tight specification windows. Some small scale maltsters are finding it challenging to source good quality barley. Finding barley that meets malting specifications is a huge problem for maltsters in the East due to disease pressures. It can also be a problem for maltsters in areas of Western Canada where agronomics result in farmers favouring other crops. This problem is compounded when the competing crops bring diseases that adversely affect barley, such as Fusarium head blight.

**Opportunities**
In some important ways, being small allows a maltster to be more nimble, which can be quite useful in the barley value chain. Smaller batch sizes mean a maltster can work with breeding programs to make malt that brewers can try earlier in the variety development timeline. This can allow them to find varieties that have unique flavour component or other characteristic that is valued by brewers enough for them to pay a premium (as is the case with UK barley variety Maris Otter).
Craft maltsters can offer brewers ways to differentiate and appeal to “buy-local” consumer trends. They can offer farmers a market for malt barley as a sustainable rotational crop.

**Threats**
Porter’s Five Forces Analysis highlighted the uphill battle, small scale maltsters face in carving out a profitable niche in the industry due to fierce competition and cheap substitutes available to brewers. There are many factors well outside of the maltsters’ control that can impact the industry, like changes in legislation and consumer trends. Barley is a crop that is very sensitive to the environment. The timing of rains and frost can create large swings in quantity and quality of barley crops year over year. Climate change can have long term impacts on rainfall and the length of growing seasons, slowly shifting the regions that have ideal conditions for growing malt barley.

Looking at internal and external forces, it becomes clear that small scale maltsters need to find innovative ways to leverage competitive advantages to show value to their customers, as competing on price is not a feasible or sustainable option.

**2.2 Competitive Advantages**
The final step of the analysis of the Western Canadian barley value chain is synthesizing the information above to identify competitive advantages. Finding out where we have a competitive advantage, provides a starting point for finding best practices form around the world that are applicable to and can be applied in Western Canada. The conclusions and recommendations found later in this report flow from the linkage of best practices to competitive advantages.

Competitive advantages are the basis upon which good, sustainable strategies are built. Being able to identify a competitive advantage and capitalize on it can help individuals and organizations stay ahead of competition. Below, I have outlined some of the competitive advantages of each group in the barley value chain. In some cases, the competitive advantages are being leveraged effectively to compete on the world market. In other cases, they represent opportunities to increase value added activities in Western Canada, and the basis for some of the conclusions and recommendations that follow later in the report.
Pre-Maltster

Farmer

Having the ideal climate is a competitive advantage that has resulted in Western Canada producing the majority of the country’s malt barley. The long warm summer days and cool nights provide sufficient time for a barley crop to produce plump grain, fully mature, that can be harvested before frost, and avoid rains that would cause sprouting damages. During the growing season, there is sufficient moisture that a lot of dryland barley farming occurs. Farmers like barley as a rotational crop that breaks the cycle of several diseases that impact high margin crops like wheat and canola. Since Western Canada has a history of growing barley, it has developed an infrastructure that supports the industry. Farmers know they have a market for their product as there are large malt plants to process crops that meet malt specifications. If it doesn’t make malt, it can be sold as feed to one of the many livestock producers.

Government & Policy

Provincial barley commissions that collect check off dollars from producers, help incentivize further industry development like research and extension work. This has led to many of the dominant malting varieties across North America having come out of provincial and federal barley breeding programs of different sizes in Lacombe, Alberta (FCDC – AAF); Saskatoon, Saskatchewan (CDC, University of Saskatchewan); and Brandon, Manitoba (AAFC). The success and longevity of these varieties, particularly Metcalfe and Copeland, have led to repeat customers in China, our key export market (Hart 2016) (Pratt 2018). Having a critical mass of growers within a similar climate zone help make investment from the for-profit sector more lucrative, or at least viable.

Over the past few years, Western Canadian provinces have made it easier for entrepreneurs to start small alcohol production facilities by eliminating minimum production laws, reducing zoning restrictions and providing some tax breaks (CBC News 2017).

Maltster

The competitive advantages of malt companies relates to availability of inputs and markets for products and by-products. Large quantities of malt quality barley and access to water at reasonable rates are essential for a malt company. Western Canada provides both. The barley
produced can be moved to markets via train. While there have been challenges with the rail companies, the rail network is extensive and can move the product to ports for export markets. Western Canada’s livestock industry creates large demand for feed quality barley, which is important as the majority of the barley grown does not meet malt specifications. In addition, the livestock industry provides a market for the high protein by-products of the malting process.

Looking at smaller malt houses, smaller volumes allow for more homogenous batches and selective barley acquisition resulting in more predictable, consistent, and higher quality malt. Using my own company as an example, we can obtain all of the barley of a certain variety that we will need for an entire year from a single quarter section (160 acres). Or, during an exceptional year, we can put away three or four years’ worth of barley supply knowing that protein, pre-germination, and malting profile will remain fairly predictable and the quality of the finished malt is consistently optimal.

**Post-Maltster**

There are several trends which have led to the impressive growth in all-malt brewing. Consumers are increasingly interested in supporting local producers who are more likely to reinvest profits back into the community. Communities are changing zoning laws because they know there is a benefit to having a brewery close by. Local breweries improve real estate demand and prices by attracting other businesses and pedestrian traffic (Hughes 2018).

Consumers are also increasingly concerned about the safety of their food. They want to know who made it, where the ingredients came from, what the farming practices were, and what safety programs were implemented. With beer in Western Canada, telling the story can be especially easy as all steps in the production can occur close by. Consumers can meet the farmer, tour the malt house, and share a beer with the brewer.

**Whole chain**

Not only are consumers able to meet all members of the value chain, there are very low barriers to members of the value chain meeting and working together. The provincial bank in Alberta puts together events where farmers, maltsters, input companies, brewers and
consumers all meet up in the same room. There is so much respect and admiration flowing in all directions, especially when the value chain becomes a loop with farmers drinking beer they know they’ve had a part in producing.

At the 2018 Alberta Small Brewers Conference, beer writer John Boll talked about what happens in a more mature market where there is increased competition for shelf space and restaurant taps. His suggestions for creating loyal customers, is to make products that are local, new, and rare (Boll 2018). With all members of the value chain in close proximity, finding ways to differentiate is achievable.

3.0 IDENTIFYING BEST PRACTICES IN AUSTRALIA, NEW ZEALAND, THE UNITED STATES OF AMERICA AND CANADA

My travels took me to Australia, New Zealand, the United States of America and Eastern Canada. I chose these destinations as the growth of craft beer in Western Canada lags behind the United States of America, New Zealand and Eastern Canada. Therefore, studying these destinations provides a great indication of where the industry is going. Businesses located in these areas have been through growing pains and have gained valuable experience from which best practices have emerged. Australia was chosen as it provides an intriguing case study as a parallel barley value chain, its similar-sized population, vast geography and reliance on China as an export market provides similarities to Western Canada. However, its distance insulates the industry from us and consequently the barley value chain has evolved in different ways. Where these differences are better, there are best practices that can be identified and possibly applied in Western Canada. Together, my travels to these countries have allowed me to discover a range of best practices spanning the entire value chain. The best practices identified below provide a broad look from some of my travels, later sections will narrow down the list but expand the analysis into more detailed conclusions. My eventual recommendations will link the conclusions (that are based on best practices uncovered during my travels) back to the competitive advantages previously identified of the Western Canadian barley value chain.
3.1 Pre-Growers

3.1.i Brewers Association - United States of America

The Brewers Association (BA) is a not-for-profit trade organization that supports independent breweries all across the United States of America. The Brewers Association has proven to be a resource that provides value to all of its membership. It has adapted well to the increase in number of breweries and changing consumer preferences. Funding for the organization comes from members, based on production volumes. BA helps the industry by providing statistics, conducting research, directing research dollars and stating research objectives. Its national scope, sustainable funding model, and unified voice assist it in being effective in shaping policy and advancing its objectives to the benefit of its members. Canada has provincial organizations which are effective, but lack the clout, capability and efficiency of a national organization.

3.1.ii Syngenta - North America

Syngenta is a global agricultural corporation active in a diverse range of crops providing seed and chemicals. I was able to tour their barley breeding program in Colorado, speak with several of their North American representatives, and attend their Malt Masters presentation and crop tour. Adoption of new barley varieties is an issue that the industry has been challenged by for many decades. The Canadian market is dominated by Copeland and Metcalfe, both varieties that are very aged, and agronomically inferior to some of the options that are available. Variety turnover can be slow due to challenges in trying to increase supply and demand at the same rate. Seed companies invest resources to grow sufficient supply for malt houses to conduct trials with full batches. Large malt houses don’t want to contract acres of new varieties until there is a developed market. End users typically have a product that has been developed using an existing variety and they do not want to have to adapt their production to accommodate flavour and performance changes that may be inherent with a new variety (Cross 2016). Agronomic advances are insufficient to drive a price change that is meaningful to the end users (i.e. if a new variety yields 10% better than its predecessor, the potential savings don’t provide the other members of the value chain sufficient margin to be an incentive to change).

Syngenta has bucked this trend with the introduction of ‘AAC Synergy’ barley. This agronomically superior variety came out of AAFC Brandon’s breeding program and was acquired by Syngenta for commercialization. It has been adopted by a critical mass of farmers and has been introduced into base malt blends by several malt plants. Its traits and characteristics make it suitable for a range of brewers and distillers (Kamchen 2018). Syngenta
has been able to steadily increase acres grown by promoting the benefits of the variety to all members of the value chain: education of farmers by its agronomists and field reps, working with maltsters on pilot malting, testing, and having it introduced as a small portion of base malt blends (Kamchen 2018). It is important that they picked a variety with traits that make it suitable to replace one of the existing dominant varieties. Syngenta also focused on the other side of the value chain by talking with brewers and even going as far as making a Synergy-based beer available to consumers through farm industry events and targeted promotion.

3.2 Growers

3.2.1 Andrew Wiedemann – Victoria, Australia

I first heard of Andrew Wiedemann from a contact in the malting industry, and then I saw a commercial featuring him on YouTube. I was finally able to meet up with him at the 2017 Victorian Farmer’s Federation Annual General Meeting in Horsham. Andrew demonstrated several best practices that have helped him in being a successful farmer. Farmers fill many roles within just their own operation, time is at a premium and it is easy to miss opportunities. In taking a broader view and looking beyond his day to day operation, Andrew sees how he can play a role beyond the farm gate. He is involved in producer groups, being the former head of the Victorian Farmer’s Federation, and Chairman of Grain Producers Australia. He shares his story, sharing the pride, he takes in growing ingredients. He was featured in an advertising campaign by Carleton United Brewers for their Crown Lager, a good match as it is a beer that is malt forward and highlights using premium ingredients (Collins 2016). Finally, he has helped assure that the farm will live on by getting his son active in the industry as well.

3.2.2 Huon Aquaculture – Tasmania, Australia

“Make people give a shit that you give a shit,” was a lesson from 2015 Nuffield Scholar Abby McKibben that I’ll never forget. In several of my previous stops, people insisted that I find time to meet up with Abby, who was writing her Nuffield research paper on provenance brand stories. Abby was kind enough to squeeze me into an impossible itinerary, meeting her shortly after her plane landed back in Tasmania. Her advice, which simplifies how to use a complex subject as an effective marketing tool, applies to any industry, but is even more crucial in agriculture. Being able to communicate our story, results in a more educated and more trusting consumer; importantly, it may lead to them thinking critically about legislation that dictates farming practices. Farmers are passionate entrepreneurs that are proud to feed the world and their kids with what they grow. We need to make sure that the care put into production is understood and appreciated by our increasingly urbanized population.
3.3.iii Derek Tiller, South Australia, Australia

Derek is another Nuffield Scholar that helped line up some stops for me, hosted me while I was in the Adelaide area, and shared insight into his own farming operation. Derek shared with me how succession planning has worked in their family farm over the past few generations. In order to be able to hand down a sustainable farming operation, his grandfather needed to double the number of acres farmed. As equipment got larger and more expensive, the cost needed to be spread over more acres, so Derek’s father doubled the farm size again in his preparations to transition the operation to his son. Now, even though there are no other siblings to split the operation with, Derek is faced with the challenging prospect of doubling the size of the operation again.

The statistics on the number of farms is a clear indicator that this is the story that is also being played out in North America (Farm Credit Canada 2017) (Ferdman 2014). While there are options to find value added opportunities, or to have off farm income to supplement farming, this is a consideration that faces many operators that want to remain in their particular industry segment. Keeping this goal in mind, helps guide all decisions and can take some of the stress out and put tangible numbers into the decision making process of renting land, purchasing land, upgrading equipment, and deciding how many hired hands are needed.

3.3.iv Seth Klann – Oregon, United States of America

Seth is the owner and operator of Mecca Grade Estate Malt. He is one of America’s craft malting pioneers. Mecca Grade’s location in Oregon provides market access to the booming craft beer scenes in Bend, Portland and California. Seth shows that it’s possible to be small and act big. He finds and develops competitive advantages to be able to compete with multinational companies. Seth does this by partnering with Oregon State University. By offering land and labour as a gift in kind, he is able to access expertise from some of the greatest minds in the business, help prove concepts, develop varieties that will be key for the craft malting industry, and ideally obtain an impossible-to-imitate product line stemming from a newly developed variety (Mecca Grade Estate Malt 2016).

Another couple of examples of maximizing opportunity is the active role he takes in the governance of the Craft Maltsters Guild, which helps to shape the burgeoning industry and keep it up to date on the latest developments, and through his unique malting process. Mecca Grade Estate Malt uses equipment to create the benefits of floor malting without the back breaking long hours normally associated with the product. His mechanical floor malting machine gently rotates the grain bed to avoid rootlets getting matted, while still allowing the stewing and development of unique flavours associated with floor malting that distillers and increasingly brewers are looking for.
3.4 Maltsters

3.4.i Barn Owl Malting – Ontario, Canada
Devon, who along with his wife, own and operate Barn Owl Malting in Ontario, taught me that sometimes there is no substitute for honest, hard work. Surely he is the hardest working individual in the malting industry. His floor malting and manual transfer to wood-fired kiln means that he lifts each barley corn numerous times to create a finished product. This has allowed him to save on expensive germinating and grain-handling equipment, and capture more margin from his work. His humbleness is also commendable, as the amount of manual work he does, makes for a great marketing story that could be shared on the back of his client’s beer bottles, however, he prefers that his brand builds based on a great product more so than a compelling story.

3.4.ii Powell Malting – Victoria, Australia
Grant Powell took years of working at Barrett Burston’s where he trained some of the maltsters still working there, wrote manuals on malting process and testing, and made the malt that eventually made its way into billions of beers. In his operation, Grant uses both drum style and Saladin box malting equipment. When he told me the history of Powell Malting, he discussed how over time a large proportion of his revenue has shifted from malt for brewers to food products for bakers. This pivot is particularly impressive considering Grant’s impressive resume and expertise in the malt for brewing market. Powell Malting exemplifies a business that continues to innovate, seeks out new markets, and adapts accordingly.

3.4.iii Gladfield Malting – Canterbury, New Zealand
Gladfield Malting started as a small craft operation, but has expanded several times and is currently in the midst of another large expansion that will allow him to compete in export markets. Despite being in the middle of the expansion project and harvest, Doug and Gabi made the time to meet with me and share what is required for small maltsters looking to grow and be competitive. A key message delivered, was to focus on the benefits that are created because of our small size, and take advantage of them to make a superior product. Then we need to be able to defend the quality and protect our reputation. A good example of how Gladfield applies this in their own operation is by hiring a professional brewer whose role is to test the malts in a real world environment, and to be able to go to breweries to help them get the most out of their malt (i.e. fine tuning mills to unlock even higher extraction levels).


### 3.5 Brewers

#### 3.5.i Garage Project – Wellington, New Zealand

Wellington-based Garage Project has lived the story that I hear so many new breweries strive for. I was able to visit their brewery, experience their culture, and see what set them apart in their industry. They made creative, daring and delicious beer that they were excited to drink and share with their friends. It evolved from a passion project in a garage into a business. Their purpose, culture and brand resonated with the market, this along with continuing to make great beer, led to several rapid expansions. Along the way, they picked up numerous awards, and invitations to collaborate with iconic breweries like Sierra Nevada.

#### 3.5.ii Little Creatures Brewing – Victoria, Australia

Little Creatures is a brewery that built itself up, and was eventually bought out by one of the dominant brewers in the country. They continue to innovate at the brewery and build their audience. While some breweries see some backlash after being bought out, Little Creatures has helped maintain its grassroots momentum by appealing to a wide-ranging audience in the state that gave them their success in the first place. In some ways, they act more artisanal than some of the artisanal brewers; their Furphy beer uses only ingredients from Victoria and is only served in Victoria. This marketable story has led to their taps being everywhere, restaurants are proud to serve it, consumers are proud to know that they are supporting local farmers, farmers like supporting an all-malt beer that uses lots of their barley (Victorian Farmers Federation had their AGM there in 2018).

### 3.6 Consumers

#### 3.6.i New Belgium Brewing – Colorado, United States of America

In September 2017, I was able to tour the New Belgium brewery in Fort Collins, Colorado. It is an employee-owned brewery that has grown to be one of the largest craft breweries in the United States of America. Their flagship, Fat Tire Amber Ale, is shipped around the world. New Belgium’s focus on culture shifts the story from what they produce to why they produce it. Jeff Lebesch, the company’s founder, believes that “business can be a force of good,” and this remains a key part of the company’s culture (New Belgium Brewing Company n.d.). The “why” before the “what” mentality is reinforced by the compensation package that is reflective of a company being a force of good. After one year, employees receive benefits that far exceed comparable companies, including an onsite family doctor, they are welcomed into the
employee ownership business model, and get their own signature Fat Tire bike. After five years on the job, employees receive a vacation in Belgium to recreate the bike trip that Jeff Lebesch took before starting the brewery, a perk that helps reinforce the inspiration behind what they produce.

3.6.ii Agri-Digital – New South Wales, Australia

Agri-Digital is a cloud-based, grain-trading, technology company based out of Sydney that uses an online ledger, known as a blockchain, to create contracts between buyers and sellers. I, first, heard the term, blockchain, in Sydney during discussions with Richard Heath, Nuffield Scholar and General Manager Research for Australian Farm Institute. His enthusiasm for the new technology was infectious, he truly saw the potential for this trade platform (and this was before Bitcoin’s – a company that was made possible by blockchain’s open ledger system – stock price had its very public wild ride in late 2017 and early 2018). Emma Watson, CEO at Agri-Digital was proud to have recently completed their proof of concept and first major grain sale based on blockchain technology. The company shows that Blue Ocean strategies, strategies that focus on value creation to create uncontested market spaces, are still possible in industries that are rooted deep in tradition and habit (Blue Ocean Strategy n.d.). Emma and her team focus on value innovation in the grain trading industry by increasing transparency, eliminating settlement risk and creating digital contracts with clearly stated criteria so that farmers don’t lose leverage through shifting required specifications.

3.7 Full Value Chain

3.7.i New Zealand Hops Limited – Tasman, New Zealand

New Zealand Hop Limited is a cooperative based out of Nelson that controls the vast majority of hops grown in New Zealand. Former Nuffield New Zealand Chairman Julien Raine (Picture 4) arranged a tour of a NZ Hops owned hop farm and introduced me to NZ Hops CEO Doug Donelan (Picture 5). Doug was able to provide a tour of the processing facility and distribution warehouse, and shed some light on how the industry has adapted over time (Picture 6).

A couple decades ago, the hop industry in New Zealand found itself struggling to compete against other hop growing regions as a low-cost provider of bittering hops. Bittering hops focus on the amount of alpha acids, and are treated as an interchangeable commodity by the brewing industry. To survive, the entire industry worked together to refocus on aroma hops that brewers are willing to pay a premium for. As a result, they have introduced several varieties
that are known and sought after around the world. Ron Beatson at the government-owned Crown Research Institute Plant and Food Research is in charge of the breeding program (Plant & Food Research n.d.). Ron knew that hops that contributed unique aromas and flavours to beer were what was needed to de-commoditize New Zealand’s varieties from the rest of the world’s, so they began selecting for this criteria, in addition to agronomics. Acceptance downstream in the value chain was accelerated by getting promising new varieties into the hands of brewers as quickly as possible. Brewers, like Garage Project, were eager to get advance access to new varieties, and got consumers excited as well, through their Hop Trial series. These provided quick feedback as to what brewers and consumers liked, and were willing to pay for, while avoiding wasting resources.

In New Zealand, almost all hops are sold to and processed by NZ Hops. NZ Hops works on behalf of the growers to create economies of scale in processing and packaging. Top quality equipment allows per unit costs to be minimized and quality to be consistently excellent. It has also proven advantageous in marketing the hops, as they have a monopoly on the unique flavours that they can parcel out to distributors over specific geographic regions.

Doug introduced me to Sandy Ross and Jon Burridge of HopCo, a distribution company with exclusive rights to NZ Hops in Australia. HopCo helped demonstrate the value of working closely with others in the value chain, by partnering with a brewery to showcase HopCo and NZ Hops. The end product was the Pirate Life HopCo New Zealand Pale Ale, but shortened by most in the industry to simply: HopCo (shown in picture 7). The three hops utilized in the beer went from being widely available to being sold out multiple years in advance (supply can trail demand as hop plants require about four years to reach peak yields and produce stable flavours).
MillerCoors – Colorado, United States of America

MillerCoors is more vertically integrated than most breweries having their own research program, malt plant, can manufacturer, water treatment facility, brewery, distribution centres and other related businesses. Occupying multiple links of the value chain makes them more connected and interdependent with their farmers and consumers. This has led them to invest heavily in these key relationships. They are also more immune to some of the challenges (and/or perceived challenges) faced by value chains where breeders, growers, maltsters and brewers are separate entities.

Long-time employees, Kristen and Mont, gave me a tour of the malt plant in Golden, Colorado. They provided great insight into Coors’ unique role in the barley value chain. A long standing tradition of Coors was to focus on the farmer and focus on the barley. Coors firmly believes that focus is a key difference that allowed them to survive prohibition, while rivals closed down around them. This tradition lives on through their in-house breeding program which has introduced numerous iterations of their Moravian lineage of barley varieties. They provide agronomics that are competitive enough to have farmers choose to grow it instead of other barley varieties.

Beyond the agronomics though is the relationship. Kristen and Mont provided, as an example, the harvest of 2015, when wet harvest conditions led to a shortage of high quality malt barley and a surplus of barley that showed signs of, or was at risk of, sprouting damage, storability issues, and low germination. Coors worked closely with their farmers, and accepted barley that in most years wouldn’t meet specifications. This required them to drastically change their malting schedules which took a considerable amount of effort. While not all of the barley could be accepted, and overall acceptance rates were lower than previous years, open communication, transparency, and honest effort allowed the farmers to know that they were
being treated fairly. Members of the Coors family still take the time to celebrate with the farmers hosting Barley Days for their growers, a time for comradery, recognition of achievement, and beer (H. Dawson 2014).

MillerCoors never loses sight of the importance of the consumer. One example of how tightly they are engrained in the community is that they provide water treatment services for their entire hometown of Golden, Colorado.

At a recent barley value chain stakeholders’ meeting hosted by Alberta Barley, a key issue that was identified was the challenge of having new barley varieties accepted downstream by maltsters and brewers. Familiar examples were offered of varieties that with ten or more years of development and investment in them, and that finally had a critical mass of growers able to supply sufficient amounts of malt quality barley to maltsters for full-scale batches, were all but killed when brewers found (real or perceived) flaws in the flavour profile. Coors is able to coordinate internally to have the seed stock multiplied in the right quantity at the right time for plant size malt trials and commercial scale brews. They have the ability to control how much of each of their varieties of malt barley is grown and malted to suit adjustments to their recipes.

3.7.iii Oregon State University -> Mecca Grade -> Rahr Malting -> New Glarus – United States of America

‘Maris Otter’ is a prime example of a barley variety that has de-commoditized itself in much the same way that NZ Hops have. Farmers are willing to put up with yields that are significantly inferior to alternatives because they are paid a premium that bridges the yield gap. This can be done profitably because brewers are in turn willing to pay significantly more for Maris Otter. Brewers are willing to pay more because they notice a flavour difference that they want to incorporate into their recipes (Hill 2017). This flavour difference carries through in the finished beer as evidenced by the number of award winning beers that use Maris Otter (Hawkes 2015). While the average consumer might not be able to pick out the subtleties of the nuances in flavour, they are much more likely to purchase when they see the accolades piling up for the brewery or beer. So, while I didn’t travel to the UK to speak with people who have grown or malted Maris Otter, it did influence my line of questioning to include, “how can Canada develop the next Maris Otter” and “who is looking at flavour in barley”. When these questions were posed to barley breeders, maltsters and brewers, and when doing research myself, one name kept coming up: Dr. Pat Hayes.

I travelled to Oregon where I was able to tour with Dr. Pat Hayes and grad student, Dustin Herb, through the breeding program at Oregon State University (Picture 9). They took me through the test plots of their “Flavor Project” and the follow up “Flavor Fields Forever Project”, where they
are seeking to develop new varieties that have a unique flavour profile. This project receives funding from public sources (Oregon State University), private sources (Mecca Grade Estate Malting (Picture 8) & Rahr Malting), producers (Brewers Association), and brewers (Bells, Deschutes, Firestone-Walker, Russian River, New Glarus, Sierra Nevada and Summit). This project is unprecedented in the number of varieties and crosses being tasted, and how early in the development process, they are being tasted. With the data they have obtained so far, they've already been able to determine that the variety of barley makes a difference in the flavour, and to start matching up flavour attributes with parts of the genome (the Flavor Fields Forever takes it a step further by trying to match flavour attributes to geographic regions) (Oregon Wheat Industry 2017).

Picture 8 - Dustin Herb grad student at OSU by barley plots

Picture 9 - Matt with Scott Klann owner Mecca Grade Estate Malts
4.0 CONCLUSIONS DRAWN FROM BEST PRACTICES

Completing an industry analysis of small scale malting in Western Canada will be helpful to stakeholders looking to quickly find information or better understand how different areas are interconnected. Being able to pull out some competitive advantages, lays the groundwork for finding opportunities with lots of potential. The next step was to seek out members of the barley value chain that were pioneers and/or leaders in their industry and find out what their best practices are. To make the information learned to date useful, some of the competitive advantages need to be paired with best practices. I have done so below, but it is far from a complete list. I hope others pull out their own conclusions from the data too, but in an effort to make our way to some implementable recommendations I have made some intuitive matches.

4.1 Pre-Maltster

4.1.i Farmer

Western Canada has the competitive advantage of being able to grow top quality commodities, including malt barley. Huon Aquaculture has found that consumers are interested in farming practices and willing to pay a premium for food they trust more. I believe our competitive advantage pairs well with Huon Aquaculture’s best practice, and this presents an opportunity for Western Canadian malt barley farmers. Farmers have the opportunity to lead the conversation related to farming practices. Some of the everyday things we do are hugely important to the buying decisions of consumers, but the message is lost by the time it gets to the shelf. I found some support that this conclusion is as relevant in Canada as it has been for Huon Aquaculture in Australia. Deloitte Consulting conducted a study that found that consumers were willing to pay $2.29 more for a two-litre carton of milk if it was marked as 100% Canadian (Pilger 2018). Of course, the milk on the shelf has always been 100% Canadian, but too many consumers are not aware. The stakes of letting someone else tell the story are high, as consumer activist groups will latch on to fear-based marketing, which we’ve seen happen with genetically modified organisms. Deloitte Consulting identified the following key drivers that the consumer sees value in, when making purchasing decisions for food: health & wellness, safety, social impact, experience, and transparency (Deloitte Consulting 2018).
These key drivers coincide with the values of many of the people I spoke with for their own farms and businesses. This ties in so well with the lessons I learned from Abby McKibben of Huon Aquaculture. They farm in a way that they are proud of, and then they tell people about it. They have six principles that guide their planning (Huon Aquaculture n.d.):

1. Increasing production responsibly and safely
2. Improving the health and welfare of our fish
3. Improving safety for our workers
4. Reducing our environmental footprint
5. Continuing to positively participate in the community
6. Producing world-class salmon products in Tasmania

Read them again and think about how closely they mirror the key drivers for consumers, how closely they reflect your farm or business, and how they could relate to growing barley and selling beer in Western Canada. I believe we’re already doing the right things, now we just have to tell people.

4.1.i Government
Farmers have steadily been trending towards planting less and less acres to malt barley (Canadian Grain Commission n.d.). This is caused by more attractive and more consistent returns for other cash crops (Alberta Agriculture and Forestry 2015). This trend is likely to increase as crops like soybeans and corn are being seeded in areas of Western Canada where
they haven’t been grown before. Compounding the issue, corn can bring with it higher disease pressure (Fusarium Head Blight) increasing the difficulty of making malt specifications.

The declining acres are a concern to the Alberta Barley Commission (Blair 2018). It should equally be sounding alarms to those interested in increasing agri-food exports as a source of inputs for malt plants & livestock producers, with rippling effects down the chain to brewers, distillers, meat processing plants, bars, restaurants, grocery stores and so on.

Less acres also make it a less attractive investment opportunity for the private sector as critical mass isn’t waiting to pay for crop inputs and seed to cover investment in research and development. A key to combating this is to improve the genetics and agronomics of growing barley, this can be done through continued research to improve yields in comparison to rival crops and improve disease resistance (Duckworth 2017).

As noted in the competitive advantages, we have some fantastic research centres across Western Canada that have developed varieties that are demanded by export and domestic markets. These need to continue to be supported, and ways to leverage public- and farmer-funding to attract additional private investment are beneficial. A good model for what this could look like is provided by Oregon State University and their partnerships with Rahr Malting, Mecca Grate Estate Malt, Sierra Nevada, New Belgium, Deschutes and other brewers.

4.2 Maltsters

Small maltsters (and aspiring malt houses) in Western Canada, can take their competitive advantage of smaller batch sizes to be more consistent, which ties well with the strategy used by Doug Michael to scale up his own malt operations producing consistent and safe products.

Gladfield Malt owner Doug Michael sets the model for what small scale malt houses can strive to be. His growth from 2,000 MT per year to 25,000 MT per year was always based on the same principal of producing great malt. The message that he got back from his customers was that they wanted a product that was consistent and safe. When he started out, that meant calling in favours with maltsters and grain companies to get access to testing equipment and information. As he’s grown, he’s put in a $250,000 quality control lab to be sure that he knows exactly what he is putting out. He found that even that was sometimes not enough. With all the variables in brewing, he found that some brewers were quick to assume there were issues with
the malt before reviewing other processes. He was able to turn misguided complaints into customer loyalty by hiring a brewer and building a pilot brewery to help with troubleshooting.

This is something we can and should do in Western Canada. Susan Welch, President of the Master Brewers Association of America, echoed Doug’s point of view in her presentation at the Alberta Small Brewers Association Conference session: “Making the Most of Malt: What’s New and What’s Coming” when she said that the minimum threshold that every maltster must surpass is to provide a consistent and safe product (Welch 2018). This ties back in again to the key drivers that Deloitte outlined for consumers purchasing decisions: health & wellness, safety, social impact, experience, and transparency. We can also help play a key role in providing transparency, social impact, and experience with our product for the brewer. This is once again a perk of being a smaller size. We can foster closer relationships within the value chain to help brewers know exactly where their barley is coming from, and help tell the story of how the money spent on the beer benefits many different local businesses.

4.3 Post-Maltster

Breweries in Western Canada benefit from being so close to the source of the main ingredient in their beer – barley. They also benefit from consumer trends of supporting local. Merging these two benefits presents a tremendous opportunity for breweries who truly value local, top quality ingredients. New Belgium is an excellent case study for a brewery searching for their purpose. New Belgium has an incredibly unique culture and because the culture is relatable, genuine, and in line with their target markets, it has also been scalable. They have not lost who they are as they’ve grown from a small community brewery to one of the largest craft brewers in the world.

Marketing Consultant and author of Start With Why, Simon Sinek, believes that an organization's purpose can be more important than its products. He also suggests that in purpose driven organizations Culture = Values x Behaviour (Sinek 2011). Being a purpose driven organization has allowed the culture to remain intact, throughout New Belgium’s ascension to fourth largest craft brewer and eleventh largest brewery in the United States of America (New Belgium Brewing Company n.d.). They actively promote this culture on the history section of their website where they have the New Belgium Brewing Purpose Statement and Company Core Values and Beliefs (New Belgium Brewing Company n.d.).
Right now in Western Canada, most small breweries are experiencing large degrees of success. I’m often asked if we are at ‘peak beer’, or if there is a bubble forming in Alberta. For the record, I don’t think so; I’ve travelled to places that have much higher breweries per capita and where beer tourism is flourishing. I think we have room to grow still. Having said that, there will likely be breweries that do better than others and some that don’t survive.

John Holl gave a presentation at the Alberta Small Brewers Conference in Calgary about selling beer. His talk was titled “From Passion to Action: How to Talk People into Drinking Your Beer.” What he’s seen in areas where competition is fiercer and where they may be closer to “peak beer” is that a key selling feature is ‘local’. Local is a word that appears everywhere in beer advertising. It is a great way for the first brewery in a neighbourhood to convince people to try their beer instead of a multinational brand. However, for this advantage to carry on past an initial sample, and past another brewery moving in next door, local should be ingrained in the values and culture of the organization. Consumers want to see how the money they used to support their local brewery has been reinvested in the community. This can be done through sponsorships, and supporting events or it can be done by telling the story of the ingredients back to the farm.

4.4 Whole Chain

Western Canada benefits from having all members of the value chain, from the breeding programs right through to a thriving brewing industry with supportive customers. Having all the value chain members together provides opportunities for cooperation and innovation. The uptick in numbers of smaller operations in the value chain presents opportunities to accelerate innovation. MillerCoors provides examples of how the value chain can work together and benchmarking for pace of introduction of new barley varieties. NZ Hops provides an example of how to benefit from changes in the market.

NZ Hops provides an example of how an entire country’s industry moved in unison from commodity type bittering hops to premium earning aroma hops. If Canada wants a barley variety that rivals the returns of Maris Otter, it will have to do the same. This will require the cooperation of government funding, industry goal setting and direction, barley breeding programs, maltsters and brewers.

As part of the Western Canadian Barley Market Development Plan, Alberta Barley brought representatives from across the barley value chain together in Calgary to discuss the potential
benefits of quicker adoption of new barley varieties (Alberta Barley 2017). Frustration was observed as a result of the industry’s reluctance to move on from ‘Copeland’ (registered in 1999) and ‘Metcalfe’ (registered in 1997), to newer higher yielding varieties (T. Bjornson & Associates Consulting Inc. 2017). 2011 Nuffield Scholar Nick Rowsell, commended MillerCoors on their breeding program and barley supply chain management (Roswell 2012). Their vertical integration and successful introduction on newer varieties does indeed provide benchmarking for a healthy variety turnover rate that results in better agronomics.

5.0 RECOMMENDATIONS

Growing malt barley is important to grain farmers on the Canadian prairies as a rotational crop. Feed barley as a by-product is important for the Western Canadian livestock industry. An ample supply of malt quality barley is the lifeline of malt companies, with production being used domestically and as a key export product for breweries around the world. It is clearly important for Western Canada, and efforts should be made to ensure that the industry survives and thrives. The conclusions above linked a competitive advantage with a best practice observed during my travels. In the recommendations that follow, I provide actionable items for each Western Canadian member of the value chain that has been focused on in this report.

5.1 Pre-Maltster

5.1.i Farmer – Engage with the public to retain social license.

Agriculture journalist, Alexis Kienlen, attended a keynote address by author, Jolene Brown, at Advancing Women Conference in 2017. She summarized the lesson brilliantly saying that, “If you’re not ready to adapt and communicate with the public, you could lose your place in agriculture” (Kienlen 2017). I like that quote because it shows how high the stakes are. The article provides some other great quotes from Jolene Brown. One, in particular, illustrates the importance of the public relations being done by producer groups: “If you aren’t going to stand up and speak on behalf of agriculture, you darn well better be supporting the people who speak on your behalf” (Kienlen 2017).

Producer groups are doing a fantastic job leveraging dollars to portray the industry in a positive light. Alberta Barley, in particular, has done an excellent job connecting farmers and consumers through mutual interest in beer. The types of events they run, and extension work they do, should be commended and continued. However, relying solely on producer groups misses out
on too many great opportunities. Individual farmers need to actively engage with the public. This is very effective with a one-to-one conversation or in small groups. With so many people now more than one generation removed from the farm, it is important to talk about the great things we do when opportunities arise.

Next time you have an urbanite friend out for supper, take the time to show them around the farm. Tell them about what gets you excited, why you love your job, why you’re happy to feed what you produce to your own children. Also, show some vulnerability, tell them what some of the challenges are, what business decisions need to be made, why you take it personally when you hear fear-based marketing. If you’re comfortable spreading the message further, invite groups out for tours.

A very concrete example of how farmers can engage with the public, and one that we’ve implemented ourselves, is to host an event like Alberta Open Farm Days. Our malt house partnered with a nearby brewery, a hop farmer, a local restaurant, and Alberta Barley for Open Farm Days, and it was a great experience. People from the city came out, and we were able to have constructive conversations about farming practices, we were able to tell our story, and everyone was able to have some fun. Several of the families we met were going to several farms that day. It was great to see parents raising future informed consumers. These families are much more likely to make informed decisions, and not be swayed by misleading advertising.

5.1.ii Government – Continued public funding to support barley research where barley is grown.

An article in the Western Producer in April 2017 discussed the challenges of wheat breeding, and the pros and cons of private versus public funding (A. Dawson 2017). In Canada, there are four times more acres seeded to wheat than there is to barley (Statistics Canada 2017). The lower number of acres, and low proportion of certified seed usage, results in less check off dollars and less incentive for private investment. Public funds are needed, even more so than in wheat, to tip the scales and make private investment attractive. Ideally, increased investment leads to increased yields and agronomics, making barley a more competitive choice for farmers and more barley acres planted. Richard Gray, an agricultural economist at University of Saskatchewan calls for “the 4P approach: a partnership between the public and private sector and producers,” and suggests that with the government having made agriculture a renewed priority that the timing is right for investment in plant breeding (Carter 2017). To attract increased private investment for the 4P model in barley, a value creation system is likely required to improve the ability to recoup investment.
The most recent federal government budget includes a review of all agricultural programs and facilities creating the possibility of closing some research centres (Harris 2018). Keeping these centres open is crucial for continuity and obtaining more data points from various regions. The barley breeding program in Alberta is important to maintain as this is where the majority of the barley is grown in Canada.

5.2 Maltsters - Make a consistent and safe product by using traceability and transparency to ensure customer knowledge.
It takes a lot of hard work along with cooperative weather for farmers to grow barley that meets malt specifications. Maltsters need to use the same amount of care and attention to processing this barley into malt, and make sure they can clearly articulate to their customers what they’ve done. After meeting Emma Watson at AgriDigital and learning about blockchain, I’ve been hearing about it non-stop. The media first started reporting on blockchain each time the related tech company, Bitcoin, experienced a sharp increase or decrease in value. More in-depth articles start getting at some of the other uses of blockchain, such as increased traceability of food supply chains. Traceability and transparency, either with blockchain or without, is a service that maltsters can provide to brewers, to help them sell beer that consumers know is local, safe, high quality, and of social benefit.

5.3 Post-Maltsters – Have a purpose
Returning from my trip to New Zealand, Australia, and with a stop in Brazil for the Contemporary Scholars Conference, I came back with a whole lot of ideas and excitement. I also came back with a long list of books to read. I met some inspiring people and asked a lot of them about books that helped them along the way. The three most influential for my business so far have been Blue Ocean Strategy (Kim and Mauborgne 2005) (if you found the example of consumers paying $2.29 more for a 2L of milk hard to believe earlier in this report, this book will help you understand how that can happen), Daring Greatly (Brown 2012) (it changed the way I think, so it unavoidably changed the way I think about my business), and Start With Why (Sinek 2011) - as I’ll explain shortly.

The banker in me wants to say that one of the most important things in starting a brewery, or any business, is having a good business plan with things like realistic well-researched start-up
costs, knowing how you’re going to have enough working capital to get you to the point where cash starts coming in, then projecting your cash-flows out until at least the business is expected to be profitable. Right now in Western Canada, while the supply of craft beer still lags behind the growing demand, that is often enough to be successful. However, for breweries with aspirations of long term, sustainable growth in a more competitive market, and selling outside of your local area, some of the “softer” sides of the business plan become more crucial. In particular, I recommend businesses focus on their purpose, values and culture. So long before crunching the numbers on the projected revenues and expenses, sit down with your business partners and discuss why your business is going to exist, how you’re planning on doing it, and then figuring out what you’re going to brew.

Develop your purpose statement, write down your values; are your business partners in agreement? Then make sure you have a business, and not a hobby, by figuring out if it resonates with a large enough segment of the market to be profitable. Starting here will help set the culture of the company. I hope it goes without saying that it needs to be authentic. When it comes to the barley value chain, you can use bullshit to grow it, but you can’t use bullshit to sell it. If your culture is a reflection of your purpose and values, everything else will flow naturally. Your marketing plan will be a whole lot easier to figure out, and much more effective. You’ll have an easier time picking out what causes to support and what events to get involved with, and you’ll attract the customers that will remain loyal.

5.4 Whole Value Chain – Involve end users in developing new varieties of barley in Western Canada

The popularity of all-malt brewing has already had a big influence on the demand for malt barley. To maintain this momentum, and for Western Canada to capitalize the most from it, it is worth focusing on this part of the market. The Brewers Association has put forward a very specific document regarding what an ideal barley variety would look like, notably that it offers distinctive flavours and aromas, and prioritizes specifications that favour all-malt brewing over adjunct brewing (Brewers Association n.d.). Producers should use their influence with their grain commissions. Maltsters and brewers can gain a more powerful voice in what sort of research is conducted through membership with the Brewing and Malt Barley Research Institute. Together funding can be approved, and leveraged for additional investment from the private sector, for this type of research. NZ Hops provides an example of the benefits of producing products that aren’t viewed as a commodity to the benefit of the whole supply chain.
There is an even larger potential benefit to farmers in Western Canada due to the intensive barley usage from all-malt brewing.

The first item on the Brewers Association wish list is distinctive aromas and flavours. This requires some fundamental, but very achievable shifts in how we introduce new varieties. One of the biggest bottle necks is getting sufficient seed stock to conduct malt plant trials. This step precedes getting the variety into the hands of brewers to try and provide feedback. It comes after having to prove itself as agronomically superior to the check varieties. The shift in the value chain towards smaller players has provided some new and exciting opportunities. The ability to malt on a smaller scale, and brew on a smaller commercial scale, means that less seed stock is required. This can shave years off the time when flavour is tested. As Maris Otter shows, brewers are willing to pay a premium price for unique and desirable flavours. This shifts the agronomics of production from a farmer’s perspective, making yield testing less crucial. It could reduce hurdles required for new varieties, and could also lead to more varieties making it to taste tests. Maybe equally or more valuable than shortening the variety development timeline, is having the feedback from the end users to help create pull demand. This will help increase engagement and variety acceptance. It will shake some of the rust that tends to accumulate throughout the barley value chain due to the difficulty of pushing varieties, because they clear the sequence of hurdles of high yielding, disease resistant, modify quickly and consistently in the malt house, high enough enzymes and extract for large adjunct brewers.

The barley value chain has been impacted considerably by the increase in demand caused by all-malt brewing. This has the potential to reverse the trend of declining barley acres in Western Canada. Barley is an important crop for Western Canada due to its importance in healthy and sustainable crop rotations as well as providing inputs for food and beverage sectors. It can play a vital role in increasing Canada’s agri-food exports while also providing increased food security domestically. There is an opportunity for all members of the barley value chain to take some of the best barley grown in the world and profitably add value in supplying products that consumers are demanding. This report provides some tangible and realistic ways forward, and the base of information for others to come up with their own solutions as well.
6.0 GLOSSARY

**AAF Lacombe** – A research centre in Lacombe, Alberta that is operated by Agriculture and Agri-Food Canada, a branch of government that conducts research for benefit of agriculture and agri-foods sector.

**AAFC Brandon** – A research centre in Brandon, Manitoba that is operated by Agriculture and Agri-Food Canada, one of the original five experimental farms established by the Government of Canada in 1886 under the *Experimental Farm Station Act*.

**Adjunct** – A source of fermentable sugars that doesn’t come from malted barley or wheat. Typically a cheaper source of sugar like rice or corn.

**AGLC** – Alberta Liquor and Gaming Commission, the provincial government oversight body that also provides recommendations to the finance minister around taxation, interprovincial trade and other legislation related to production and sales of alcohol.

**Agronomics** – The economics of producing an agricultural commodity includes factors that impact profitability of producing a commodity such as yield, sales price, and susceptibility to disease.

**Alberta Barley** – Provincial producer group representing Alberta barley producers, funded by check off dollars collected on the sale of barley.

**All-Malt Brewing** – Brewing without the addition of other adjuncts. This type of brewing requires significantly more malted barley or wheat to produce the same amount of alcohol in beer compared to using other sugar sources.

**AMBA** – American Malting Barley Association

**Aroma Hops** – Hops that are added later in the brewing process. Adding them later results in aromas that will carry through into the finished product.

**Bittering Hops** – Hops that are added earlier in the boil during the brewing process; adding hops earlier in the boil produces more residual bitterness in the finished product.

**Blockchain** – The technology that Bitcoin uses. Information related to transactions is included in a data packet that is added to the blockchain and is viewable by all members.

**BMBRI** – Brewing and Malting Barley Research Institute

**CDC** – Crop Development Centre – A field crop research organization within the Department of Plant Sciences at the University of Saskatchewan

**CMBTC** - Canadian Malt Barley Technical Centre

**Fusarium Head Blight** – A fungal disease (*Fusarium graminearum*) that can occur in barley; that makes the grain not suitable for brewing.

**FCDC** - Lacombe Field Crop Development Centre – A provincially funded and run research institution that includes a barley breeding program.
Malt Barley – Barley that meets certain criteria indicating it is appropriate for malting. Not to be confused with barley malt or more commonly malt, the name given after it has undergone the malting process

Malt House – An operation that can process barley (and/or other grains) into malt

Malting Specifications – There are no concrete guidelines, but key specifications are germination power, moisture, protein, plump and absence of discoloration, disease and other grains

Pilot Brewing – brewing on a small scale for testing purposes

Pilot Malting – malting on a small scale for testing purposes

Plant and Food Research (NZ) – A government owned crown research institute conducting research on fruits, vegetables, crops and food products and value added activities

Provenance – In this report, provenance refers to the information and story behind where something comes from

Saladin Box – A piece of equipment used in the malting process to complete the germination and kilning steps in the same vessel

Social License – When the general public accepts business practices

Sustainability – Ability to continue operating over a long term basis

Western Grains Research Foundation – A farmer funded, non-profit organization investing in agricultural research to benefit Western Canadian producers
7.0 REFERENCES


Collins, Brad. 2016. "The malt barley market and its quality assurance requirements may be a pointer to future producer–buyer relationships for most grains as consumers demand more information on how food is grown." *GroundCover*, September.


