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**A Perfect Brew:
Leveraging Intangible
Capital to Move up the
Coffee Value Chain**

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Abstract

Coffee is one of the most important traded agricultural commodities. It is a commodity that is produced in the Global South but consumed mainly in the Global North. Coffee's global value chain is thus heavily influenced by consumers in these high income countries. However, newer consumption patterns are triggering a change in the coffee business model. Coffee aficionados who are interested in the quality of the coffee beans they consume and also in knowing how the coffee plants are farmed and harvested, and if the growers are receiving a fair wage are helping coffee growers to earn more from their coffee harvests. This paper examines how the new preference for coffee consumption is reshaping its global value chain, and how this change offers an opportunity for coffee growers to earn more income by catering to this new consumption trend. It provides important insights into how agrarian economies should invest and cultivate their intangible assets to enhance their value chain participation and improve their competitiveness in international trade.

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A Perfect Brew: Leveraging Intangible Capital to Move up the Coffee Value Chain

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INTRODUCTION

Over the past two decades, there has been a relatively small but noticeable shift in how people prefer their coffees. Today, more and more coffee drinkers are aligning their consumption patterns with their beliefs and social awareness. They are choosing to buy and consume coffee goods that address social and environmental concerns. They do so even when the prices of these coffee products are higher than the average.

This new coffee consumption preference has set off a change in the business of coffee. Traditional coffee producers, which consist of roasters, soluble (instant) coffee manufacturers and large retailers, are trying to capitalize on this movement and have started to mimic the business model brought about by this new consumption pattern.

At the same time, participants across all segments of the coffee value chain are increasingly investing in intangible capital to earn more from their transformative activity along the chain. In particular, there has been a significant increase in the investments into knowledge assets along the coffee's global value chain.

The new wave of consumption pattern coupled with the emphasis on investing in intangible capital offer a unique opportunity for coffee growers to earn more income from their efforts. It has the potential of increasing the participation of coffee growers into the value chain, and integrating coffee-producing countries further into global trade economy. It may be an essential element for these countries to move beyond the vagaries of exporting commodities.

This paper examines how the new preference for coffee consumption is reshaping its global value chain, and how this change offers an opportunity for coffee growers to earn more income by catering to this new consumption trend. It provides important insights into how agrarian economies should invest and cultivate their intangible assets to enhance their value chain participation and improve their competitiveness in international trade.

The outline of this paper is as follows. First it illustrates the global value chain of coffee, and how income is distributed along the chain. It focuses on how the income is linked to the ownership and management of intangible capital. It then describes evolution of coffee consumption pattern and how this small change in coffee trend impacts the participants in its global value chain. The third section of this paper relates the investments in intangible capital to the new consumption pattern, and provides some evidence of how coffee growers may enhance their value chain participation by investing in their own intangible capital. The final section concludes with further research questions and discussion on how this coffee case could be extended to other agricultural commodities.

GROWN IN THE SOUTH BUT CONSUMED IN THE NORTH

Coffee's value chain is international in two main ways. First, coffee is farmed in the Global South. These coffee-producing countries lie in the southern hemisphere and fall within the low- to middle-income brackets. However, most coffee is consumed in the Global North, which accounts for nearly 70 percent of worldwide demand for coffee.¹ These coffee-importing countries tend to be located in the northern hemisphere and are fall under the high income bracket. They include countries such as the United States, Germany, Japan, France and Italy.

¹ While coffee-producing countries have also increasingly consumed coffee in recent decades, their levels of consumption are still significantly below those of their richer counterparts except for Brazil. Brazil increased its coffee consumption by nearly 65 percent, from 26.4 million bags in 2000 to 43.5 million bags in 2012. See ICO 2014. World coffee trade (1963-2013): A review of the markets, challenges and opportunities facing the sector. *International Coffee Council 112th Session Document No. ICC 111-5 Rev.1*. London: International Coffee Organization.

Second, roasted coffee beans lose their quality and taste relatively quickly. The short shelf life of roasted coffee beans and the slow development of adequate packaging and distribution technologies until recently explain why most of the transformative, value added activity, of coffee production is close to the consumers in the Global North. Therefore, coffee-producing countries tend to export green coffee – as an intermediate good in the value chain – while the blending and roasting tends to take place in coffee-importing countries.

WHAT THE COFFEE VALUE CHAIN IS LIKE

The coffee global value chain follows a snake-type configuration, whereby there is a distinct product separation between each sequential process stage along the chain.²

At the input end of the coffee production chain, the coffee grower chooses the coffee tree variety, and farms and harvests the coffee cherries. In choosing the tree variety, the grower undertakes a ten-year long risk that the variety would produce coffee cherries suitable for the market.³ Mature coffee cherries then undergo different post-harvesting processes to yield green coffee.

Depending on the market structures in place in the different coffee-producing countries, post-harvesting processes may take place at the farm site, in a cooperative, at a wet or dry mill owned by local traders, or even at a mill owned by exporters.

The exporters or cooperatives then select the green coffees by their density, size and color, and pack them according to specific definitions and standards set by coffee importers or industrial users such as roasters and soluble coffee producers.

Green coffees arriving in bulk in coffee-importing countries are stored in warehouses. The importers may mix and blend different green coffees from various countries in response to requests from buyers. They then sell these blends or the green coffee shipments to roasters, soluble coffee manufacturers and large retailers.

Down the output end of the production line, these roasters, soluble coffee manufacturers and/or retailers may also blend the green coffee according to their needs. They then roast the green coffee using their own roasting recipes and protocols to obtain particular flavor profiles adapted to the regional taste preferences of their customers.

HOW INCOME IS LINKED TO THE VALUE ADDED ACTIVITY

Coffee's global value chain of coffee has a market-based governance structure. This implies that the interaction between each participant along the value chain is minimal and the transactions between them are price based. There is not much knowledge flow between the participants, and relationship is at arm's length.

This governance structure results in most of the value added along the coffee value chain is appropriated by downstream participants. These participants mainly consist of roasters, soluble coffee manufacturers and large retailers. The higher value added activity at this tail end of the value chain in turn reflects the share of income accrued to these participants.

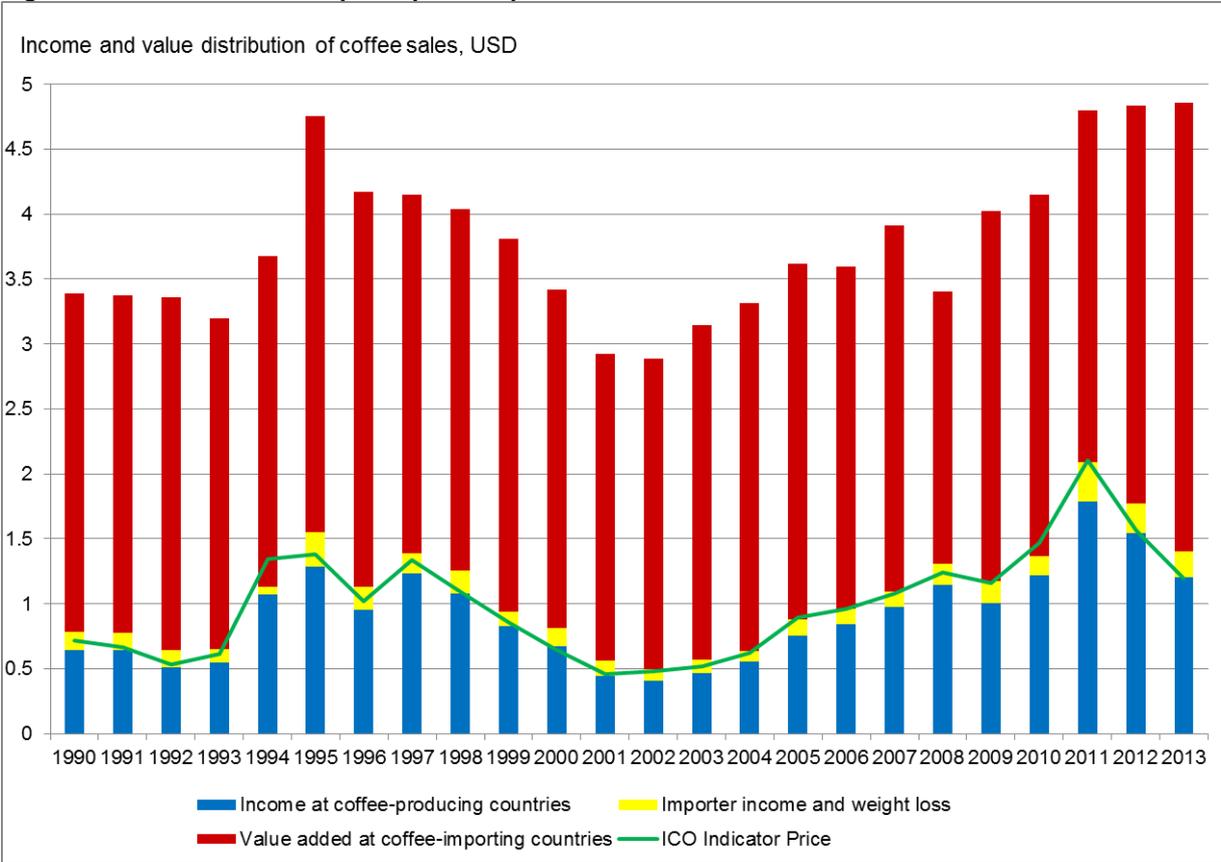
Figure 1 shows how total income from grocery retail coffee is distributed across the coffee-exporting countries, importers and coffee-importing countries for the years 1990-2013. Coffee-importing countries have enjoyed a larger share of value than other coffee

² The spider-like configuration, by contrast, has many parts and components that come together to become the final product.

³ Coffee trees take ten years from first planting the seed to producing viable coffee cherries. The farmer takes on the risk of the demand for the coffee bean produced, the climate change unpredictability and the danger of coffee tree parasites.

participants every year since 1986. Before 1986, coffee-producing countries retained a larger share of income due to regulation on global coffee trade by the International Coffee Agreement.⁴

Figure 1: Downstream coffee participants capture most of the income from coffee retail sales



Source: Samper et al. (2017) based on data collected from the FAO and ICO.
 Note: Retail prices of grocery sales attributed to coffee-importing countries are based on USD per pound of roasted coffee, while incomes in coffee-producing countries and import prices are USD per pound of green coffee free-on-board (FOB). The weight loss refers to the hulling, drying, export preparation and roasting of green coffee. The International Coffee Organization (ICO) indicator price is a benchmark price for green coffee of all major origins and types.

Four factors account for why a significant share of the value added to coffee along its value chain is close to where coffee is consumed.

First, roasted coffee beans lose their flavor and aroma quickly, so most beans are exported as green beans in order to preserve their quality. Prices for green coffee beans are competitive and set by the international exchange platforms in New York for Arabica and in London for Robusta beans.

Coffee is also exported as soluble (instant) coffee. However, coffee participants in the producing countries are not as active in exporting soluble coffee as their counterparts in the importing countries. In addition, manufacturing soluble coffee is capital intensive, which may pose a barrier to entry for some participants in coffee-producing countries. For those

⁴ See ICO 2014. World coffee trade (1963-2013): A review of the markets, challenges and opportunities facing the sector. *International Coffee Council 112th Session Document No. ICC 111-5 Rev.1*. London: International Coffee Organization. Also see Box 2.2 of WIPO 2017. World Intellectual Property Report 2017: Intangible Capital in Global Value Chains. Geneva: World Intellectual Property Organization. p.52.

participants who do export coffee in soluble form, the unit value they receive is about 26 percent less on average than that produced by coffee-importing countries.⁵

Second, consumers across regions have different and distinctive preferences for the composition of their coffee bean blends, and even the degree of the coffee bean roast. Northern European consumers prefer their coffee blends to consist of lighter roasted Arabica beans, while their Southern counterparts are drawn to darker roasts of coffee blends that include Robusta beans.⁶ Roasters and soluble coffee manufacturers located close to consumers tend to be better placed than their competitors in coffee-producing countries to tailor the blend and roast to these regional preferences.

In addition to tailoring blends and roasting degrees to specific regional taste, large roasters locate their roasting facilities so as to benefit from economies of scale. For example, a roasting facility in Germany may roast and blend coffee for several European brands, reducing its costs and increasing its production levels.

Third, coffee-importing countries tend to have industrial policies that favor the importation of unprocessed, mainly green coffee beans over their roasted and more processed soluble form. This trade restriction in the form of tariff escalation inflates the cost of any roasted or even processed coffee exported by coffee-producing countries.

However, it is worth noting that for many coffee-importing countries – particularly the more developed economies – tariffs on coffee have been steadily reduced through various bilateral, regional and multilateral trade agreements. And today, while tariff escalation remains an issue, tariffs on roast and processed coffee tend to be low in the European Union and the United States; by contrast, India and Ghana have duties on soluble coffee of 35 and 20 percent respectively.⁷

Moreover, a study conducted by ICO (2011) shows that this tariff escalation is likely to have a higher impact on coffee consumers residing in less developed countries than their developed counterparts.⁸ In particular, consumers in developed countries will continue to purchase coffee even when the price of coffee beverage increases. This implies that coffee consumers in these countries will continue to consume their favorite imported coffee even if there is an increase in tariff-equivalent tax imposed on those imports.

There are also regulatory measures affecting the import of roasted and processed coffee from coffee-producing countries, such as sanitary and phytosanitary measures, which are not trade restrictions per se but may entail higher compliance costs for firms in coffee-producing countries.

Fourth, investments in innovation and branding account for the high value added towards the tail end of the coffee value chain. Investments in innovation may be measured through

⁵ The ICO calculates that soluble coffee exports by coffee-producing countries were worth 26 percent less on average than soluble coffee re-exports by coffee-importing countries in the period 2000-2011. ICO 2013. World trade of soluble coffee. *International Coffee Council 110th Session Document No. ICC 110-5*. London: International Coffee Organization.

⁶ See PONTE, S. 2002. The 'Latte Revolution'? Regulation, Markets and Consumption in the Global Coffee Chain. *World Development*, 30, 1099-1122, PENDERGRAST, M. 2010. *Uncommon Grounds: The History of Coffee and How it Transformed Our World*, New York, Basic Books, MORRIS, J. 2013. Why espresso? Explaining changes in European coffee preferences from a production of culture perspective. *European Review of History: Revue européenne d'histoire*, 20, 881-901, ELAVARASAN, K., KUMAR, A., MANOHARAN, A. & SOUNDARA RAJAN, S. 2016. The Basics of Coffee Cupping. *Tea & Coffee Trade Journal*, 30-33.

⁷ ITC 2012. The Coffee Exporter's Guide - Third Edition. Geneva: International Trade Centre.

⁸ ICO 2011. The Effects of Tariffs on the Coffee Trade. *International Coffee Organization 107th Session Document No. ICC 107-7*. London: International Coffee Organization.

examining the number of patents, utility models⁹ and design patents¹⁰ while branding may be captured through trademark and collective marks filings and geographical indication¹¹.

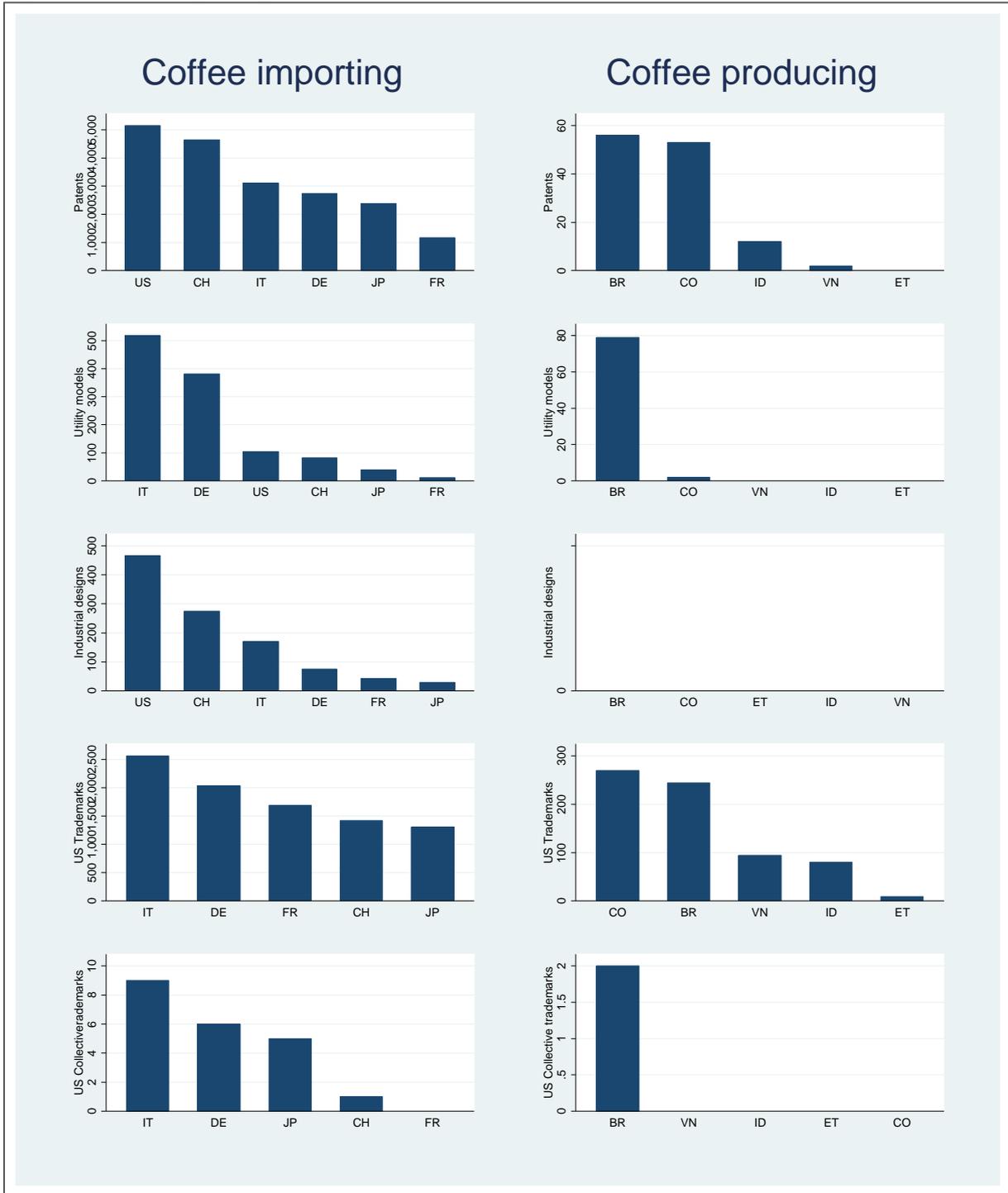
Figure 2 compares the number of applications filed in the top five coffee-importing (left) versus top five coffee-producing (right) countries in the five different intellectual property (IP) instruments. It shows that participants in importing countries account for large numbers of the IP rights related to coffee.

⁹ Some countries allow for utility model protection. Utility model is a form of intellectual property right that is considered a second-tier patent.

¹⁰ Design patents are also known as industrial design in certain countries.

¹¹ Some countries allow for geographical indication protection. Geographical indication is different from a trademark in that it relates to the specific geographical origin of the product, which possesses qualities or a reputation associated with that origin, the terroir. See box 2.2 in WIPO 2013. *World Intellectual Property Report 2013: Brands -- Reputation and Image in the Global Marketplace*, Geneva, World Intellectual Property Organization. p.85-86.

Figure 2 Coffee-importing countries file for most of the IP related to coffee



Source: WIPO based on PATSTAT and USPTO

Note: Data on patents, design patents and utility models are from the PATSTAT database, while data on trademarks come from the USPTO.

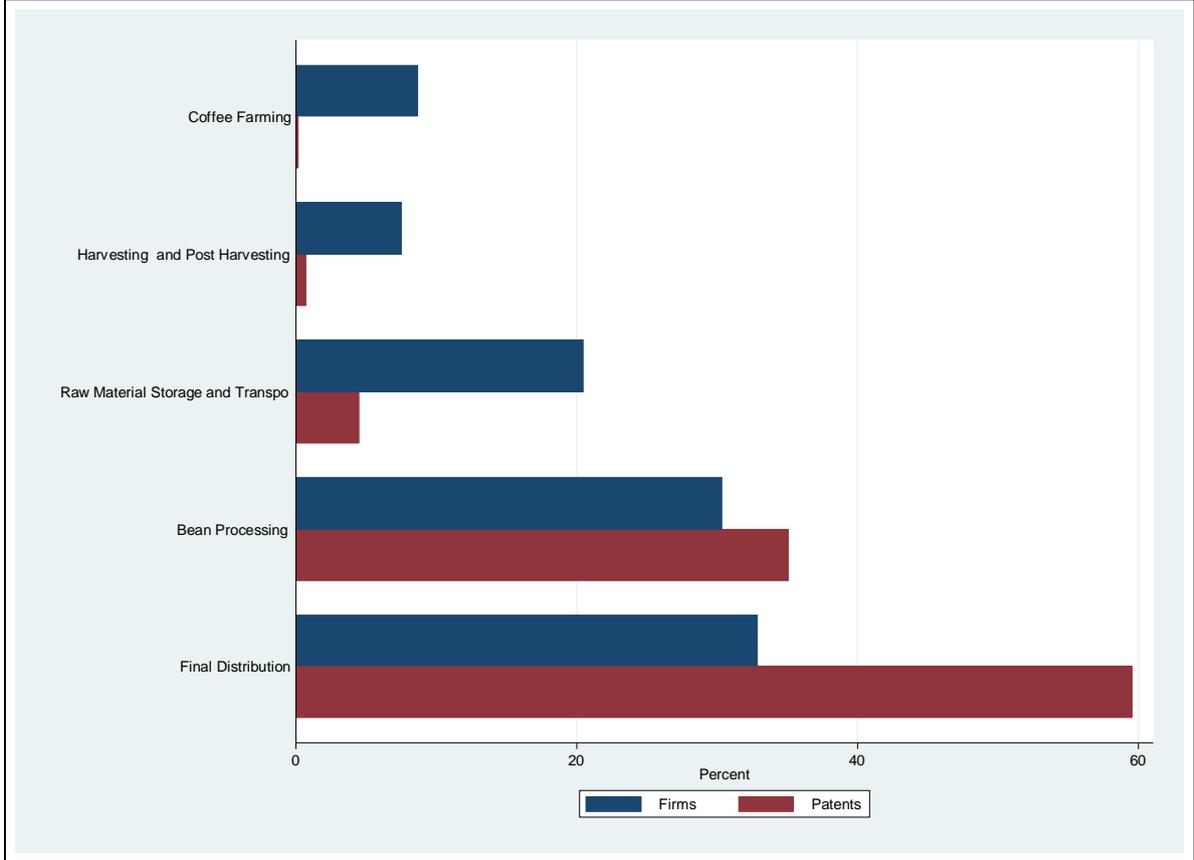
The stark contrast between IP filed in coffee-importing versus coffee-producing countries is not surprising. Most product and process innovations related to processing coffee were developed in coffee-importing countries by coffee participants close to the consumers.

Figure 3 distributes the share of coffee-related patents across the six value chain segments of coffee production line (in red), and contrasts these filings to the proportion of coffee participants at each stage of the chain (in blue). Over 90 percent of all coffee-related

patenting activities are concentrated in the bean processing and final distribution segments.⁴³ These two segments account for nearly two-thirds of the total number of firms in the coffee industry worldwide. They typically include roasters, soluble coffee manufacturers and retailers that also do their own roasting such as specialty coffee shops and independent coffee retailers.

In contrast, the activities that usually take place in coffee-producing countries such as coffee farming, harvesting and post-harvesting do not see much patenting. The farming and harvesting/post-harvesting segments together account for less than 2 percent of overall coffee-related patent filings.

Figure 3: Most coffee-related patents are filed by coffee participants close to the consumers



Source: WIPO based on PATSTAT and Ukers (2017); see technical notes. The classification of value chain segments is based on Samper et al. (2017).

Note: The bars in blue represent the share of all firms in the coffee industry operating in each particular segment of the value chain. The red bars indicate the share of coffee-related patents attributable to each chain segment. The share of coffee participants for the coffee-farming segment is likely an underestimate as the list of coffee participants retrieved from the Ukers directory only includes registered firms.

Many apparatuses were invented and introduced on both sides of the Atlantic Ocean to maximize the taste and flavor of coffee by roasting, grinding and even percolating the coffee beans (see Table 1).¹² Soluble coffee manufacturing, which involves more processing than coffee roasting, was arguably invented during the U.S. Civil War so that soldiers could easily drink caffeinated beverages. This origin of soluble coffee has been disputed as evidenced by the first patent granted to an Englishman in 1771 for “coffee compound”.¹³ But it would take an engineer from Nestlé to develop a method of producing powered soluble coffee – at the

¹² UKERS, W. H. (ed.) 1922. *All About Coffee*, New York: The Tea and Coffee Trade Journal Company.
¹³ See TALBOT, J. M. 1997. Where Does your Coffee Dollar Go?: The Division of Income and Surplus along the Coffee Commodity Chain. *Studies in Comparative International Development*, 32, 56-91. UKERS, W. H. (ed.) 1922. *All About Coffee*, New York: The Tea and Coffee Trade Journal Company.

request of Brazilian coffee officials – that would cement the importance of soluble coffee as a beverage.¹⁴

Table 1: Selected coffee-related product and process inventions

Period	Invention	Country
1704	Roasting coffee machine patented in England. First use of coal for commercial roasting.	Great Britain
1771	First English patent granted on soluble coffee.	Great Britain
1800	First drip pot -"De Belloy coffee pot"- appears; it would dominate coffee preparation method.	France
1802	First patent on coffee maker for a "pharmacological-chemical coffee-making device by infusion."	France
1806	First patent on coffee percolator granted. The invention is similar to De Belloy's "drip" pot.	Great Britain
1807	Patent on device for "filtering coffee without boiling and bathed in air" granted.	France
1836	First patent that combines coffee-roaster and grinder issued.	France
1846	"Pull-out" roaster machine was granted a patent to James W. Carter. Over the next twenty years, this machine would dominate the business of roasting coffee in the U.S.	U.S.
1860s	Manufacturing of coffee roasting equipment led to pop-up of specialist coffee-roasting firms that service grocery stores.	Germany
1860s	First ground-coffee package in New York market known as "Osborn's Celebrated Prepared Java Coffee".	U.S.
1864	Patent on Burns roaster granted, revolutionized coffee-roasting.	U.S.
1864	First coffee roasting machine that did not have to be moved away from the fire for discharging the roasted coffee granted to Jabez Burns.	U.S.
1870s	Patents on coffee roasting issued in Germany.	Germany
1873	First patent granted on coffee substitute to E. Dugdale in U.S.	U.S.
1882	Earliest coffee extract making machine patented.	Germany
1889	Satori Kato granted patent on soluble coffee.	U.S.
1889	David Strang filed for patent on soluble coffee. Marketed the product as "Strang's coffee".	New Zealand
1891-1900	English and US patents on machine for shelling, pulping and drying coffee granted to O'Krassa in Antigua, Guatemala.	Great Britain/Guatemala
1901	First single serving espresso machine invented and patented by Luigi Bezzerra.	Italy
1933	Patent on "steam-cleaning" process introduced. A turning point for roaster as it enabled the use of cheaper Robusta beans in coffee blends.	Germany
1973	Patent on a "Process of preserving the aromatic substances of a dry soluble coffee extract" granted in Switzerland. Paved way for Nestlé to enter the coffee market under brand name Nescafé.	Switzerland
1976	Eric Favre an employee of Nestlé patented the single coffee capsule, paving the way for the Nespresso system.	Switzerland

Source: Ukers (1922).

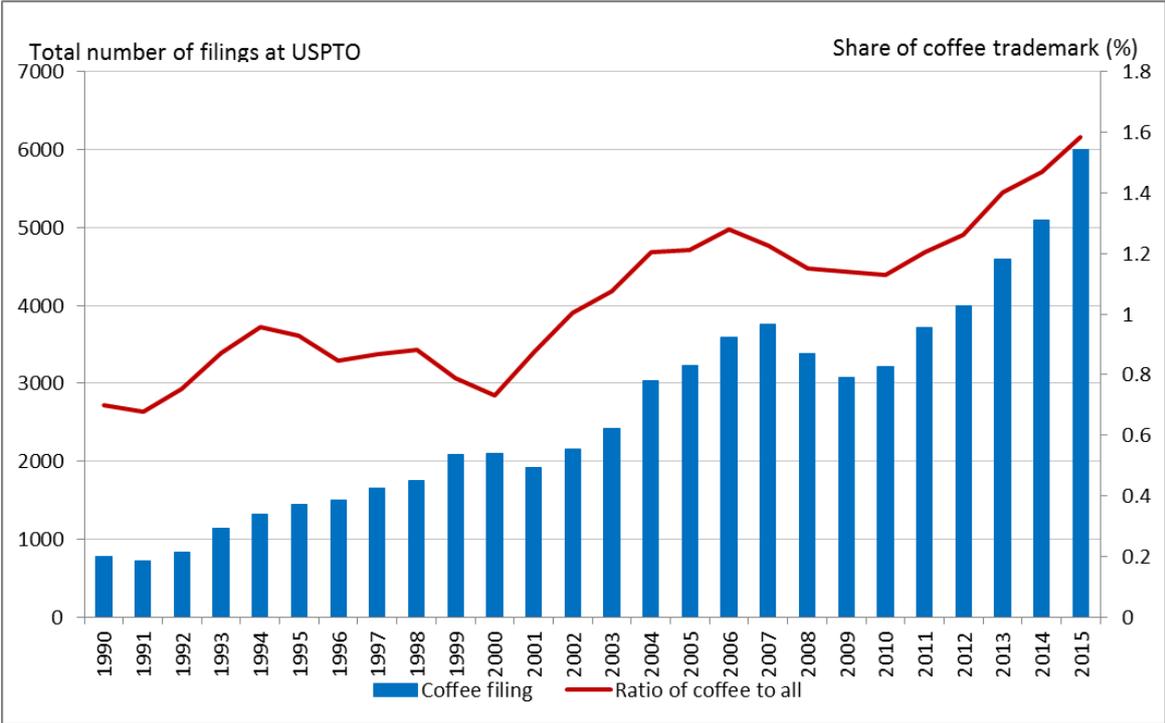
In addition, ownership of coffee-related patented technologies has been useful in helping launch new coffee products and services. The patents and industrial designs owned by Nespresso on its coffee machines and capsules helped cement Nestlé's strong presence in catering to coffee consumers in the first wave market segment. Most of these patents have

¹⁴ The engineer was Max Rudolph Morgenthaler, and the patent was filed in Switzerland in 1937 for a "Process of preserving the aromatic substances of a dry soluble coffee extract."

now expired, but both Nestlé and Nespresso continue to be strong brand names in the coffee market.

Branding is an important investment to build consumers’ trust and gain market share in the relatively saturated coffee market. Research has shown that branded products can command higher prices than their generic counterparts.¹⁵ Many roasters, soluble coffee producers and retailers invest heavily in this intangible asset, to differentiate themselves from their competitors and gain goodwill. Both Nescafé and Starbucks are well-recognized trademarked names which are popular with coffee consumers worldwide. In the United States, coffee-related trademark filing has been steadily increasing even when accounting for the yearly general increase in trademark filings (see the red line in Figure 4).

Figure 4: Coffee participants are increasingly relying on trademark as a means of differentiation



Source: WIPO (2017) based on the USPTO trademark data.

SHIFT IN COFFEE CONSUMPTION

Coffee’s global value chain is slowly changing due to the shift in coffee consumption patterns. The new generations of coffee consumers are expecting more from their cup of joe, demanding higher quality coffee products and wanting to know more about how their coffee beans came to their mugs.

The emphasis placed on the quality of the coffee beans as well as the journey of the beans implies that downstream participants have to better coordinate and control the beans as they move along the value chain. In some instances, some participants find their role in the chain become more important. In other instances, some participants find that their roles have become redundant.

¹⁵ See Chapter 3 of WIPO 2013. *World Intellectual Property Report 2013: Brands -- Reputation and Image in the Global Marketplace*, Geneva, World Intellectual Property Organization.

HOW DRINKING PREFERENCES ARE CHANGING

The coffee industry loosely classifies its consumers into three market segments based on consumption patterns.¹⁶

The first coffee market segment caters to coffee drinkers who consume coffee at home. It is characterized by consumers' need-for-energy consumption demand for coffee on a daily basis, and cheaply. This segment is known as the *conventional* segment and accounts for the largest share and market value of coffee consumption worldwide.

Competition in this market is intense and, more importantly, based on keeping the production cost low. Decisions regarding the origin of the coffee and whether Arabica or Robusta beans are used are based on price. Until recently, the origin of the coffee has been of minor importance; rather, downstream coffee participants rely on branding to differentiate themselves from their rivals. These participants capture a significant share of the total market income, reflecting the economic importance of these activities in the global value chain.

The second market segment targets those who prefer to consume coffee in a social setting. It started in the mid-1990s and revived the coffee-drinking culture in a social setting. In this segment, consumers are able to appreciate a wide range of espresso-based beverages in a comfortable and convenient location. This market segment is known as the *differentiated* segment. One of the main competitors in this market is the globally known Starbucks.

The differentiated market segment is also the first to start addressing specific social awareness issues. When coffee prices fell drastically in 1990s¹⁷, several non-governmental organizations (NGOs) started highlighting the impact of the low coffee prices on farmers, calling for action to help alleviate this problem. In response, coffee specialty shops such as Starbucks started offering coffees that met the expectations of their more socially conscious consumers. In responding to these demands, downstream coffee participants in this segment began to focus on issues of transparency, such as providing more information and knowledge about upstream coffee-related activities through certification and Voluntary Standard Setting (VSS) compliances.

And finally, the third market segment focuses on coffee aficionados with discerning coffee tastes. Consumers in this market are willing to pay premium prices for their coffee. In exchange, they want to know where their coffee beans are sourced, how they have been farmed and how best to brew the beans in order to fully appreciate the flavor, body, aroma, fragrance and mouthfeel of the coffee. This market segment is known as the *experiential* segment.

What differentiates the conventional market segment from the differentiated and the experiential segments is that the latter two segments may be generalized as "coffee-plus". In these two newer segments, coffee is more than just a drink to be consumed for energy. It is an energy drink that carries material, symbolic and personalized quality attributes.

The quality of the coffee beans used in the beverages improves across three segments, with the highest quality associated with the experiential market segment. While coffee products sold in the conventional market tend to be homogenized commodities with the quality of coffee beans range from mediocre to low, the newer market segments emphasize the higher

¹⁶ These three market segments of conventional, differentiated and experiential are also known as the First-, Second- and Third Waves, respectively.

¹⁷ Between 1962 and 1989, the global coffee trade was heavily regulated by the International Coffee Agreement. The aim of the agreement was to reduce price fluctuations and stabilize prices, particularly when the coffee prices were low. See ICO 2014. World coffee trade (1963-2013): A review of the markets, challenges and opportunities facing the sector. *International Coffee Council 112th Session Document No. ICC 111-5 Rev.1*. London: International Coffee Organization.

quality of the coffee beans offered and focus on the importance of the origin of the coffee bean, and even how they are farmed. In the experiential market segments, the baristas are assumed to have deep product knowledge of the coffee beans, from the personalized roasting recipes to the ideal beverage preparation techniques. These baristas may even have played a role in cultivating the coffee plants.

HOW PREFERENCES IMPACT COFFEE’S VALUE CHAIN

To understand how the shift in coffee consumption affects the participants along the value chain, it is important to understand how these participants relate and interact with one another. This link in turn is determined by product characteristics, the participants’ capabilities and ability to scale-up or standardize the production process.

The conventional market segment makes up the largest volume of coffee’s global value chain. As explained briefly earlier, this segment is governed by a market-based structure. This implies that there is little interaction between the upstream and downstream coffee participants. Coffee roasters, soluble manufacturers and retailers are able to source and purchase their coffee beans from different geographical location depending on their needs and price considerations without having to cultivate a relationship with their coffee bean growers and suppliers.

In the differentiated market segment where certification issues became more important, the intermediaries in the coffee chain find themselves in a unique position. Most specialty shops do not have direct access to coffee farmers and so have to rely on intermediaries to ensure that the coffee beans they purchase meet their chosen criteria. Exporters in coffee-producing countries, with relationships with both coffee farmers on the one hand and the importers or roasters in coffee-importing countries on the other, are well placed to arrange for the supply of certified beans that comply with given farming methods and other sustainability criteria. Some NGOs also help provide certifications such as Fair Trade or Rainforest Alliance certifications.²⁹

In the experiential market segment, where the quality and origin of the coffee beans become part of the product sold, the role of the coffee grower becomes important. This market segment emphasizes direct links between the downstream and upstream participants, and its selling point is the in-depth knowledge of how best to brew beans in order to fully appreciate their flavor, body, aroma, fragrance and mouthfeel.

Unlike the conventional and differentiated market segments, the experiential market segment is governed by a relational value chain. The closer interaction between upstream and downstream market participants implies exchange of knowledge between these participants. It is this relational link between the input and the output sides of coffee production – brought about by consumers’ drive for more information about what they consume – that gives rise to value enhancement for the coffee growers.

Table 2 provides a summary of the different coffee participant along the value segment, their main value added activities, who the participants are, the risks they undertake and the intangible assets associated with that activity. It showcases how the improving or even focusing on the intangible assets may allow for value enhancement for the participants in that segment.

Table 2: Coffee participants, their value added activities and the associated intangible assets

Participant	Main value added activities	Main actors	Risks	Intangible assets	Geographical location
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Farmers	<p>Grow and harvest coffee crops.</p> <p>Many are connected to cooperatives or farmers associations. Coffee cherries are processed (in wet or dry processes) at the farm or by the next participant in the chain.</p>	<p>Farmers and/or coffee growers; most of the farmers grow their coffee crop on less than five hectares of land.</p>	<p>Crops and harvest are affected by changes in climate.</p> <p>The high volatility of coffee prices and domestic exchange rates are a threat to farmers' incomes</p>	<p>Farming methods (whether traditional or not).</p> <p>Trademarks and/or geographical indications.</p>	<p>In over 50 less developed countries.</p>
Cooperatives, Mills	<p>Cooperatives build on economies of scale to reduce the cost of cleaning, sorting and/or grading green coffee.</p> <p>May sometimes export or roast the coffee. Most sell to exporters according to exporters' needs</p> <p>Mills treat cherries and /or perform hulling (removing remaining fruit from beans). They operate like cooperatives in some areas.</p>	<p>Cooperatives are usually located in other regions and do not directly compete with one another</p>	<p>Price volatility, credit risks and inability to control hulling or dry-milling operations.</p>	<p>Some cooperatives are owned or supported by the state.</p> <p>The link between cooperatives and farmers helps in disseminating new farming methods or even new coffee varieties to plant.</p>	<p>In coffee-producing countries.</p>
Coffee exporters and importers	<p>Coffee beans from farmers, cooperatives, etc. are purchased and prepared for exportation.</p> <p>Some coffee exporters also perform post-harvesting processes such as cleaning.</p> <p>Coffee beans are mechanically grouped by their density, size and color to</p>	<p>Many coffee exporters are connected to international importers or trading houses.</p> <p>Three firms arguably control 50 percent of the world's coffee imports: Volcafe and ECOM of Switzerland, and Neumann Coffee Gruppe of Germany.</p> <p>Large coffee farmers and</p>	<p>Highly leveraged business with exposure to price and exchange rate fluctuations.</p>	<p>Trade secrets.</p> <p>Strong network/link to both upstream and downstream coffee supply chain providers.</p> <p>Know-how regarding blending, grading and some processing.</p> <p>Patents.</p>	<p>Exporters have procurement agencies located close to the farms in coffee-producing countries.</p> <p>Importers tend to be located in coffee-consuming countries.</p>

	<p>comply with definitions and standards set by clients. Milling may be outsourced.</p> <p>Importers store the green coffee and may blend it.</p> <p>Provide logistical arrangements to handle large inventories and deliver product to roasters in timely manner.</p> <p>As of more recently, they also perform traceability and certification services due to their connection to both upstream and downstream coffee actors.</p>	<p>cooperatives may also be coffee exporters.</p>		<p>Can attest to farming methods and support eco-labelling, or any other types of certifications as demanded by their clients.</p>	
<p>Roasters and soluble manufacturers</p>	<p>Process green coffee beans based on regional preferences as well as to standard specifications using both proprietary technologies and firm-specific know-how.</p> <p>Distribute roasted and soluble coffee to various coffee retail outlets, depending on the standard specification of that market segment.</p> <p>Invest in packaging and branding to differentiate products from competitors.</p>	<p>Nestlé, JAB-Jacobs Douwe Egberts, Strauss, J.M. Smucker Co. Folgers Coffee, Luigi Lavazza SpA, Tchibo GmbH and Kraft Heinz Co. represent nearly 40 percent of the major roasting companies in the retail grocery market.</p> <p>Nescafe (owned by Nestlé of Switzerland), and DEK and Dr. Otto Suwelak of Germany are the top soluble coffee manufacturers.</p>	<p>Requires significant capital investment and reliance on economies of scale for soluble coffee manufacturers</p>	<p>Patents.</p> <p>Trademarks.</p> <p>Industrial designs.</p> <p>Trade secrets.</p> <p>Know-how in blending and roasting for market preferences.</p>	<p>Usually located in proximity to the consuming market.</p> <p>Soluble manufacturers, may be located elsewhere than the consuming market, thanks to the longer shelf life of soluble coffee products.</p>

Source: WIPO (2017).

HOW INTANGIBLE CAPITAL LINKS TO HIGHER INCOME

Broadly speaking, intangible assets may be grouped into two categories.¹⁸ There is the knowledge assets which relate to both the explicit (product and process inventions, and design) as well as tacit knowledge (organizational, logistical, managerial and related know-how). The second is reputational assets, which derive from repeated interactions and associated images, and consists of consumers' goodwill.

In the conventional coffee market segment, most of the value added and investments in intangible assets take place in the downstream segment of the value chain. These investments arguably translate into higher income for the downstream participants. Daviron and Ponte (2005) argue that the roasting, blending, grinding and vacuum packaging processes along the coffee value chain are relatively low-tech and make up a small share of downstream participants' margins. Rather, it is the investments they make to differentiate their coffee products, particularly through branding, that generate a significant share of the high value added in coffee-importing countries.¹⁹

In the differentiated coffee market segment, investments into certification and VSS labeling of coffee products have led to higher prices for the green coffee beans for the upstream coffee participants. A host of other non-monetary benefits associated with VSSs have also been observed, ranging from improved resource and environmental conservation to better labor practices.²⁰

However, researchers differ on whether coffee growers receive significantly higher incomes under this differentiated market segment. Some argue that farmers participating in this market segment receive higher prices than those in the first wave; others are less convinced.²¹ The skeptics argue that the cost of implementing a VSS and complying with certification standards may offset the higher gross income received, or that price premiums are declining.²²

Finally, the experiential market segment underscores the importance of sharing knowledge between the upstream and downstream participants. This direct trade shortens the coffee global value chain and provides investments into upgrading the upstream participants, which in turn translates into higher income for the downstream participants. The average price differential between coffees that identify the grower and those that do not can reach USD 8 per pound.²³ Moreover, one study focusing on the U.S. market estimates that single-origin coffee protected using IP instruments fetches at least three times the average U.S. retail price for roasted coffee.²³

¹⁸ See Chapter 1 of WIPO 2017. World Intellectual Property Report 2017: Intangible Capital in Global Value Chains. Geneva: World Intellectual Property Organization. p. 30-31.

¹⁹ Branding is also referred to as "symbolic production" and "non-coffee costs." See DAVIRON, B. & PONTE, S. 2005. *The Coffee Paradox: Global Markets, Commodity Trade and the Elusive Promise of Development*, London and New York, Zed Books, LEWIN, B., GIOVANNUCCI, D. & VARANGIS, P. March 2004. Coffee Markets: New Paradigms in Global Supply and Demand. *World Bank Agriculture and Rural Development Discussion Paper*, 3.

²⁰ For more observed benefits associated with VSSs see COSA 2013. The COSA measuring sustainability report: Cocoa and coffee in 12 countries. Philadelphia: The Committee on Sustainability Assessment.

²¹ WOLLNI, M. & ZELLER, M. 2007. Do farmers benefit from participating in specialty markets and cooperatives? The case of coffee marketing in Costa Rica. *Agricultural Economics*, 37, 243-248, DRAGUNASU, R., GIOVANNUCCI, D. & NUNN, N. 2014. The economics of fair trade. *Journal of Economics Perspectives*, 28, 217-236.

²² GARCIA-CARDONA, J. 2016. *Value-added initiatives: Distributional impacts on the global value chain for Colombia's coffee*. Doctor of Philosophy, University of Sussex, IISD 2014. The state of sustainability initiatives review 2014: Standards and the green economy. Geneva: International Institute for Sustainable Development, SAMPER, L. & QUIÑONES-RUIZ, X. 2017. Towards a Balanced Sustainability Vision for the Coffee Industry. *Resources*, 6, 17.

²³ TEUBER, R. 2010. Geographical Indications of Origin as a Tool of Product Differentiation: The Case of Coffee. *Journal of International Food & Agribusiness Marketing*, 22, 277-298.

Table 3 provides an illustration of the difference in prices under the conventional, differentiated, and experiential market segments of coffee. Two important points emerge. First, the farm-gate price per pound of coffee that a grower supplying to the differentiated or experiential market segments receives is higher than in the conventional segment. In particular, the average experiential coffee grower’s income per pound is triple that of the conventional segment. While this jump in income is impressive, it reflects the differentiation strategies through investing in intangible capital employed at upstream of the value chain. In the differentiated segment, participants’ adherence to the VSSs separate themselves from their competitors (reputation asset), while experiential coffee growers look to differentiate both by emphasizing the quality of coffee bean and through direct trade with downstream participants in coffee-importing countries (both knowledge and reputation assets).

Table 3: Coffee-producing countries see higher export prices in the newer market segments

		First Wave		Second Wave		Third wave	
		USD/lb (453g)	Index	USD/lb (453g)	Index	USD/lb (453g)	Index
Coffee farmer to exporter	Producer/Farm Gate	1.25 (a)	86.2069	na		4.11	80
	Exporter	na		na		0.45 (d)	
	Dry milling	na		na		0.4	
	Packaging	na		na		0.11	
	Coop Services	na		na		0.07	
Importer	Green FOB	1.45 (b)	100	2.89	100	5.14	100
	Logistic costs and importer margin			0.24			
	Green coffee at warehouse	na		3.13	108.3045	6.58	128.0156
Roaster	Weight Loss and delivery to roaster	na		3.91		na	
	Packaging and Direct Labor	na		0.84		na	
	Other Wages	na		1		na	
	Other Fixed Costs	na		2		na	
	Fair Trade USA fee for maintaining certifi	na		0.04		na	
	Traveling to Origin	na				0.3543984	
	Gross Margin	na		0.71		na	
Total Roaster Sale Price		4.11 (c)	283	8.5	294	17.454045	340

Source: ICO (2014), SCAA (2014) and Wendelboe (2015).
 Notes: (a) Simple average from all ICO countries that submitted data; (b) average exdock indicator minus 10 cents for exdock free-on-board (FOB) conversion; (c) simple average from all ICO countries that submitted data on retail prices minus 30 percent to cover channel markup, (d) producer–exporter breakdown based on 2012 figures. Index FOB=100. Data for the market segments are based on 2014 prices.

The experiential and differentiated coffee market segments show that consumers are willing to spend more money on coffee beverages when they feel that the coffee they are purchasing fulfill certain quality and social conscious awareness standards. In these cases, investing in intangible assets is clearly beneficial for the participants in coffee’s global value chain.

VALUE ENHANCEMENT OPPORTUNITY

The experiential market segment offers a unique opportunity for coffee growers to earn more from participation in the global value chain. This segment has influenced how intangible assets are managed in the coffee industry. Its shortened value chain, which allows for downstream participants to directly trade with farmers, has opened up new opportunities for both the participants to upgrade in the following ways.

First, consumers’ focus on knowing about the origin and variety of coffee beans, how they were farmed and processed, and if the farmers are adequately compensated has become an integral part of selling coffee. This information and knowledge translates into higher prices for coffee, which can be reinvested to upgrade coffee farms.

Second, sourcing high-quality coffee beans is increasingly important for many roasters and retailers. Direct trade is one way these buyers can ensure they are purchasing high-quality coffee.

In addition, buyers learn more about the coffee and may then be able to communicate its history to their customers. For coffee growers, direct communication with buyers can sometimes lead to sharing of technology and know-how, helping to upgrade farms and processing.

A case in point is the Italian roaster Illycafé and its relationship with Brazilian coffee farmers since the late 1980s. For Illycafé, partnering directly with coffee growers ensured that it had a relatively stable supply of Brazilian coffee beans that met its high-quality specification. For the farmers, the partnership helped them to upgrade their coffee-growing and post-harvest methods and processing facilities, and included substantial formal training systems.

Third, the origin of the coffee bean has become an important aspect of coffee, and features on the packaging of coffee products. Single-sourced beans are now being offered by roasters, soluble coffee manufacturers and specialty coffee shops in both the first and second wave market segments. This emphasis on the origin of the coffee provides an opportunity for coffee farmers to differentiate themselves from suppliers in other coffee-producing countries.

ADOPTING MORE DIFFERENTIATION STRATEGIES

The experiential and differentiated coffee market segments show that consumers are willing to spend more money on their cup of joe when they feel that the coffee they are purchasing fulfill certain quality and social conscious awareness standards. Seeing this, more and more coffee-producing countries are investing in efforts to distinguish their production from generic or commoditized coffee.

Some coffee farmers and/or associations are actively protecting the branding of coffees originating from their countries in overseas markets. In the United States, participants file trademarks to protect their coffee products. Brazil, Jamaica and Mexico have all used collective and certification marks there. Colombia, Ethiopia, Jamaica and Kenya also use trademarks to protect the origin of their coffee products. In the European Union, there are two GIs on coffee originating from Thailand, and one each for Colombia, the Dominican Republic and Indonesia, four EU trademarks related to the word “coffee” for Jamaica and Ethiopia, and five trademarks on logos for coffee from Colombia and Jamaica.

Governments such as those of Colombia and Ethiopia have supported initiatives to secure IP rights like GIs and trademarks to ensure that their countries’ products stand out. In Colombia, the Colombian Coffee Growers Federation (FNC) implemented a differentiation strategy that involved actively protecting coffees originating from its regions, compliance with certain VSSs and demonstrating that its coffee beans were suitable for espresso-based beverages. The FNC’s efforts include supporting the 100% Colombian Coffee Program, which allows certain coffee blends in the first wave as well as other market segments to be labelled with the 100% Colombian logo.²⁴

The Ethiopian Coffee Trademarking and Licensing Initiative, a public-private partnership consortium, has been actively branding coffees originating from its regions in an effort to promote them.²⁵ It has applied for trademark rights in Australia, Brazil, Canada, China, the European Union, South Africa and the United States, to name a few. The consortium has also hired a U.K.-based company to help market its coffees worldwide. Its initiatives have helped to increase the popularity of Ethiopian coffee.

²⁴ REINA, M., SILVA, G., SAMPER, L. F. & DEL PILAR FERNANDEZ, M. 2008. *Juan Valdez: The strategy behind the brand*, Bogotá, Ediciones B.

²⁵ This consortium includes the Ethiopian coffee cooperatives, private exporters and the EIPO among other government bodies.

ENTERING DOWNSTREAM ACTIVITIES

Countries like Colombia and Brazil have entered the downstream coffee supply chain by roasting and selling products to markets overseas. Colombia has also entered the coffee retail business by opening specialty shops akin to Starbucks in different parts of the world. These shops carry the Juan Valdez brand and only serve Colombian coffee. By 2016, there were 371 Juan Valdez coffee shops in operation, 120 of them located outside the country. The Juan Valdez brand had accumulated USD 37 million in royalties for the Colombian coffee association by the end of that year.

BUILDING REPUTATION BY MOBILIZING THE COFFEE COMMUNITY

An increasing number of coffee growers are liaising directly with coffee buyers by tapping into coffee community networks.

The coffee community includes a network of baristas and roasters organized into guilds and associations. These guilds and associations hold contests and meetings whereby participants learn from one another and showcase their craftsmanship to gain recognition for their work.

One contest that benefits coffee farmers and buyers is the Cup of Excellence (COE). The COE recognizes coffee farmers for their investments in producing high-quality coffee. It provides an opportunity for the farmers to promote their coffees in an international setting. Coffees that rank among the top 10 of the COE are auctioned off and often receive premium prices. Their farmers and farms gain recognition and usually enter into long-term relationships with coffee buyers.²⁶ This form of branding confers substantial value on successful competitors.

An independent assessment of the COE programs in Brazil and Honduras put the value generated for these countries at USD 137 million and USD 25 million, respectively. These gains in value were estimated to come from direct auction sales, an upsurge in direct trade and increased access to specialty coffee markets. Successful COE participants saw their profit margins increase by two to nine times those of their conventional counterparts.²⁷

The coffee community adheres to standards to simplify the trade between buyers and farmers. Codified quality concepts and measurements such as the cupping and grading standards of the Specialty Coffee Association (SCA) facilitate this trade. These standards motivate coffee farmers to produce higher-quality coffee while also assuring baristas and roasters of the quality of the coffee they purchase. The more coffee participants that recognize a standard, the easier it becomes for transactions to take place directly between coffee suppliers and buyers in the global marketplace.

CONCLUSION

Coffee is one of the most important traded agricultural commodities. It is the income source for nearly 26 million farmers in over 50 developing economies.²⁸ For seven countries in particular, coffee exports account for more than 10 percent of total export earnings over the past three decades.²⁹ While the importance of coffee exports for countries' incomes has

²⁶ See www.allianceforcoffeexcellence.org/en/cup-of-excellence/winning-farms for more information.

²⁷ ACE & TECHNOSERVE 2015. Cup of Excellence in Brazil and Honduras: An impact assessment. Alliance for Coffee Excellence.

²⁸ ICO 2015a. Employment generated by the coffee sector. *International Coffee Council 105th Session Document No. ICC 105-5*. London: International Coffee Organization.

²⁹ The seven countries include Burundi, Ethiopia, Guatemala, Honduras, Nicaragua, Rwanda and Uganda. See ITC 2012. *The Coffee Exporter's Guide - Third Edition*. Geneva: International Trade Centre. ICO 2015b. Sustainability of the coffee sector in Africa. *International Coffee Council 114th Session Document No. ICC 114-5*. London: International Coffee Organization.

been decreasing over time, upgrading their participation in the global coffee value chain can contribute to their economic development, especially in combating poverty.

The newer consumption pattern of coffee is helping some coffee growers enhance their participation in the global value chain. First, ways to address social and ethical concerns pioneered by differentiated coffee market segment roasters and retailers through various certification and VSS schemes have become a big differentiating point for selling coffee. The price differential between coffees that identify the grower and those that do not can reach up to USD 8 per pound.

Second, direct links between downstream and upstream participants in the experiential market segment provide upgrading opportunities for both actors. This new way of doing business in the coffee industry facilitates learning and technology transfer between participants. It also helps coffee farmers to create awareness of their coffees through branding efforts which may include marketing and/or filing for formal IP protection of trademarks and GIs. The farm-gate prices that coffee growers receive by supplying to the differentiated and experiential market segments are higher than those in the conventional market; farmers' income in the experiential market is triple that of conventional market farmers.

Third, focusing on activities upstream in the coffee value chain helps to increase the income of both upstream and downstream participants.

The new way of doing business pioneered in the experiential market segment is being assimilated by the first and second waves due to its fast growth and potential to expand coffee consumption. Indications include the recent acquisition by Nestlé – a large conventional roaster – of a notable experiential firm, Blue Bottle, signaling its entry into this latest market segment. And it is not the only one. Its close competitor, JAB, has joined the market segment by purchasing brand names Peet's and Stumptown. Starbucks, from the differentiated market segment, recently tested the waters by introducing its Reserve brand.³⁰

The adoption of the experiential market business strategy in other market segments creates further opportunities for upstream coffee participants to increase their income, particularly by leveraging their brands. The extent to which these participants are able to do so will depend on consumers' recognition and awareness of these brands. This will require more investment to raise awareness among both consumers and large retailers in coffee-importing countries.

The growth potential of the experiential market is increasingly attractive to traditional roasters and soluble coffee manufacturers, even if it represents a small share of the coffee industry. So far, this business model seems to be highly profitable for every member of the coffee global value chain. If coffee growers are to benefit more from this attention, they must not only focus more on the array of differentiation opportunities, but may also need to consider using IP instruments to retain the value they create.

POLICY IMPLICATIONS

In order to generate further economic growth, the coffee-producing countries would need to invest in complementary infrastructure that would help build on the intangible assets they already own. For one, governments could raise awareness on how farming communities could use the IP instruments to retain the value they create. Secondly, they could implement industrial policies that would facilitate building local growers' capacities to turn their raw materials into products. In essence, the coffee growers could leverage their intangible assets to foster local innovation and development by encouraging technology transfer.

³⁰ DE LA MERCED, M. J. & STRAND, O. 2017. Nestlé targets high-end coffee by taking majority stake in Blue Bottle. *The New York Times*, Sept, 14, 2017.

Cooperation between coffee growers and coffee producers could come in handy in dealing with issues relating to the supply of coffee beans. Using IP instruments to protect research into breeding disease resistant Arabica coffee varieties could help stimulate further investments in this field, and also encourage the sharing of the varieties across national boundaries.

FURTHER RESEARCH QUESTIONS

The lessons learned in this coffee case study of investing in intangible assets and leveraging them to enhance value participation in the global value chain should be considered for other commodities. For one, more and more people are aware about sustainability; fair remuneration and climate change issues. Those who can afford the purchase seem more inclined to consume goods in line with their personal beliefs.

Secondly, the use of IP instruments as a tool for rural development has not been thoroughly explored. While acknowledging that there are other relevant investments factors to consider, such as transportation access to rural communities that produce these goods, investment into the knowledge and reputation assets such as seen in this case study could generate more income for the communities. For example, engaging with downstream participants to encourage technology transfer could help build the local capacities of growers to move up the value chain. Branding, such as trademark and GI, could help inform final consumers of the origin of the commodity and help differentiate from other generic ones.

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TECHNICAL NOTES

The coffee-related IP data extracted for this paper are sourced from the WIPO Statistics Database, the EPO Worldwide Patent Statistical Database (PATSTAT, April 2017) and the USPTO Trademark Case Files and Assignment Datasets (2016).

Key methodological elements underlying the mapping exercise include the following.

UNIT OF ANALYSIS

The main unit of analysis in patent data is the first filing of a given invention.³¹ Therefore, the date of reference for patent counts is the date of first filing. The origin of the invention is attributed to the first applicant in the first patent filing document; whenever this information was missing we imputed the information based on a strategy described below.

The unit of analysis in trademark data is any filing for trademark protection at any of the sources employed – namely the USPTO, the Madrid System and the national offices included in WIPO's Global Brands Database. This definition includes trademarks for both products and services. It also includes renewals of existing trademarks and trademarks claiming a priority based on existing trademarks.

IMPUTING COUNTRY OF ORIGIN

When information about the first listed applicant's country of residence in the first patent filing was missing, the following sequence was adopted: (i) extract country information from the applicant's address; (ii) extract country information from the applicant's name (see further below); (iii) make use of the information from matched corporations (as described further below); (iv) rely on the most frequent first applicant country of residence within the same patent family (using the extended patent family definition); (v) rely on the most frequent first inventor's country of residence within the same patent family (again, using the extended patent family definition); and (vi) for some remaining historical records, consider the IP office of first filing as a proxy for origin.

MAPPING STRATEGIES

The patent mapping strategy for the coffee case study is based on existing evidence and experts' suggestions. Each strategy was tested against existing alternative sources whenever possible.

The coffee patent mapping is based on the following combination of CPC and IPC symbols and keywords sought in titles and abstracts.

IPC/CPC symbols: A01D46/06, A23C11/00, A23F5*, A23L27/00, A23L27/10, A23L27/28, A23N12/06, A23N12/08, A47G19/14, A47G19/145, A47G19/20, A47J42*, A47J31* and C07D473/12.

Including keywords: *coffe**; *caffè**; *espresso*; *cappuccino*; *robusta*; *arabica*; *fertilizer** AND *coffe**; *fertilizer** AND *robusta*; *fertilizer** AND *arabica*; *coffe** AND (*arabica* OR *robusta*).

Excluding keywords: *coffee table*; *cleaning system for a coffee machine*; *coffee cream*; *coffee pot holder*; *coffee stirrer*; *coffee maker pod holder*; *coffee latte printer*; *coffer**; *method and structure for increasing work flow*; *not a product selected from coffee*; *cosmetic**; *cleaning agent*; *washing agent*; *smart home*; *dietary fiber*; *repellent*; *residues*; *grevillea*; *food*;

³¹ Mappings include data on utility models whenever available.

malus; eucalyptus; hypsipyla robusta moore; health; wine; leaf; cannot place coffee cup; coffee stain; coffee car; coffee by-products; coffee shop 510; extract; coffee owner board.*

These patents are classified in five segments of the coffee supply chain as follows:

Coffee farming: A01B; A01C1/00; A01C11/00; A01C13/00; A01C14/00; A01C15/00; A01C17/00; A01C19/00; A01C21/00; A01C5/00; A01C7/00; A01G11/00; A01G7/00; A01G9/00; A01H1/00; A01H3/00; A01H4/00; A01H5/00; A01M1/14; A01N25/00; A01N27/00; A01N29/00; A01N31/00; A01N33/00; A01N35/00; A01N37/00; A01N39/00; A01N41/00; A01N43/00; A01N45/00; A01N47/00; A01N49/00; A01N51/00; A01N53/00; A01N55/00; A01N57/00; A01N59/00; A01N61/00; A01N63/00; A01N65/00; C12N15/00.

Harvesting and post-harvesting:

A01D46/06; A01D46/30; A47J42/00; B02B1/02; B02B1/04; C02F1/00; C02F3/00; C02F5/00; C02F7/00; C02F9/00; F26B11/04; F26B21/10; F26B23/10; F26B9/08; G01N7/22; G06K9/46; G06T7/40.

Raw material storage and transportation: A01F25/00; A23F5/00; A23N12/02; B03B5/66; B65B1/00; B65B3/00; B65B35/00; B65B7/00; B65G65/00; C02F1/00; C02F3/00; C02F5/00; C02F7/00; C02F9/00; E04H7/00; G01G1/00; G01G11/00; G01G13/00; G01G15/00; G01G19/00; G01G21/00; G01G23/00; G01G3/00; G01G5/00; G01G7/00; G01G9/00; G01N.

Bean processing: A01D46/06; A01D46/30; A23F3/36; A23F5/00; A23F5/02; A23F5/04; A23F5/08; A23F5/10; A23F5/12; A23F5/14; A23F5/18; A23F5/20; A23F5/22; A23F5/24; A23F5/26; A23F5/28; A23F5/30; A23F5/32; A23F5/36; A23F5/46; A23F5/48; A23L3/44; A23N12/10; A23N12/12; A47J31/42; A47J37/06; A47J42/00; A47J42/20; A47J42/52; B07B4/02; B07C7/00; B07C7/04; G01N27/62; G01N30/06; G01N33/14; G06K9/46; G06T7/40.

Final distribution: A23F3/00; A23L1/234; A23L2/38; A23P10/28; A47J27/21; A47J31/00; A47J31/02; A47J31/047; A47J31/06; A47J31/10; A47J31/18; A47J31/20; A47J31/26; A47J31/34; A47J31/36; A47J31/38; A47J31/40; A47J31/42; A47J31/44; A47J31/46; A47J31/54; B01D29/35; B01D29/56; B65B1/00; B65B3/00; B65B31/02; B65B31/04; B65B35/00; B65B7/00; B65D33/01; B65D33/16; B65D85/804; B67D1/00; G06Q10/00; G06Q50/00;

The trademark mapping strategy for the coffee industry in chapter 2 is based on the following keywords sought in trademark statement descriptions: *coffe**; *caffè**; *kaffe**; *café**; *kopi*; *espresso*; *cappuccino*; *robusta*; *arabica*.