



SCHOOL OF  
ECONOMICS AND  
MANAGEMENT

Department of Business Administration  
BUSN09 Degree Project in Strategic Management  
Spring 2021

# **Policies – A lever for industry transformation**

*Analysing policy development in the alternative dairy industry  
across different regions*

## **Authors**

Nicholas Banneke  
Dedy Syahputra Sijabat

## **Supervisor**

Matts Kärreman

## **Abstract**

Sustainability is a megatrend affecting companies' strategic development process in many industries, including the dairy industry. The concerns on environmental issues in combination with other societal demands have initiated an industry transformation towards dairy alternatives. While the magnitude remains uncertain, policies are significant in accelerating or inhibiting the shift. However, existing literature revealed a scholarly gap requiring investigation. Thus, this study aims to map the policy development in different regions with varying market ideologies, to identify factors influencing the policy development, to analyse the resulting regional magnitude towards an industry transformation, and to provide recommendations for practitioners. Designed with an explorative qualitative approach, this multiple comparative case study analysed both secondary data and primary data through semi-structured expert interviews and investigated the EU, the USA, China, Singapore, and Israel.

The findings imply a framework consisting of five factors responsible for a country's policy development: (1) relevance of the dairy sector, (2) political economic ideology, (3) sustainability and environmental viewpoint, (4) intra-societal demand, and (5) path dependency. In fact, the study hints towards an industry transformation in favour of dairy alternatives. It is observed that the context specificity alters a region's response on the underlying subject, but dairy alternatives are gradually incorporated into the dominant food system. Furthermore, it is confirmed that the intra-societal demand for sustainability influences legislative development and is thus a main driver for industry transformation but shaped by varying interrelations across and to other factors. Ultimately, four policy themes were observed across the regions, underlying the legislators' current primary concerns on market interventions, label censorships, sustainability focus, and R&D funding.

This research adds to prior literature by addressing scholarly gaps in comparative legislative development and provides insights into the ongoing industry transformation from a political perspective. For scholars, the identified framework might serve as a basis for other industries as well. Moreover, due to research scarcity, the explorative nature opens a new field of theoretical investigations regarding political influences on specific industries. Likewise, practitioners benefit from business recommendations to exploit the potential of existing and upcoming policies.

*Keywords: dairy industry, dairy alternatives, industry transformation, policies, sustainability*

## **Acknowledgements**

Firstly, we would like to express our sincere gratitude to our supervisor, Matts Kärreman, who supported us throughout the process with precise insights and recommendations. His commitment to the finalisation of this study was invaluable.

Secondly, it is noteworthy that the willingness and enthusiasm of our interviewees (GFI, Swedish Embassy in Beijing, and Economic and Societal Impact of Research and Innovation), as well as Tetra Pak and Arla's contributions to the initial research project, have significantly improved the overall value of this study. Your recommendations and insights are highly appreciated.

Lastly, we are more than grateful to all supporters and stakeholders who encouraged the completion of this thesis and the entire masters' programme.

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## List of Abbreviations

|      |   |   |
|------|---|---|
| ADP  | - | Alternative Dairy Products                              |
| CAGR | - | Compound Annual Growth Rate                             |
| CSR  | - | Corporate Social Responsibility                         |
| CSV  | - | Creating Shared Value                                   |
| EAP  | - | Environment Action Programme (EU)                       |
| EU   | - | The European Union                                      |
| ESIR | - | Economic and Societal Impact of Research and Innovation |
| FDA  | - | Food and Drug Administration (US)                       |
| GFI  | - | Good Food Institute                                     |
| GHG  | - | Greenhouse Gases  |
| GOC  | - | Government of China                                     |
| MARA | - | Ministry of Agriculture and Rural Affairs (China)       |
| NGO  | - | Non-Governmental Organisation                           |
| OECD | - | Organisation for Economic Co-operation and Development  |
| R&D  | - | Research and Development                                |
| SAMR | - | State Administration of Market Regulation (China)       |
| SFA  | - | Singapore Food Agency                                   |
| SOE  | - | State-Owned Enterprise                                  |
| US   | - | The United States                                       |
| USD  | - | US-Dollar   |
| USDA | - | United States Department of Agriculture                 |
| WWF  | - | The World Wildlife Fund for Nature                      |

## Glossary

|                                     |   |
|-------------------------------------|---|
| ADP industry (sector)               | Includes alternative products, deriving from plant-, insect-, and lab-grown-based ingredients   |
| Australasia                         | Regional clustering of Australia, New Zealand, and neighbouring islands   |
| Bullwhip Effect                     | Small fluctuations on the retail level of the supply chain can cause high volatility towards suppliers, in this case, farmers   |
| Dairy industry (sector)             | The overall industry scope, hence both traditional and alternative products   |
| Gatekeepers                         | Also named as ‘watchdogs’ or ‘whistleblowers’, are individuals, groups, or parties, that oversee a specific business related field. We refer to ‘gatekeepers’ as individuals, groups, or parties, that have an influence on legislations and thus shape the formulation of societal demands into policies |
| Neoliberalism                       | Economic liberalism and free-market capitalism, characterised by limited to none governmental interventions   |
| Niche (markets)                     | Segments of a large market that has its own demands and preferences. Entails high market potential due to largely omitted customer audience   |
| Political ecology                   | The study of the relationships between political, economic, and social factors with environmental issues and changes  |
| Price Controls                      | Governmental market interventions, such as price floors and price ceilings  |
| Traditional dairy industry (sector) | Includes solely traditional products, originating from cow and other similar animals  |
| Westernisation                      | A shift in societal and demographic values, inspired by Western countries, such as the USA or western Europe  |

*“If you want to change the world, change your milk” (Plenish Drinks, 2019).*

## **1. Introduction**

The *dairy industry* is one of the most mature sectors within the food industry, originating from about 8,000 years ago (Galanakis, 2020; *OECD*, 2004; Valente, 2017). Until 2019, the dairy sector grew to a global market value of 674 billion *USD* and illustrated a 30% increase since 2015 (Shahbandeh, 2021). Expected to grow to 1 trillion *USD* by 2024 with a cumulative aggregate growth rate (*CAGR*) of 5%, it seems that the dairy industry’s growth will not abate (Kumar & Deshmukh, 2019; Mordor Intelligence, 2021).

However, the dairy industry is considered one of the most relevant sectors in the world’s attempts of fighting climate change and thus gained particular interest in recent years among scholars (Galanakis, 2020; Kirby, 2011; *OECD*, 2004; Good, 2021). This matter combined with globalisation and demographic changes, such as arising health and environmental concerns, place the dairy industry in an unfavourable position (Watkins & Nash, 2010; *FAO*, 2018; Springman et al., 2016; Haas et al., 2019). As the *WWF* (2021) outlined, around 9% of *US* arable land is employed to feed its ten million dairy cows. In 2015, 3.4% of global carbon emissions were caused by the dairy industry. Although the environmental impact differs across countries, these factors have gradually spurred focus on alternative dairy products (*ADP*) (Poore & Nemecek, 2018): plant-based-, lab-grown- based-, and insect-based alternatives. These items emerge as substitutional products within the dairy industry.

These *ADP* are increasingly adopted by consumers and promoted by numerous institutions, striving for a more sustainable future. In 2018, *ADP* accounted for 20% of the total global dairy market share (Shah, 2018). From 2019 to 2026, its industry growth is forecasted with a *CAGR* of 13.6% (Kumar & Deshmukh, 2019). These attributes should not be omitted by food industry players. In fact, Chandler (2020) suggested companies must proactively pursue sustainability strategies to maintain market relevance. Nonetheless, numerous external factors must be considered (Aguilar, 1967; Porter, 2004; Grant, 2008; Vignali & Vrontis, 2004). Apart from changing consumer- and societal preferences, political factors also play a crucial role in industry transformation and hence shape strategy development. In the context of the dairy industry, the *EU*’s amendment 171 to prohibit labelling *ADP* packaging with terms associated with traditional products (such as milk, yoghurt, and cheese) is an example of potential policy influences on an industry (European Commission, 2019; Leialohilani & de Boer, 2020).

Therefore, factors such as policies, taxes, regulations, subsidies, and other aspects must be assessed to allow firms to understand and exploit the disruptive potential in the dairy industry (Tetra Pak & Arla, 2021). These policy instruments are established by governments to achieve their goals of improving the country's overall situation. Subsequently, companies need to comply with and fulfil legislative decisions, which eventually affects the firm's business model (Howlett & Rayner, 2007; Rööös et al., 2018). Firms are either directly impacted by domestic policies, or indirectly by foreign policies, resulting in the need to develop strategic plans on how to overcome the emerging barriers, or how to exploit their opportunities. Generally, firms can respond either reactively, interactively, or proactively to the legislations. In practice, these responses can be translated to numerous governmental relations tactics, such as business lobbying (Gittel et al., 2012).

Clay and Yurco (2020) analysed the legislations of ADP as a sustainable alternative and argued for the cruciality of a *neoliberal* view on politics, suggesting that when legislators do not engage in the market, alternatives can prosper and contribute to fighting climate change. In contrast, Leialohilani and de Boer (2020) and Kanger et al. (2020) claimed that policies are necessary to foster the sector's growth, indicating that opinions regarding the magnitude of political interventions in the dairy industry are diverse. Nonetheless, legislations should not be neglected, as they can both limit and foster the competitiveness of companies.

During the development process of policies, numerous influences must be considered. Next to societal demands, Slembeck (2000) outlined that a political ideology also shapes the final policy implementation because it might represent a membrane between the legislative system and societal demands (Easton, 1953). Moreover, the level of economic development significantly influences sustainability policies of a country (Younis & Chaudhary, 2017). Hence, when analysing policy development in the context of an industry transformation, the political economic ideologies (Free-Market-, Mixed-, and Command ideology) and the general economic status are crucial to investigate. Nonetheless, consumer- and societal changes are perceived as the predecessors for political modification (Clay & Yurco, 2020; Galli et al., 2020; Rööös et al., 2018; Hart & Milstein, 2003; Beghin, 2005; Easton, 1953; Schlupe Campo & Beghin, 2006; Nair, 2019). As Easton (1953) explained, the intra-societal demand highly influences policies. As a result, the ongoing societal transformation and their shift in norms and values towards sustainability (Corporate social responsibility and creating shared value) are determining policies of the future (Clay et al., 2020; Galli et al., 2020; Beghin, 2005).

To conclude, changes in societal demands are one of the main drivers for an industry transformation. The environmental and health concerns, animal welfare, as well as a gradual ‘*westernisation*’ in norms and values of the Asia-Pacific market, might result in the substitution of traditional dairies with their alternatives. By influencing policy development, the industry can be steered in the desired direction. Nonetheless, although an emerging global trend can be observed in societal norms and values, the political reactions are diverging and their future direction is uncertain (Park, 2018; Clay et al., 2020; Beghin, 2005; Rangarajan, 2000).

### **1.1 Problematisation**

The transformation potential of the dairy industry has gained much interest in recent research. Especially the industry’s opportunities for improving sustainability in the dairy sector have been discussed (Clay et al., 2020; Clay & Yurco, 2020; Schyver & Smith, 2005; Marasque, 2020; Poore & Nemecek, 2018). Although ADP are perceived as superior to its traditional substitutes in terms of sustainability, the industry transformation was not successful yet (Clay et al., 2020). Much research has been carried out on ADP, but investigations from a political standpoint appear to be scarce. An extensive review of existing literature has revealed two empirical and one practical research gap:

Firstly, most literatures have seen the dairy industry transformation from a societal and sustainability viewpoint. The majority has analysed behavioural changes and thus solely focused on the consumers’ perceptions. Naturally, rising consumer demand increases the overall market share of ADP compared to traditional products (Moll et al., 2007; Andersson & Gotting, 2011; Clay & Yurco, 2020; Blainey & Normile, 2004; Schyver & Smith, 2005). However, other factors including political trends and their influence on industries should be also included (Aguilar, 1967; Porter, 2004; Clay et al., 2020).

Within the context of the dairy industry, existing research on these legislative systems was rather holistic and developed for a political viewpoint, neglecting the firms’ and consumers’ practical preferences (Clay & Yurco, 2020; Galanakis, 2020; Huang & Yang, 2017; Blainey & Normile, 2004; Leialohilani & de Boer, 2020; Kanger et al., 2020). Subsequently, although Clay and Yurco (2020, p.12) mention that “*political ecological* work is essential to empowering transformations in the dairy [industry]”, research on the influence of legislative responses on the society and industry itself did not gain much interest, leading to a critical lack of information for strategic decision-making.

Few authors assessed and criticised policy development in the ADP industry, but solely analysed a specific policy and thus lacked overview (Leialohilani & de Boer, 2020). Furthermore, existing research suggested changes in political behaviour but lacked practical implications on how firms can cope with the ongoing development, leaving room for interpretation for strategists.

Secondly, according to Beghin (2005), policies and legislative behaviour differs across countries. Thus, comparative research between regions with different ideologies would be beneficial to receive an overall understanding of the development. Existing research focuses on either one specific country or the whole globe, making it difficult to compare between different localities and contexts (Clay & Yurco, 2020; Clay et al., 2020; Schyver & Smith, 2005; Leialohilani & de Boer, 2020). Only two reports compared policy development in different regions but solely contextualised traditional dairies (Moll et al., 2007; Andersson & Gotting, 2011). Hence, a comparative approach of policies across regions in the context of the traditional- and alternative dairy industry is scarce. Furthermore, existing literature does not agree on a common standpoint on political interventions. This results in implications on how specific legislators should behave but disregarding the underlying context of countries' policy development, generating a non-generalisability of the findings (Clay et al., 2020; Leialohilani & de Boer, 2020).

In summary, the assessment of policy development is modular and fragmented. Hence, an aggregation of the general situation in the ADP industry in the most relevant countries is limited. Although a small number of research analyses policies, their impact, and potential development in a specific region, the authors do not consider other emerging policies and their causal factors that might counteract resulting barriers. Moreover, literatures position themselves towards legislative recommendations but disregard business implications. Due to the lack of comparative studies, the identified forces of policy development have been applied to a specific country only, missing the adequacy for comparing between different contexts. As a result, it is significant to analyse the ongoing policy development of future industry leaders and to investigate which direction legislators are likely to pursue and why. Based on our findings, none of the existing research has addressed the identified research gaps. Therefore, from an academic perspective, this research aims to address these scholarly gaps and will contribute to a further comprehension of the subject.

## 1.2 Significance for Strategic Management

The dairy industry is one of the most established sectors in the agriculture industry and has endured strong performance in recent decades. However, the rising trend of sustainability awareness and healthy lifestyle among consumers has ignited discussions about a potential industry transformation towards ADP (Clay et al., 2020; Rööös et al., 2018; Chandler, 2020). The growing popularity of ADP reveals high market flexibility and significant expansion opportunities for both *traditional dairy* and ADP firms. On the one hand, traditional dairy firms can expand their product lines, tackling the mentioned trends to maintain competitiveness. On the other hand, ADP have the potential to alter the industry, decreasing the relevance of traditional products in the future.

From a strategic management perspective, the phenomenon of an industry transformation is an essential factor in strategic planning (Sloan, 2020). The potential transformation deriving from an emerging product or industry can influence a company's strategic decisions, such as for marketing, *R&D*, or business development. Prior to strategic planning, decision-makers need to gather a sufficient amount of data. Hence, scanning the market environment is crucial. Both geographic and demographic markets undergo continuous developments which need to be thoroughly reviewed when deciding for or against a strategic decision.

According to several scholars, the external environment must be evaluated regarding social, technological, and economic factors, as well as political behaviour (Aguilar, 1967; Porter, 2004; Vignali & Vrontis, 2004). In all emerging industries, these four factors are paramount when engaging in a new opportunity. Especially in the food industry, political behaviour has a high influence on market development, as it can affect the value chain of the firms including foreign partners (Rööös et al., 2018; Galli et al., 2020). Therefore, policies have the ability to either foster or limit a firm's opportunities, implying that policy development affects the magnitude of industry transformation from traditional dairies to ADP.

By researching policy development regarding the industry transformation, firms will receive insights into the political context of the industry and can subsequently design an appropriate strategy to gain and sustain competitive advantage (Galli et al., 2020). Moreover, the complexity of the issue confirms the significance of this study for strategic planning and management (Snowden, 2010).

### **1.3 Research Questions and Purpose of the Study**

The study aims to map the policy development regarding the dairy industry's sustainable transformation. It will provide insights on whether the policy development will enable or hamper the emergence of ADP in different regions.

Building up on the background and problematisation, the purpose of this research is three-fold. First, to map, assess, and compare the development of legislative behaviour in different regions regarding the ongoing transition in the context of sustainability. Second, to develop a generalisable framework for analysing forces within the policy development process. Third, to develop implications for businesses in each of the selected regions by synthesising the collected data. Firms will receive recommendations on how to incorporate the findings into their long-term strategy to potentially gain competitive advantage.

The research will contribute to the mentioned scholarly gaps and investigate possible opportunities and strategies to be pursued by companies. This research will be relevant for businesses to gain insights into the policy development in the industry's most relevant markets. Based on the given information and the scholarly gaps, the main research question is as follows:

**“What is the legislative development path of alternative dairy products?”**

Following this main research question, three sub-questions were established to increase specificity, depth, and focus. The first sub-question intends to gather necessary data utilised as the foundation of the analysis. Meanwhile, sub-questions two and three are used to synthesise relevant findings, recommendations, and conclusions.

1. What is the current policy development in the selected regions?
  - 1.1. *What is the overall context regarding ADP and sustainability in these regions?*
  - 1.2. *Which policies have been and/or will soon be adopted in certain regions?*
  - 1.3. *What is the outlook on the regions' policy development for ADP?*
2. What political and societal differences or similarities are observed across the regions?
3. What are possible business implications for ADP firms?

To address these questions, the most relevant markets and germane theories will be identified, which are employed as a foundation for secondary data collection and interviews with industry experts. Detailed information about the general approach and methods to be used are to be found in the sections below. The regions will be selected in section 4.2.

## 1.4 Outline of the Thesis

After introducing the topic in the first chapter, the second chapter aims to provide a holistic overview of the traditional dairy industry, its recent trends, and transitions. This contributes to an overall understanding of the underlying topic and explains the rationale of the growing demand of ADP.

Chapter three reviews existing literature. The intention is to create a common understanding of the *ADP industry*, policy development, as well as their contextual factors. Subsequently, the collected literature is gathered and synthesised to detect specific factors influencing policy development and their implementation in the industry. These findings are then structured in a preliminary framework to create a holistic comprehension of the topic. Supporting frameworks complementary to the preliminary framework are created, entailing causal drivers for change and a policy analysis matrix. These three frameworks build a basis for empirical research and data analysis.

Chapter four examines the methodology where we intend to explain our research design and approach, followed by the utilised data collection and analysis methods. Additionally, chapter four contains the regional selection. The section ends with a clarification about the study's validity, reliability, and ethical considerations.

The fifth chapter introduces the topic and reveals collected empirical data, answering the first research question of detecting the policy development in specific regions. Additionally, this chapter discusses the findings and compares the cases to answer research question two. Based on this information, the empirical framework is designed and differences to the preliminary framework are outlined.

Chapter six creates observable policy themes across the selected regions. Additionally, the existing literature and empirical data is synthesised, where important differences and similarities are outlined. This chapter also entails business implications on how firms can cope with detected threats and exploit opportunities.

Chapter seven concludes the research findings and underlines theoretical and practical implications. Lastly, limitations and implications for future research are addressed.

## 2. The Context of the Global Traditional Dairy Industry

Although this study focuses on ADP, it is noteworthy that ADP are a sector within the dairy industry. The traditional dairy industry is thus crucial to be introduced prior to investigating the ADP sector. Additionally, recent trends and transitions are explained.

### 2.1 Traditional Dairy Industry Overview

Milk from a variety of animals has historically played a significant role in human nutrition. While the variety of food available in developed countries has significantly increased in recent decades, milk and dairy products remain an important part in diets. On the other hand, in less developed areas, milk and its derivatives are still essential for human survival (Roginski et al., 2002; Niamsiri & Batt, 2009; Barker, 2002). In general, the dairy industry consists of different market actors, such as farm-input suppliers, small and large-scale farmers, collection centres, traders and transporters, processors and distributors, industry facilitators, and end-consumers (Yilma et al., 2011; Rademaker, 2017). The sector positions itself among the most advanced and well-organised within the food industry. Through an integrated and complex interaction between these actors, the dairy industry seeks to ensure an adequate supply of high-quality dairy products (Roginski et al., 2002). The dairy industry is considered mature, characterised by high efficiency in developed countries, while developing regions indicate efficiency improvement potential.

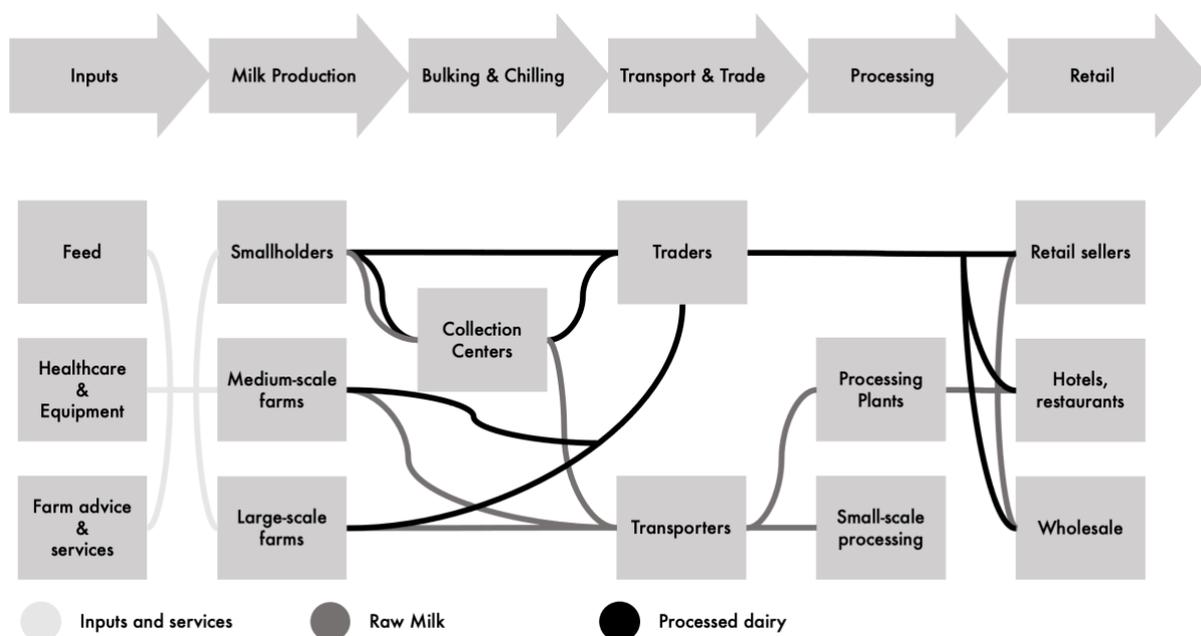


Figure 1. Value chain in the traditional dairy industry, based on Rademaker et al., 2017.

Although the traditional role of dairies varies across different regions, the dairy industry is considered one of the world's most dynamic and fastest-growing markets (Niamsiri & Batt, 2009; Market Research Reports, 2021). In fact, the global dairy market is expected to grow at a CAGR of 5% over the forecast period of 2020 – 2025 (Mordor Intelligence, 2021). Production expansions in India, Turkey, the EU, Pakistan, and the US are primarily responsible, although a decrease in milk output, such as in Ukraine, also offset this factor (Mordor Intelligence, 2021). In 2017, the global dairy market was valued at 413.8 billion USD (Market Reports World, 2021). This growth is primarily driven by the increasing demand for dairy products due to the growing population, higher income levels, and rising health consciousness (Mordor Intelligence, 2021). In fact, sources state the increase in demand is caused by higher per capita demand in developing countries, such as China (Muthee & Oukemeni, 2018; Yan et al., 2021).

## **2.2 Regional Traditional Dairy Industry Overview**

*Major Producing Countries.* The EU leads the global market, accounting for 25% of the world's milk production. Within the EU, the two largest producing countries are Germany (4%) and France (3%). Followed by the EU are India (20%), the US (12%), China (5%), and Pakistan (5%) (CLAL, 2021). While production in developed countries is generally characterised by large herds and high-efficiency models, the production in developing countries is more fragmented and owned by small farmers (Doupbrate et al., 2013). Milk production is projected to remain among the fastest-growing agricultural sectors in developing countries, especially in sub-Saharan Africa and India (Muthee & Oukemeni, 2018).

*Major Consuming Countries.* The Asia-Pacific region is considered the largest dairy market, representing more than 30% of the industry's global market size in 2021. The growing demand combined with relatively low per capita consumption compared to western countries implies potential for further expansion (Muthee & Oukemeni, 2018; Clay et al., 2020). This is confirmed by a market report claiming that Asia-Pacific and European countries account for more than half of global sales. Specifically, India, China and Australia lead the market in Asia-Pacific, whilst Belarus and Ukraine drive demand in Europe (Mordor Intelligence, 2021).

The international dairy industry is composed of a multitude of countries with unique production practices and consumer markets. The global industry growth comes with increasing farm sizes due to associated economies of scale, leading to farm expansions and increased production, and making international producers face new challenges related to assuring food quality.

An increased competition for markets has amplified the importance of milk quality and might enable national dairy firms to gain competitive advantages (See Appendix C for a summary of producing and consuming countries).

### **2.3 Recent Trends and Transitions**

The aforementioned strong market performance of dairies hints that the industry is exempted from the slowed growth other commodities experienced (Muthee & Oukemeni, 2018). However, this does not guarantee an immunity towards changes. As Drucker (1998) suggested, although many business leaders believe that the ‘good Lord’ has ordained market structure and performance, they can change overnight, which also applies for the dairy industry. Although the change within the dairy industry is granular, studies have shown that multiple trends influence the industry and push it towards a transition period (Clay et al., 2020; Leialohilani & de Boer, 2020). In the following, these transitions are identified. Pieters et al. (2017) identified trends for each stakeholder of the above-shown value chain. Hereby, different trends emerge, but the societal and environmental trends seem to be overarching, and are thus the main areas of focus.

*Societal Trends.* According to Park (2018), five societal trends exist within the dairy industry. First, reduction in added sugars. For health-conscious consumers, sugar has been avoided in foods, including dairy products, pushing dairy manufacturers towards crafting products containing no or few added sugar. Second, the rising demands on flavours. Studies have shown that modern consumers, especially younger generations, are highly explorative for flavoured dairy products. Third, clean labels. Modern consumers in developed countries are increasingly interested in the production methods adopted in certain products. Recently, clean labels have become the ‘new supreme’ for dairy products. Clean labels are known as not containing additives, artificial preservatives, or chemicals, and inform whether a certain additive is used or not. A study by Deloitte has evidenced that around 70% of consumers are aware of clean label products and include this factor into their buying decisions (Pieters et al., 2017). Fourth, plant-based or non-dairy alternative milk (such as soy milk) become increasingly popular. In the context of health consciousness, the rising trend is driven by issues such as cow milk allergy, calorie concerns, and lactose intolerance, whereas products catering for the latter are expected to quickly gain market share (Pieters et al., 2017; Mordor Intelligence, 2021). Pieters et al.’s (2017) study discovered that the majority of consumers are willing to spend up to 20% more for sustainable and healthy products.

Moreover, the increasing acceptance of ADP is fuelled by a negative perception of dairy products in terms of their environmental effect (Clay et al., 2020). Fifth, transparency and advanced technologies. The recent trend has shown a growing need for transparency among dairy consumers to increase trust. This includes issues on sourcing policies, the products' nutritional information, and human rights policies during the production processes. In addition, dairy manufacturers have employed a variety of advanced technologies to enhance better decision-making regarding production, by using, for example, data analytics, sensors, and digital technology. (Clay et al., 2020; Pieters et al., 2017)

*Environmental Trends.* Today's dairy companies are confronted with the megatrend of providing consumers with sustainable nutrition through environmentally friendly production. In fact, studies suggested that dairy products must be produced and supplied by complying with sustainable practices (Park, 2018). Moreover, environmental and sustainability awareness is increasing in importance for consumers across the globe. These trends urge the dairy industry to decrease carbon emissions, lower food consumption, and sustainably manage waste by minimising input and unused output. These shifts result in a 'mounting pressure to go green' within the sector (Pieters et al., 2017).

Moreover, in developed countries, sustainability is an increasingly crucial factor for consumers' purchasing decisions. In contrast, studies proved that producers in developing countries perceive sustainability as less important, putting more emphasis on economic factors. For example, in emerging markets such as India, dairy producers (generally smallholder farmers) do not possess knowledge and awareness of dairy's source depletion and effects on the environment. Hence, the concern on sustainability is not anticipated to change if the sustainable solutions do not yield economic returns (Looschen & Schnüpk, 2019). Nonetheless, the dairy industry needs reconfiguration due to its high negative influence on environmental sustainability. For example, ADP occupies only around 10% of arable land compared to the traditional dairies, for the same amount of produced milk (ProVeg e.V., 2019). The following graph illustrates the climate impact (Kg in *GHG*) of dairy milk per glass (200ml) in different countries.

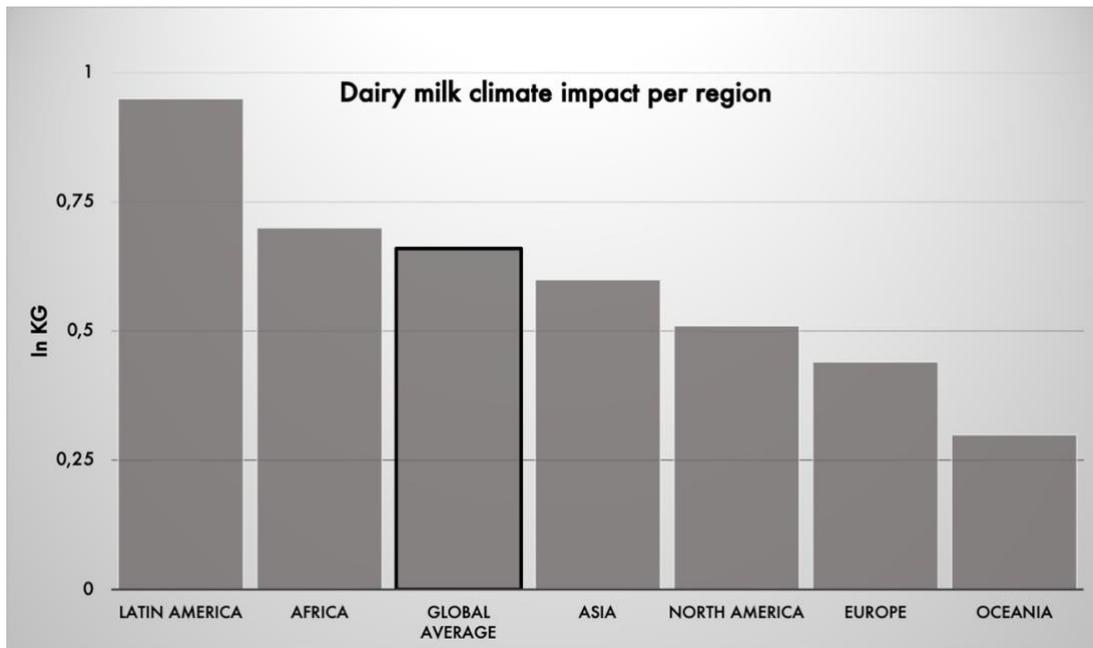


Figure 2. The impact of dairy milk per region (Poore & Nemecek, 2018.)

As shown, the dairy industry is affected by multiple trends from changes in socio-technological preferences on the existing dairy products. Connecting the mentioned societal trends to the negligence of sustainability in the production in developing countries, it is likely that other more sustainable product imitations can disrupt the dairy market to cater the changing consumer demands. Next to this, political regulations have an influence on the magnitude of sustainability goals and compliance. In context of the dairy industry, sustainability is one of the main drivers for the industry transformation and the resulting product substitution. These matters confirm the suitability for a policy development analysis in the dairy industry in the context of sustainability. The following literature review creates an overview of ADP and sheds light on the effects of policies and their influence on the dairy industry.

### **3. Literature Review and Theory**

In the previous chapter, the dairy industry and the recent societal trends were outlined, indicating an ongoing industry transformation towards ADP. The following literature review is structured according to the previously identified most relevant factors, namely social and political, and serves to generate an overall understanding to answer the research questions. First, the trend of sustainability and its effect on the ADP industry is analysed to provide an overall understanding of the industry transformation. Second, the importance of policies and crucial contextual factors are outlined and serve as a basis for empirical research. Two review methods were applied: 1) the narrative review has been utilised to scope the thesis and reveal significant insights. 2) the meta-analysis method was applied to connect the findings, draw conclusions, and exercise critiques to subsequently create a solid foundation for empirical research (O’Gorman & MacIntosh, 2015).

#### **3.1 Sustainability as a Creative Disruptor for Industry Transformation**

Sustainability concerns as part of societal demands are capable of transforming industries. Hart and Milstein (1999) argued that both internal and external environments are pushing businesses towards global sustainability due to four causes: Firstly, increased industrialisation and its associated material consumption, pollution, and waste generation have resulted in a need for resource efficiency and environmental protection. Secondly, the proliferation and interconnectedness of the society fuelled by the spread of information through the internet have allowed consumers to challenge firms operating in ethical manners. Thirdly, emerging technologies can provide disruptive solutions through innovation and technological change. Lastly, the authors describe that globalisation has spurred the need to address social development due to increasing population, poverty, and income inequality.

Several scholars have identified reasons for businesses to become sustainable, establishing links between profitability, society, and long-term sustainability. Hart and Milstein (2003) argued that global sustainability is a catalyst for creative disruption, hence corporations should seize the opportunity for sustainable development by looking beyond continuous and incremental improvements. Lubin and Etsy (2010) identified sustainability as an emerging megatrend driven by environmental issues, competition for natural resources, and public and governmental concerns about climate change that require businesses to reconsider sustainability as a strategic approach. Companies are increasingly accused of societal failures as they are perceived as the principal cause of social, environmental, and economic problems.

Change is urged to shift from the traditional mindset of corporate social responsibility (CSR) to the principle of creating shared value (CSV) (Porter & Kramer, 2011). In the previous decade, CSV has increasingly become part of the discourse about business-society relationships. Whilst CSR predominantly aims to satisfy stakeholders' demands and minimise harm to society through compliance, CSV focuses on maintaining a balance between economic and societal benefits by integrating societal concerns in their business model. Proponents of the concepts believe CSV advances traditional CSR by establishing direct links between a company's core business and societal needs in the value creation processes. As a result, CSV considered the win-win solution in business and societal relationships, which potentially leads to a sustainable industry disruption. (Yang & Yan, 2020; Porter & Kramer, 2007; Porter & Kramer, 2011)

According to Nidumolu et al. (2009), the quest for sustainability is transforming the competitive landscape, forcing companies to change their perception about products, technologies, processes, and business models, especially through innovation. The authors outline five stages companies should accomplish to tackle sustainability challenges: (1) Complying with norms and values should be viewed as an opportunity by fostering innovation, for example, by experimenting with sustainable technologies, materials, and processes. (2) Transforming the value chain towards sustainability through increased efficiencies within the supply chain and waste reduction through circular economies. (3) Designing sustainable products and services to become eco-friendlier. (4) Developing new business models by finding innovative ways to deliver and capture value, transforming the basis of competition. (5) Creating 'next practice' platforms by questioning the dominant logic behind businesses. The dairy industry and its firms seem to situate in stage 3 regarding developed countries, and in stage 2 for developing regions. In stage 2, the mature industry has become highly efficient through new technologies and approaches towards sustainability, such as circular economies. In stage 3, new products have been designed through innovative approaches. In particular, plant-based alternatives are adopted, and lab-grown dairies are currently in development.

To conclude, ADP appear to be more sustainable than traditional dairies (Röös et al., 2018; Poore & Nemecek, 2018). In fact, studies hint that the average amount of water needed and GHG emitted to produce one litre of cow milk is about 22 times and 3.2 times higher than producing soy milk, respectively (Buchholz & Richter, 2020). Hence, the 'creative disruption' potential of ADP is confirmed, triggered by societal concerns which are adopted by firms through CSV.

### *3.1.1 Sustainability in the Dairy Industry*

As outlined before, sustainability is a driving force for industry transformation. Especially in the dairy industry, the pressure for sustainability increased in recent years, and ADP might be able to cater for the desires for sustainable and healthy solutions (Pieters et al., 2017). Nonetheless, although many authors perceive ADP as superior to traditional dairy products in the assessment of environmental benefits, the findings are inconclusive. Neo (2020) agrees on the sustainable advantage of ADP but highlights the importance of technology in the traditional dairy industry. The more efficient and technology-driven, the fewer emissions are caused, indicating that the sustainability of traditional dairy products can still be improved through technological advancements. This is confirmed by Rööös et al. (2018) who argues that western production systems emit two to three times more emissions for traditional dairy products compared to ADP but that this amount varies with the technologies used. This applies to both sectors. Hence, developed countries with advanced technologies can be more sustainable in production processes compared to developing countries, notwithstanding the relative superiority of ADP (Rööös et al., 2018; Poore & Nemecek, 2018; Neo, 2020). This is in line with Poore & Nemecek (2018) who identified that the efficiency of dairy and ADP production varies to a great extent across the world (see Appendix B).

To conclude, previous argumentation has argued in favour of an undergoing industry transformation through sustainable disruption. Although the sustainability advantages of ADP can become less apparent in developed countries due to technological advancements and high efficiency, the aforementioned societal trends of animal welfare and health further enforce the dairy industry transformation. These effects can be in favour of ADP.

## **3.2 Alternative Dairy Industry Overview**

In the previous chapter, societal preferences were introduced and linked to sustainability aspects. Additionally, differences across traditional dairy-producing countries were highlighted. The following section introduces the ADP sector and its current development.

There is not any scholarly definition for ADP. Here, the authors refer to Shah's (2018) definition of 'free-from dairy' products. ADP are thus items not containing milk but resembling it. Alternatively, they are named milk substitutes, alternative milk, or imitation dairy products (Shah, 2018; Fuentes & Fuentes, 2017; Mäkinen et al., 2015; Zhang et al., 2020; Silva et al., 2020; Haisman, 2002).

Overall, it is noteworthy that the authors define ADP as complete ranges of alternative milk or milk substitutes as well as their derivatives, such as but not limited to cheese, ice cream, or yoghurt. Lastly, due to similarities regarding trends and dependences on political behaviour, plant-based and lab-grown meat alternatives will be included and treated as derivatives (Shah, 2018; Marasque, 2020).

Alternative dairy products are created from plants, laboratories, and insects. According to Leialohilani and Boer (2020), plant-based alternative dairy products are made from plant-based milk instead of livestock, such as soy, rice, oat, and almond (Astolfi et al., 2020). Meanwhile, lab-grown dairy alternatives can be defined as products made from microbes and water through, for example, cell-culture (Monbiot, 2020). Insect-based dairy alternatives consist of insects, such as mealworms, crickets, and cockroaches, but due to their premature development, they will not be factored into further investigation (Miller, 2019). In general, ADP are becoming increasingly popular, and their sales have risen in recent years (Schiano et al., 2017). In 2018, the global revenues of plant-based dairy alternatives totalled 13.02 billion USD and are projected to grow to approximately 35.8 billion USD by 2026 (Shahbandeh, 2020). This rapid growth of the dairy substitutes is mainly attributed to the growing popularity of flexitarianism and veganism (Shah, 2018; Clay et al., 2020; Mäkinen, et al., 2016; Rööös et al., 2018). To conclude, ADP continuously gain market share, pressuring their traditional substitutes to counteract for maintaining their market share.

### *3.2.1 Regional Alternative Dairy Industry Overview*

Due to the purpose of the study, the following section highlights contextually important regions in the ADP sector. This section will be structured according to two ADP types, namely plant-based-, and lab-grown alternatives because each of this type entails distinguishable characteristics. In general, the high growth of ADP is driven by Asia-Pacific, and the Middle East and Africa, where Asian-Pacific countries claim around 49% of the global ADP market share. China leads in terms of retail value sales, accounting for approximately 8 billion USD in 2019, followed by Japan (0.89 billion USD) and Thailand (0.841 USD). Nonetheless, studies indicate that Western countries (France, UK, and Germany) are also relevant, leading to Europe claiming around 21% of the share. Additionally, North America currently consumes 25% of global ADP. The rest of the world is covering the residual 5%. (Coppola, 2020; Shah, 2018) (See Appendix C). Interestingly, due to increasing consumer awareness, Russia is expected to be one of the most dynamic countries from 2019 to 2024 (Marasque, 2020).

*Plant-based dairy alternatives.* Existing literature identified the most relevant countries for plant-based alternatives, namely China, the USA, Japan, *Australasia*, and the EU (Marasque, 2020). China positions itself as the largest market, mainly due to their high demand for soy. In general, China receives special attention because plant-based alternatives are already commoditised due to their traditional use, but continue growing with a 5% CAGR, followed by the USA and the EU. The high sales value in these regions is partly due to the high population, but also the rising societal demand for sustainability and healthy food, such as the ‘westernisation’ of the Asian market (Beghin, 2005; Marasque, 2020). The European dairy market is already covered by plant-based alternatives to around 15% (Marasque, 2020). Australasia is receiving much interest due to its high adoption. The USA, however, positioned itself as an attractive market in the free-from-dairy yoghurt sector with a 40% CAGR growth rate, closely followed by the EU. Lastly, the Chinese market reveals potential due to a low market share in derivative alternatives regardless of the high popularity of both derivatives and plant-based alternatives. (Huang & Yang, 2017; Blainey & Normile, 2004; Marasque, 2020)

*Plant-based meat alternatives.* Plant-based meat alternatives (such as tofu or tempeh) are emerging due to sustainability and animal welfare. Europe is one of the main emerging markets, mainly caused by decreasing consumption of fresh and processed meat, and the improvement of taste and textures of ADP. Currently, its largest markets are China, the USA, the UK, Germany, and Israel. In addition, France and Australasia have comparably high growth rates (Shah, 2018; Campbell & Yuan, 2021). It is noteworthy that the Israelian growth rate for plant-based meat alternatives is 13 times higher than for traditional meat products (Ho, 2021). In 2020, the former sales value was 9-times higher compared to the latter (Axworthy, 2021). Similar to Israel, Singapore also claims one of the highest adoption rates for plant-based alternatives, regarding both dairy and meat (Hirschmann, 2020).

*Lab-grown dairy and meat alternatives.* Another emerging substitute is created in laboratories. Although the current market share is insignificant, lab-grown dairy and meat have high market potential. A high number of existing literatures indicate that traditional food processors are ‘worried’ due to the high risk of disruption (Southey, 2020). Shah (2018) investigated lab-grown ADP and found that numerous start-ups are engaged in their development, residing mostly in the USA (Southey, 2020; Demetrakakes, 2019). Israel and Singapore reveal innovative approaches and seem to have a high potential for becoming market leaders, being referred to as ‘innovation powerhouses’ for dairy alternatives (Southey, 2020; Shah, 2018).

Lastly, China intends to become ‘self-sufficient’ in terms of dairy and meat consumption, which is why the country invests in lab-grown alternatives (Xiaojin & Yiran, 2019).

Although their commercialisation is currently only allowed in Singapore, Carrington (2020) confirmed the emergence of lab-grown alternatives. However, he emphasised that this type of food needs further development, as 450 grams of lab-grown chicken had production costs of 9000 USD in 2017. As Shah (2018) explained, the lab-grown sector is subject to similar market movements compared to plant-based alternatives. In fact, the author recommends selecting markets where plant-based alternatives and ‘ethical living’ are booming. In other words, most of the success depends on consumer perceptions and technological advancements, which is why the lab-grown meat market is future oriented and also subject to societal demands (Shah, 2018).

### 3.3 The Driving Forces of Policy Development

The first section has elaborated the significance of societal demands on the undergoing industry transformation. The second section focuses on the importance of policies and their underlying forces which are connected to the first section.

#### 3.3.1 The Importance of Policies

“Policy instruments are techniques [...], involving the utilisation of state resources, or their conscious limitation, to achieve policy goals. They are the ‘tools of the government’, the mechanisms and techniques [...]” (Howlett & Rayner, 2007). In general, around 60 types of instruments exist (Leeds University, 2021). Costantini et al. (2014) cluster these in Economic, Regulatory-, R&D-, Information & Education-, Support-, and Voluntary instruments. In this study, the former three are most relevant and summarised in the following table.

Table 1. Policy instruments overview, based on Costantini et al., 2014

| Policy Types           | Instruments                                 | Example                         |
|------------------------|---|---------------------------------|
| Economic Instruments   | Direct investments and Financial incentives | Subsidies and Taxes             |
|                        | Market-based instruments                    | Price ceilings and price floors |
| Regulatory instruments | Codes and Standards                         | Codes of conduct                |
|                        | Auditing and Monitoring                     | Financial statement auditing    |
|                        | Obligation Schemes                          | Creating Shared Value           |
| R&D and Deployment     | Demonstration Project                       | Governmental prototyping        |
|                        | Research Programme                          | Governmental research           |

Additionally, this study will investigate the development of specific regulations. Literature was found discussing the importance of political interventions in the dairy market to promote ADP and sustainability. Kanger et al. (2020) analysed policy interventions to foster sustainable industry transformation and found that, to improve sustainability, policies are crucial. In fact, they should stimulate more than one *niche* and destabilise the ‘regime’ (dominant sector) to create a dual system of substitute products. Most importantly, policies should be designed for ‘tilting’ the landscape, indicating that policy interventions are able to influence societal demand. The authors suggest that policies are crucial to foster sustainable disruption (Kanger et al., 2020). However, their view contrasts to Clay et al.’s (2020) argumentation who promoted a neoliberal behaviour due to the rising landscape’s concerns. Kanger et al.’s (2020) research leads to a mixed economy, whereas Clay et al. (2020) see *laissez-faire* as crucial. To conclude, existing research does not agree on the optimal magnitude of political market interventions.

Whilst assessing the impact of policies on an industry, scholars agree that policies shape the future path (Beghin, 2005; Kanger et al., 2020; Rööös et al., 2018). In contrast to Clay et al.’s (2020) findings, research suggests that in the absence of policies that foster an industry transformation, the industry is at risk to remain stagnant due to a lack of development incentives (Rangarajan, 2000; Beghin, 2005). In well-developed and mature markets like the dairy industry with high competition, policies are crucial to promote niche markets. As existing literature hints, Clay et al.’s neoliberal view is rather fostering emerging industries but is not suitable for emerging niches in mature markets because slowly changing societal shifts might not be convincing enough for triggering a disruption (Schluep Campo & Beghin, 2006; Clay et al., 2020; Rööös et al., 2018; Galli et al., 2020; Rangarajan, 2000). Thus, to foster the industry transformation, certain policies need to be in place (Galli et al., 2020; Leialohilani & de Boer, 2020; Rööös et al., 2018).

Rööös et al. (2018) examined societal behaviour regarding ADP and diets, discovering that policies directly influence companies in the whole value chain, which in line with Kanger et al.’s (2020) argumentation about the high influence of policies on the society. Rööös et al.’s (2018) argumentation shows that policies are central, affecting all parts of the food industry (See Figure 3).

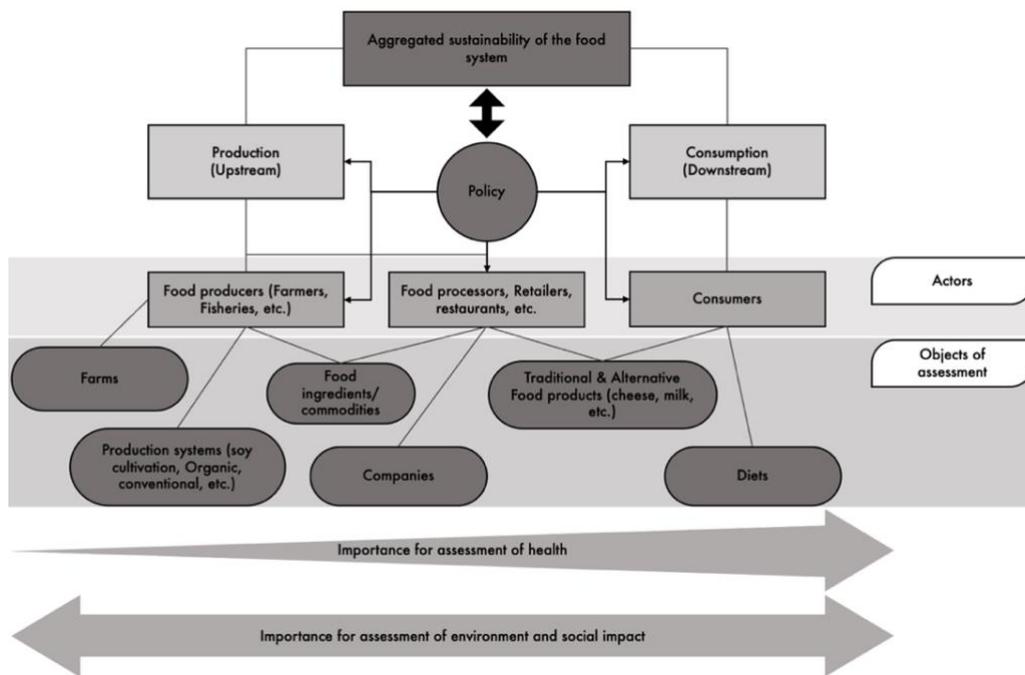


Figure 3. Policy influence map (Röös et al., 2018.)

Leialohilani and de Boer (2020) investigated the impact of the EU’s policies on the ADP industry and how it affects its development, elaborating on the mentioned amendment 171. The authors found that, by implementing these policies, the development of the ADP sector can be “negatively affected”, because “consumers use the dairy terminology to identify” ADP. These barriers can be disastrous for the future of firms due to specific limits in marketing opportunities, resulting in limited growth (Leialohilani & de Boer, 2020, p. 266). This example proves the influence of one policy on all stakeholders within the value chain, which is in line with Röös et al. (2020) (Marketlinks, 2021). This is coherent with Goodpaster’s (2011) definition of policies as a type for Business Enabling Environment that views a set of policies as factors governing formal and informal business activities.

For example, in 2013, the world’s growing milk demand has resulted in a significant price increase, followed by a strong supply growth within the EU. This rise in supply combined with trade restrictions to Russia led to plummeting demand and volatile prices in the following years. The EU established direct support packages (direct payments), price floors, and supply regulations, to ensure the long-term survival of farms and secure employment within the industry. The fluctuating prices have affected small-scale dairy farms the most due to their low bargaining power and the bullwhip effect. Although the EU plans to lower its market intervention practices, the support to small-scale farmers appears to be maintained. The long-term outlook foresees a continuum in the high price volatility (Augère-Granier, 2018).

Firms can either reactively, interactively, or proactively respond to policies (Gittel et al., 2012). (1) A reactive response entails firms reacting on policies after their imposition. For example, the creation of workarounds through value chain transformations, such as the hedging strategy of moving key activities to other locations (Laker & Roulet, 2019). (2) An interactive response implies active efforts to engage with policymakers, trying to alter policies for aligning with the business' interests. For example, the Federation of German Dairy Farmers is a joint association of mid-scale and large-scale firms who are excluded from the above-mentioned direct support. They claim to be as affected by price fluctuations as small-scale farmers. Thus, their protests and lobbying aim to receive direct supports (Deutsche Welle, 2009). (3) A proactive response suggests efforts to influence policies, anticipating regulatory changes before their imposition (Gittel et al., 2012). Common practices include confrontation, such as lobbying. For example, the ongoing petition of dismissing amendment 171 by ADP firms, such as Oatly (Oatly, 2021).

### 3.3.2 *A Conceptual Framework for Policy Transition*

The systems theory (Easton, 1953) and Kahneman and Tversky's (1979) prospect theory are utilised for theorising policy development as a response to changes in its environment. Systems theory explains policies and regulations as a reaction to societal demands. Different units within the legislative 'system' allow for creating equilibria through continuous interactions to develop adequate policies. It highlights that intra- (economy, society, culture) and extra-societal (international) environments are shaping the legislative system. By having 'inputs' (societal concerns, desires, needs) from the environment, the 'outputs' (political responses) are internally generated, and further developed as policies. Between receiving inputs and generating outputs, a certain time is needed for developing appropriate policies. Within this period, *gatekeepers* filter and convert inputs, which Easton (1953) explains as 'support systems', such as ideologies or values that sustain the overall system. The prospect theory describes a different weighting of gains compared to losses. If an individual is to decide between two equal rewards, but one is framed as a potential gain and the other as a potential loss, the individual chooses the former due to a 'loss aversion'. By connecting both theories, the 'loss aversion' (risk of change versus stability; maintain workplaces versus long-term economic growth) changes the gatekeepers' perception of societal inputs and thus influences policy development. This can result in a 'protection' of traditional industries because of a natural loss aversion among decision-makers. The prospect theory proves that a different framing of a subject might result in different reactions. Hence, emphasising CSV and other intra-societal demands might aid to overcome the loss aversion.

The given theories proved the societal influence on policymaking. However, the systems theory lacks practical implications. Dramatic changes in the environment are disregarded, and the theory is designed for remaining within a range of feasibility. Geographical and ideological differences are also not considered. The prospect theory explains the psychology, but not the overall process. As a result, they lack important contextual factors and are insufficient for the aim of this study. Consequently, Galli et al.'s (2020) conceptual framework for policy transition in the food industry might close the gaps of both theories.

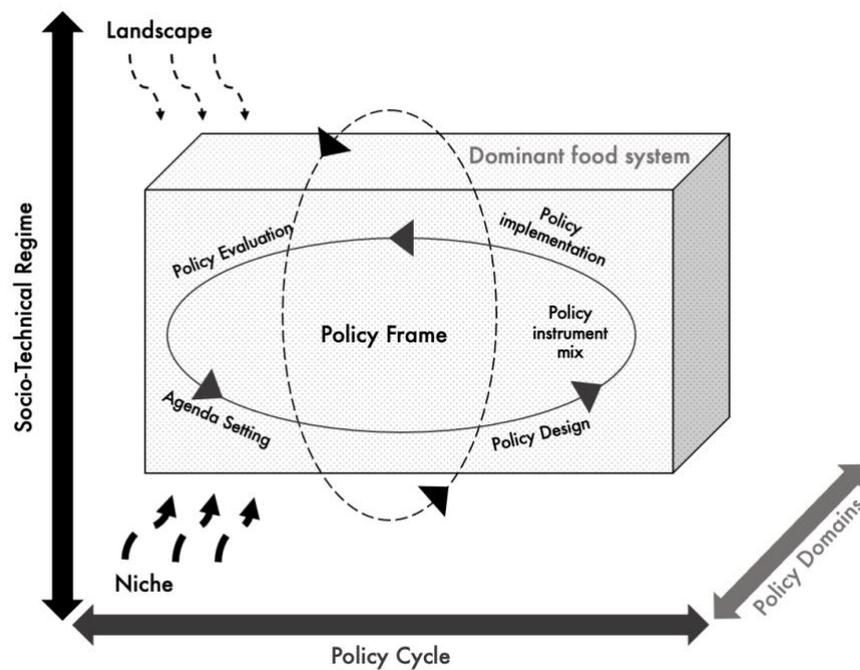


Figure 4. A policy transition framework (Galli et al., 2020)

As shown in Figure 4, the policy transition landscape consists of a ‘policy cycle’, a ‘socio-technical regime’, ‘policy domains’, the ‘policy frame’, and the ‘landscape’. The ‘policy domain’ explains a particular sector within the dominant food system. The ‘policy frame’ determines the underlying subject (e.g., sustainability, financial stability) and the legislators’ perceptions. The policy cycle indicates a constant policy development and improvement. Interestingly, the ‘landscape’ (societal demands) influences policy development. Furthermore, the socio-technical regime is connected both with the landscape and the policy cycle, indicating that the landscape influences the socio-technical regime, which then impacts policies and allows for ‘niches’ to emerge (Kanger et al., 2020; Easton, 1953). The result is the incorporation of niches into the ‘dominant food system’ with political support. Easton’s (1953) systems theory hereby explains the socio-technical regime: The landscape refers to the societal environment, and the theory about inputs and outputs refers to the policy cycle.

Lastly, Kahnemann and Tversky's (1979) prospect theory explains policy reactions on societal inputs. For example, the landscape's concerns on climate change have led to the enforcement of subsidies for local farmers to improve sustainability and competitiveness against larger firms in the EU's '2013 reform'. Nonetheless, there is criticism about their applicability, potentially caused by the gatekeeper's 'loss aversion' (Galli et al., 2020; Kahnemann & Tversky, 1979). In summary, the 'landscape' (hereby the intra- societal environment), has a high impact on the socio-technical regime and is thus one of the main drivers for policy changes (Easton, 1953). Nonetheless, Galli et al.'s (2020) framework has shortcomings as the authors do not specify the landscape. Easton (1953) argued that the landscape can be classified as intra- and extra-societal demands, and the previously identified importance reveals the significance of an in-depth analysis. In this context, PEST is a model designed to examine the environment of an industry.

### *3.3.3 PESTEL Analysis*

After Aguilar (1967) developed ETPS, numerous versions followed to enable different viewpoints on the environment. The basic PEST analysis focuses on Political, Economic, Social, and Technological factors. However, for policy analysis research, this framework does not cover all spotlights. In fact, the context of sustainability underlines the significance of including environmental factors. Legal factors also need to be included to investigate specific policies. Subsequently, the regions will be analysed with support of the PESTEL analysis.

### *3.3.4 Frameworks for Comparative Policy Analysis*

The researchers' endeavour is to provide a comparative analysis between different regions. As outlined by Rööös et al. (2018), policies can influence the whole industry, but solely identifying and mapping all relevant policies without understanding its context, background, and rationale might not suffice and lead to misinterpretation. Hereby, Walt & Gilson's (1994) policy analysis framework was deemed appropriate to allow for a comprehensive analysis of the identified legislations. The framework divides aspects of policies and their development into four main divisions, namely content, context, actors, and process (See Appendix E).

However, Walt & Gilson's (1994) framework does not capture the direction pursued by legislation. Thus, Nair's (2019) framework for comparative policy analysis was considered complementary to Walt and Gilson (1994). Although the author analysed ongoing farming policies for climate change in India, it is also applicable for other contexts. The framework's vertical axis structures existing legislations according to a change in policy context (high-low).

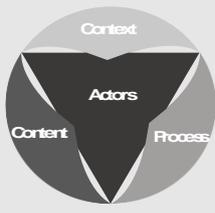
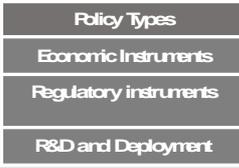
A high change in policy context implies that a newly imposed legislation is highly different to the status quo and vice versa. The horizontal axis distinguishes between a change to the status quo in policy responses (high-low), whereas a high change indicates significant alterations. The structure results in four different types of directions policies can pursue, namely coping, incremental, adaptive, or transitional policies, as shown table 2.

Table 2. Comparative policy matrix, based on Nair, 2019.

| Comparative Policy analysis |      | Change to Status Quo in Policy Responses   |   |
|-----------------------------|------|--|---|
|                             |      | Low  | High  |
| Change in Policy Context    | High | <b>Coping</b><br><i>Addresses rapid changes and provides temporary support</i><br>- Subsidies for sustainable dairy (e.g., fair-trade) | <b>Adaptive</b><br><i>Prepare for likely changes in the future</i><br>- Support of ADP, restricting traditional dairy |
|                             | Low  | <b>Incremental</b><br><i>Addresses small changes in a policy context</i><br>- Efficiency and sustainability improvement subsidies      | <b>Transitional</b><br><i>Highly flexible to address large changes</i><br>-Support of ADP and traditional             |

This thesis considers the frameworks not as substitutional but as complementary. Both frameworks will be used as follows: First, Walt & Gilson’s (1994) framework is combined with the policy instruments by Costantini et al. (2014) to gain in-depth insights. Secondly, Nair’s (2019) framework is utilised to structure the findings and detect which direction the legislators are pursuing. The final policy analysis framework is depicted in Table 3.

Table 3. Final policy analysis framework (created by authors based on literature review)

|                             |                     |  |         |         |              |  |                           |
|-----------------------------|---------------------|---|---------|---------|--------------|---|---------------------------|
| Country / Region            | Policy / Regulation | Actors  | Content | Context | Process      | Type of policy  | Nature of policy response |
| Comparative Policy analysis |                     | Change to Status Quo in Policy Responses  |         |         |              |   |                           |
|                             |                     | Low   |         |         | High         |   |                           |
| Change in Policy Context    | High                | Coping  |         |         | Adaptive     |   |                           |
|                             | Low                 | Incremental   |         |         | Transitional |   |                           |

### 3.4 Economic Ideologies and Differences

In the previous sections, the importance of policies and the impact of societal demands has been outlined. Referring to the research's objective, it seems Galli et al.'s (2020) framework for policy development is not sufficient for a comparative purpose as their approaches differ across countries (Trentman, 1998). Regimes with contrasting ideologies have different policy instrument mixes, diverse approaches to policy implementation, and a distinct viewpoint on agenda-setting. In the following, the main ideologies are shown, and differences are highlighted to build a basis for regional comparisons (See Appendix B for more information and examples).

From an economic perspective, all legislative systems are confronted with three economic questions: *What goods (and quantity) are produced; How they are produced; How they are distributed.* Political systems respond differently. Literature predominantly applies three ideological schools, namely command-, free-market-, and mixed- ideology (O'Connor, 2004)<sup>1</sup>.

In free markets, the answers for the mentioned economic questions are determined by the market (supply/ demand), whereas the government plans them in command ideologies. The command- and free-market ideologies are related to Karl Marx's Communist Manifesto, and Adam Smith's Invisible Hand, respectively (Petr, 1987). However, both systems have changed in recent decades. Clarke (2016) highlighted external influences on corporate governance systems and outlined that they are influenced by globalisation. Assessing the multiple equilibria (path dependency, law, culture, politics), he highlighted that there is no one-size-fits-all, but a continuous development shapes the systems. This is similar to Easton's (1953) systems theory, where the intra- and extra-societal environment influences politics. Additionally, Nordberg (2009, p.1) argued that "the macro-political environment shapes company law and the parameters under which corporations operate in society", confirming that political systems are subject to similar equilibria.

Petr (1987, p.1448) explained that "There are no 'pure' economies of either Smithian or Marxian type; [the] world consists only of 'mixed' economies, differing in the nature of the mix. [...] Many [...] see such economies as [...] departures from [...] purity." This is aligned with Clarke's (2016) argumentation that multiple equilibria and path dependencies led to the establishment of 'mixed ideologies' (Nordberg, 2009; Clarke, 2016; Hindriks & Myles, 2006).

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<sup>1</sup> Traditional economies are disregarded as they are not widely used, which is in line with the purpose of this thesis and Yin's (2003) suggestion for generalisability of a qualitative study.

To conclude, all market ideologies are ‘mixed’, but to different extents (Petr, 1987). The following section reviews literature on the main ideologies and their impact on policy development. It is noteworthy that literature connecting the dairy industry to political economic ideologies is limited, hence the findings intend to create a holistic overview.

*Command ideologies.* Bjørnskov (2005) analysed the impact of a political ideology on economic growth. He found that command economies had stronger growth than free-market economies due to more regulations and a higher quality of the legislative system. In this context, Rangarajan compared different regions and their political ideologies. He agrees with Bjørnskov’s (2005) findings on higher growth, which was mainly due to governmental interventions in the market, such as the regulation of “entry and exit of firms, [...] production priorities, and an extensive use of subsidies”, resulting in a less competitive domestic market and flourishing firms (Rangarajan, 2000, p.1388) However, Rangarajan (2000) highlights that an unbalanced mix of sectoral regulations risks government and market failures.

Furthermore, Huang and Yang (2017) analysed Chinese regulations on food policies. The Chinese government has four main driving forces for policy development in the food sector, namely institutional reforms, technology changes, market reforms and trade liberalisation, and investments in agriculture. They argue that the Chinese government realises problems and actively addresses them, for instance by setting price controls to ensure farmers’ net income. Nonetheless, they argue that the governmental interventions are modular solutions, resulting in a ‘policy dilemma’ of treating symptoms but disregarding root causes. Governmental interventions, for example, price controls, can result in the inability to trade internationally, as prices are at risk to be uncompetitive (Rangarajan, 2000). The Chinese government pursues agenda setting and has an extensive policy mix. The intra-societal environment has only limited influence on policy development, as legislators set strategic plans internally.

Rangarajan (2000, p.1389) found that India’s command economy has resulted in high economic growth in the past, but it “still missed the targets”. Public companies needed subsidies for survival, which he referred to as firms’ ‘inefficiencies’. He concluded that regulations could foster market development, but it depends on the overall quality of regulations and their enforcement. Many command economies are reducing market interventions because the risk of failure outweighs the benefits of growth.

These countries perceive that fewer regulations are beneficial for efficiency improvements and eventually for international competitiveness (Rangarajan, 2000; Beghin, 2005; UN Comtrade, 2021; Jahn, 2020).

This inefficiency has been extensively debated. For example, *SOE*'s in western countries are also criticised for inefficiencies, principal-agent problems, multiple principals, and high transaction costs (Voorn et al., 2017; Papenfuß, 2015; Ferry et al., 2018). Beghin (2005, p.196) designed a comparative analysis on Asian countries. He referred to market interventions by policies and regulations as 'distortions', naming the dairy industry as "the most distorted worldwide" where developing Asian countries make extensive use of protective measures. Nonetheless, countries like China lowered domestic support and trade barriers in recent years.

To conclude, command economies are subject to extensive control and prone to market inefficiencies. In the effort to become major exporters of dairy products, countries, such as China and India, have been decreasing interventions and protectionism and thus developed towards trade liberalisation (Beghin, 2005). These countries attempt diminishing market inefficiencies to lower production prices and subsequently engage in international competition.

*Free-market ideologies.* Solomon (1986) analysed the impact of free-market ideologies on policy development. The US' liberal view resulted in policies to cut taxes and let the market regulate itself. However, this 'industrial policy' was 'oversimplified' and had many negative effects on the economy, resulting in 'winner-take-all markets' and 'sectoral imbalances' (Schilling, 2017, p.76; Solomon, 1986, p.14-16). After perceiving the free-market ideology as 'imperfect', regulations were created to stabilise and control the market. Solomon's example of a 'laissez-faire' economy shows that its impact on policies can foster the economy in the short-term but has negative effects in the long-term for an industry's prosperity.

Blainey and Normile (2004) analysed the effect of US policies on dairies. The authors have discovered that the government's attempts for price regulation and subsidies might have exacerbated the situation instead of helping farmers, as they cost more than they return. Blainey and Normile's (2004) conclusion is in line with previous research about command ideologies and their regulations causing price inefficiencies. As one can see, both regulation and deregulation faced criticism in the US and caused imbalances. Hereby, the proper design of policies by gatekeepers, the adequacy of these policy instruments, and the sufficient inclusion of the intra-societal environment, is questionable (Galli et al., 2020; Blainey & Normile, 2004).

To conclude, both command and free-market ideologies have shortcomings. Free-markets and their policies foster efficiency and growth but result in an imbalanced competition. Command ideologies actively regulate the market, which can improve overall economic growth but exacerbates the risk to market and government failure due to inefficiencies. Hence, mixed ideologies might be most optimal for stability, security, and economic growth.

*Mixed ideologies.* “The state should not row but steer” (Blair & Schröder, 1999). The mixed economies are defined as the “involvement of the public sector in the creation and modification of institutions to shape and direct the use of societal power to move toward the attainment of current community ends-in-view” (Petr, 1987, p.1450). Petr (1987) suggests that the four main objectives of mixed economies are an adequate amount of production, sustainability, equity (monetary and social), and democratic approaches. Regions with mixed ideologies achieve this with, for example, a Keynesian viewpoint on fiscal policy, private ownership, sustainable regulation, and wealth distribution. As a result, a mixed economy interferes in the market to reach desired objectives, but only to a limited extent. It combines both regulations for stability from the command ideology, and privatisation and efficiency from the free-market ideology.

For example, the European Union can be seen as a ‘mixed ideology’ region. Regarding the dairy industry, the Environment Action Programme of the European Commission (*EAP*) outlined in 2014 that “In 2050, we live well, within the planet’s ecological limits. Our prosperity and healthy environment stem from an innovative, circular economy [...], and biodiversity is protected, valued, and restored in ways that enhance our society’s resilience” (European Commission, 2021a). This shows the attempt of regulating the market to support the main objectives (Petr, 1987).

To conclude, the application of Galli et al.’s (2020) policy cycle differs across the three main political ideologies. Furthermore, the magnitude of influence from the landscape varies: in countries being closer to command ideologies, the legislators develop an agenda and pursue this with help of a policy instrument mix (Huang & Yang, 2017; Rangarajan, 2000; Beghin, 2005). Regions closer to the free-market ideology are characterised by a self-regulation of the market and is directly influenced by the environment, which however can cause sectoral imbalances. Lastly, mixed ideologies consist of legislators designing the agenda and policy instruments to reach the overall goals determined by the environment with limited tools.

### **3.5 Policy Development in the Dairy Industry**

The previous sections outlined the development of the dairy industry and sustainability aspects. Additionally, political differences across regions were outlined. The following section synthesises the findings and summarises existing literatures.

Several papers have analysed transformations within the dairy industry. All regions agree on sustainability as a main pillar for future development (Blainey & Normile, 2004; Huang & Yang, 2017; Petr, 1987; Clay & Yurco, 2020; Clay et al., 2020; Andersson & Gotting, 2011; Schyver & Smith, 2005; Tuohy, 2014). Regarding dairy products, it is evident that alternatives are more sustainable than traditional ones. Traditional products have an up to three times higher carbon footprint than ADP, but this number varies (Park, 2021; Poore & Nemecek, 2018). In contrast, Clay and Yurco (2020) explained that the characterisation of striving for production efficiency has worsened the outlook for a truly sustainable solution in the dairy industry. They thus agree with other authors arguing that technological advancements might lead to the assumption of the traditional dairy products' competitiveness to ADP in developed countries regarding sustainability (Poore & Nemecek, 2018; Rööös et al., 2018; Neo, 2020). However, studies hint that the recent market share increase of ADP has had a high impact on traditional dairies and their outlook, shedding light on a controversial transition period (Park, 2021).

Due to the recent transitions in the dairy industry, sustainability is one of the main drivers for change, indicating that the literature's findings on varying sustainable success might be a crucial factor to consider when reasoning the political behaviour in selected countries. Therefore, it is necessary to include the general economic status of a country when investigating sustainable policy development and its effects. In general, regions are taking different paths and do not follow an akin route regarding ADP. Some regions engage in transformation (Asia-Pacific), and some seem to support traditional dairies by setting barriers for market development in order to secure employment (EU). Other regions are following the general market movement whilst pursuing few interventions (USA, Singapore) (Huang & Yang, 2017; Clay et al., 2020; European Commission, 2021a; Leialohilani & de Boer, 2020).

It is evident that societal inputs, such as sustainability and shared value, are necessary to trigger a policy transformation (Rööös et al., 2018; Easton, 1953). For example, Clay and Yurco (2020) outline that emerging consumer trends (such as veganism) emerge and that the landscape's influence on policies as well as a polarisation of viewpoints (dairy industry versus activists) might be a predecessor to a complete industry transformation.

However, the extent to which the landscape can influence policy development varies across economic ideologies (Rangarajan, 2000; Easton, 1953; Petr, 1987; Galli et al., 2020). The success of ADP thus also lies in legislative viewpoints on market interventions.

In this context, policies can be seen as ‘market distortions’, a tool for governmental interference to stabilising the economy but inhibiting growth in the long term (Beghin, 2005; Blainey & Normile, 2004; Petr, 1987; Huang & Yang, 2017). This hints that literature agrees with Clay and Yurco’s (2020) viewpoint on a neoliberalist government to foster economic growth with as few ‘distortions’ as possible. However, research has shown that free-market ideologies might be a barrier for emerging industries, and those mature industries might require active support to be tilted (Kanger et al., 2020; Solomon, 1986). Policies are an instrument to prevent ‘industrial imbalances’ and foster niches in mature industries, confirming that political behaviour is a crucial factor for the ADP sector (Solomon, 1986). Clay and Yurco (2020) highlighted that the traditional dairy industry is expected to grow further. Connecting the literature review to recent developments, the future potential of ADP is uncertain. This reveals the high relevance of detecting current policies of representative countries with different ideologies and comprehend their attempts at sustainability in the dairy industry.

### **3.6 Preliminary Framework**

It is useful to apply frameworks and models to structure the main findings of the examined study (Creswell & Creswell, 2018). In the following, the literature review’s findings will be structured and mapped to identify causal drivers for policy development. This examination results in the design of this study’s preliminary framework.

Although Galli et al.’s (2020) framework provides an overview of policy implications and their transformations in the food industry, it lacks important context. (1) The ‘landscape’ is not specified and leaves room for interpretation regarding societal influences, resulting in a replacement with PESTEL (Easton, 1953; Aguilar, 1967). (2) Societal demands and their impact on the industry varies according to the country’s political economic ideology (Rangarajan, 2000; Beghin, 2005; Solomon, 1986; Petr, 1987). Additionally, the landscape has a direct impact on the industry through product demand (Moll et al., 2007; Shah, 2018). (3) The policy cycle influences the landscape by tilting perceptions (Kanger et al., 2020; Rööös et al., 2018). The resulting instruments can be analysed with Walt & Gilson’s (1994) framework and structured according to Nair’s (2019) matrix.

It is noteworthy that policies in place shape the future of the food industry. (4) Another driving force is the country's economic development as it can influence societal demands and the policy cycle (Beghin, 2005; Poore & Nemecek, 2018). (5) The time dimension is two-folded: Future perceptions influence current evaluations and thus change policies in place, but current evaluations also have impacted the landscape and thus future perceptions. The following figure synthesises the findings and builds up on Galli et al.'s (2020) framework.

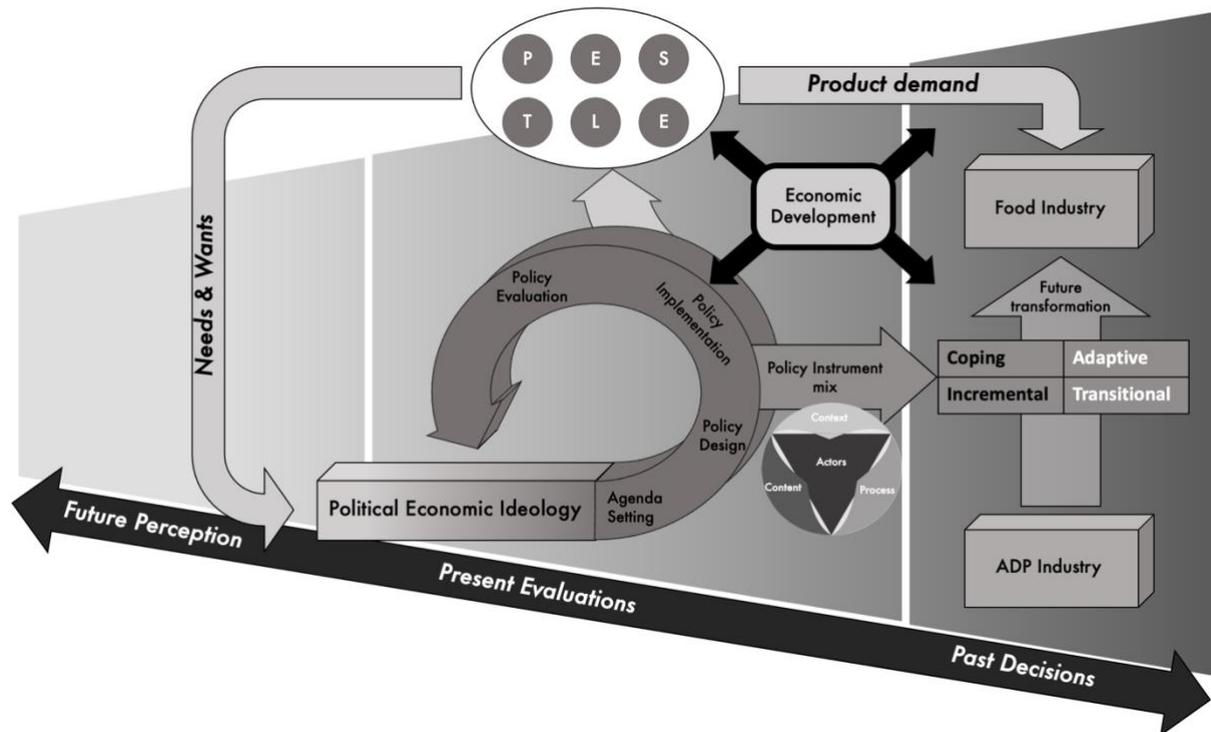


Figure 5. Causal drivers for change and their implementation process in the ADP industry (created by authors based on literature review)

After mapping the causal landscape of a policy development process, its major influencing factors can be identified and clustered with help of PESTEL. The main forces are (1) the economic and technological status of the country, (2) its political economic ideology, (3) the legislative viewpoint on environment and sustainability, and (4) the intra-societal demands. These forces are in line with the systems theory (Easton, 1953). The forces can be clustered along two dimensions: the first dimension entails legislative direct influences and what needs to be regulated (indirect influences). Secondly, predeterminants of policy development are positioned against perceptions. The time dimension is two-folded and runs horizontally. It is noteworthy that the forces also influence each other, as illustrated in the above-shown causal map. The four forces affect the policy cycle and thus produce the outcome of legal instruments.

The forces' influence differs across the underlying context, represented by the policy frame as third dimension, which can be linked to the prospect theory (Kahnemann & Tversky, 1979). This means that the loss aversion of gatekeepers affects the magnitude of the forces' influence on the policy cycle. To conclude, a number of multi-dimensional frames on a subject determines whether legal instruments will promote or limit the emergence of ADP. It is noteworthy that the resulting preliminary framework does not cover all relevant causal factors. As a result, the below-shown framework only allows for structuring and analysing empirical findings to a certain extent, which is why the above-illustrated causal map is also considered during the analysis.

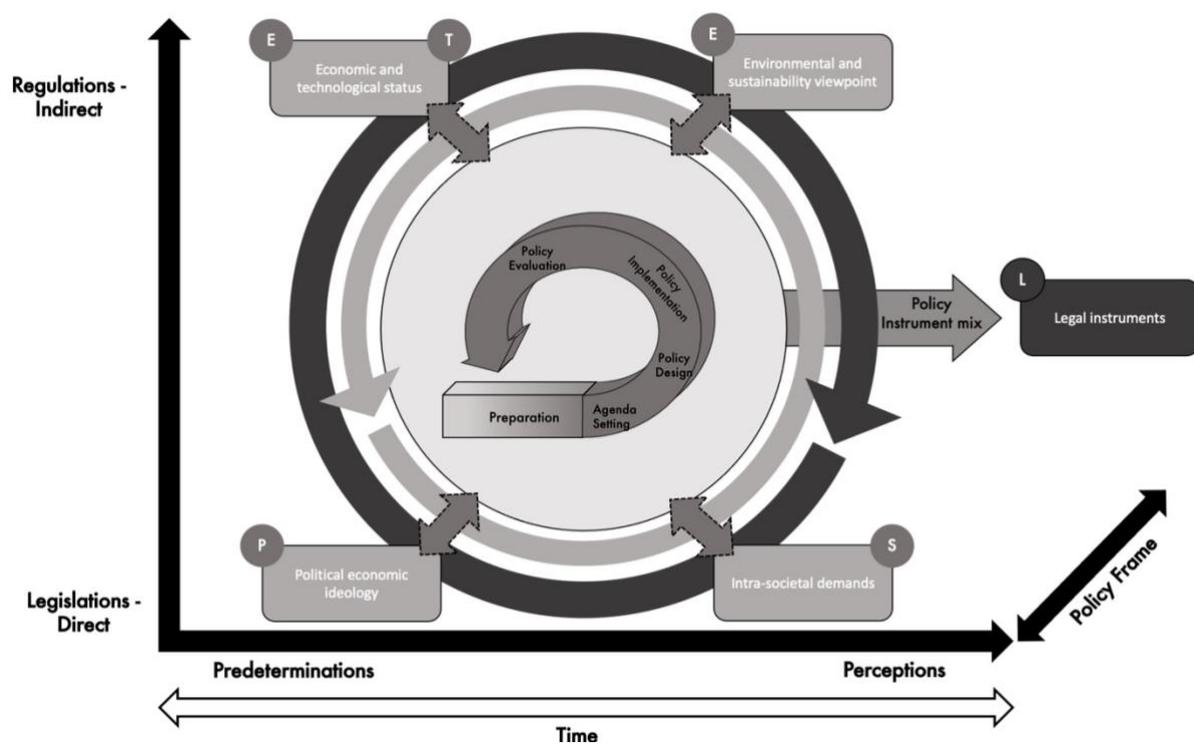


Figure 6. Preliminary Framework: Factors influencing policy development within a country (created by authors based on literature review)

The framework, (Figure 6), aids to answer the research questions. The first research question is answered with the help of the previously designed framework for policy analysis, driving from the literature review (Nair, 2019; Costantini et al., 2014; Walt & Gilson, 1994), whereas the findings can be further structured and understood with the preliminary framework's horizontal axis, identifying the overall context of the country. The vertical axis aids to draw conclusions for the second research question by synthesising general themes of the identified policies. The research questions will be answered by considering the framework of causal drivers for change (Figure 5). These findings aid to answer research question three.

## **4. Research Methodology**

The research methodology, its approach, and its design are detailed plans for data collection, their analysis, as well as their subsequent interpretation (Cresswell & Cresswell, 2018). This chapter addresses the methodology used to answer the research questions and consequently fulfil the study objective. In the first section, the adequacy of the selected research design and approach is justified, followed by argumentations for the case country selection. Moreover, the procedures for data collection and their analysis are outlined and measures for assuring validity and reliability are elaborated. Lastly, this chapter includes information about ethical considerations.

### **4.1 Research Approach and Design**

As Cresswell and Cresswell (2018) outlined, the research approach and its design are employed to explain analysis processes. According to Saunders (2011, cited in Losbichler & Schatz, 2019), the research design is dependent on the research objective and questions to reach the overall purpose of the study, hereby identifying the policy development in the dairy industry in different regions. The research question is thus as follows:

*What is the legislative development path of alternative dairy products?*

The given research question was justified by identifying the earlier mentioned research gaps, revealing novelty and a lack of extensive research. To fulfil the research question's objective, a multiple comparative case study is crucial to identify differences and similarities between the cases (Baxter & Jack, 2008). Case studies are utilised to test theories, render description, and develop a theory about topics (Mintzberg & Waters, 1982). They are most suitable to understand complex situations with varying contextual factors (Yin, 2003). In contrast to multiple comparative case studies, single case studies are suitable for detailed observations and to examine a theory by studying a single phenomenon in a specific context. This research's case study is subject to specific context, which, as identified in the previous chapters, varies across regions. These factors need to be investigated and compared whilst analysing the data at hand within and across different situations (Yin, 2003). As a result, a multiple comparative case study is considered superior to a single case study (Yin, 2003). Most importantly, a multiple case study increases evidence and thus reliability, improving the strength of justification for the identified influences (Vannoni, 2014). Lastly, Solberg and Huber (2006) found the highest necessity for case studies in uncertain and ambiguous situations, which is also applicable for this research.

Nonetheless, the selected multiple comparative case study comes along with difficulties and limitations. For example, the research and data collection process are more time-intensive compared to single case studies (Baxter & Jack, 2008). This might result in lacking depth and omitting crucial details in each of the cases (Gerring, 2004). The risks must be treated carefully as they can significantly influence the outcomes when comparing the cases and identifying business implications. Within this research, the predominant objective is creating a holistic overview of the current policy development in different regions. Highly detailed analyses might result in fragmented findings, which could harm the overall value of the study, whereas this trait is observed in existing literature (Losbichler & Schatz, 2019). Nevertheless, rich data sets for each of the cases must be ensured. We acknowledge this fact and minimise this pitfall by using primary and secondary data and including broader data sets about specific phenomena.

As Cresswell and Cresswell (2018) outlined, limited literature on an underlying topic might result in the need for explorative research, as it allows for flexibility to identify different factors influencing policy responses while maintaining the varying nature of the selected countries. This also results in the exclusion of a descriptive approach, as it requires existing research. Although explanatory research includes the rationale of the underlying study, it also requires existing investigation. Due to these reasons, explorative research seems to be most appropriate. Hereby, exploration is the prerequisite for discussing current and future development (Cresswell, 2013). Qualitative research is an approach commonly used to explore and understand certain phenomena by allowing researchers to observe and develop patterns and themes based on the collected information to answer open-ended questions (Cresswell & Cresswell, 2018). In qualitative research, comparative case studies are designed as an explorative study in which the researchers develop an in-depth analysis and a comparison of various cases (Cresswell & Cresswell, 2018). In this context, the comparative case studies were utilised to establish an in-depth analysis and a comparison of different policies, government programs, and other legislations in different regions. These arguments hint that an explorative qualitative approach with a multiple case study might be most suitable.

Contrary to qualitative research, quantitative approaches test the applicability of theories or measure correlations of variables by using a deductive approach to generalise and replicate findings. Furthermore, the necessary variables and factors influencing the outcome must be known (Cresswell & Cresswell, 2018). In this research, the topic's novelty and the identified research gaps limit the adequacy of a quantitative investigation.

As identified, previous research missed contextual factors, preventing a holistic overview of both regional responses and the overall policy development process. The research questions and objectives aim for analysing and comparing general patterns rather than observing correlations between variables, confirming the applicability of a qualitative investigation. The nature of qualitative research allows for developing complex and complete pictures of the case by identifying multiple perspectives interacting in different ways, developing holistic overviews, or contextualisation, which is particularly useful when the phenomenon has never been addressed to an appropriate extent (Cresswell & Cresswell, 2018).

To conclude, this research is approached with an explorative qualitative multiple case study. However, both primary and secondary data will be employed, whereas the latter might be either of qualitative or quantitative nature to identify certain patterns for further analysis and to enrich data sets. Since quantitative research requires statistical validation of the identified information, the scope of this research limits the extent to which numbers can be employed. Thus, only secondary descriptive statistics will be collected and further analysed to strengthen our argumentation. It is noteworthy that a quantitative testing of the data in the form of a deductive approach is thus excluded and subject to further research.

Tantamount to the reasons against a quantitative approach, a deductive approach is perceived impractical, as it requires existing theory and aims for confirmation by observing data and measuring correlations. Herewith, the qualitative design implies induction. It determines the probability of an event to occur, starting with observations and continuing with the development of a theory to receive uncertain but likely results. As this research lacks both valid theories and sufficient observations, the adequacy for inductive and deductive approaches is limited. This results in the need for abductive reasoning, allowing to find the ‘most likely’ outcome by allowing for interpretation and uncertainty. Starting with observations independent from a framework, it aims to generate new findings to develop a model for identifying future directions of the observed phenomena (Spacey, 2015; de Brito & van der Laan, 2010). As explained, this research contains complex and uncertain environments. In contrast to inductive design, abduction allows for flexible interpretations without being limited to existing empirical data as it enables the inclusion of theories in form of observations. For these reasons, abductive reasoning is applied, enabling the researchers to be the key instrument in information gathering and interpretation, whilst allowing for flexibility to work within researcher-designed frameworks and achieve the study’s objective (Cresswell & Cresswell, 2018).

## 4.2 Choice of Case Regions

In the previous chapter, the qualitative design in the form of comparative case studies was selected and its appropriateness was justified. This section explains the choice of the different regions this case study addresses and thus builds up on the literature's findings on the most relevant countries. Referring to the outline of the thesis, the mentioned markets should be utilised to compare the policy development across regions and ideologies. Therefore, a purposive sampling method is applied to select countries suiting specific criteria that are perceived relevant to answer the research questions (Mack & Woodson, 2005). These criteria include market size, market growth, and significance for further development, which are among the most important factors for a market selection (Modin and Olofsson, 2017). In Table 4, the most relevant countries are structured according to their political economic ideology and their involvement in the ADP industry. Moreover, these markets are linked to key characteristics identified in the literature review as depicted in Table 5.

Table 4. Ideologies, countries, and context of ADP (created by authors)

| Ideology/<br>ADP type                | Free-Market economy             | Mixed Economy           | Command Economy  |
|--------------------------------------|---------------------------------|-------------------------|------------------|
| Plant-based<br>dairy<br>alternatives | USA<br>Australasia              | European Union<br>Japan | Russia,<br>China |
| Plant-based<br>meat<br>alternatives  | USA<br>United Kingdom<br>Israel | European Union          | China            |
| Lab-grown<br>dairy and<br>meat (R&D) | USA<br>Israel<br>Singapore      | —                       | China            |

Table 5. Main findings per country (created by authors)

| Countries      | Key findings   |
|----------------|--|
| USA            | Large market, large growth, important for R&D              |
| Singapore      | High adoption, most free-market economy, important for R&D |
| United Kingdom | High market potential, strong growth                       |
| Australasia    | High adoption and per-capita sales                         |
| Israel         | High adoption, important for R&D                           |
| European Union | One of the main markets, large region, strong growth       |
| Russia         | Highest growth potential                                   |
| China          | Largest market, important for R&D                          |
| Japan          | High adoption  |

Table 6 categorises the findings per country and benchmarks their significance on a scale from 1-5 (1=low; 5=high), and the economic development index and the current market size with regards to the dairy industry is highlighted. The final average determines the relevance of the country to the whole industry and determines the rank. It is noteworthy that a certain subjectivity during the scoring process must be admitted. Nonetheless, qualitative research specifically allows for subjectivity due to its ‘constructionist’ design (Drapeau, 2002).

Table 6. Country comparison (created by authors)

| Country / Factor                | USA         | Australasia | UK    | Israel | Singapore | EU     | Japan | Russia  | China   |   |
|---------------------------------|-------------|-------------|-------|--------|-----------|--------|-------|---------|---------|---|
| Market size (mio USD)           | 82000       | 10000       | 19200 | 3100   | 636       | 150000 | 25    | 22300   | 95000   |   |
| Economic development            | 0.94        | 0.96        | 0.94  | 0.91   | 0.91      | 0.90   | 0.94  | 0.79    | 0.75    |   |
| Market ideology                 | Free        | Free        | Free  | Free   | Free      | Mixed  | Mixed | Command | Command |   |
| Significance (Market Potential) | Plant-Dairy | 5           | 2     | 4      | 4         | 1      | 5     | 3       | 2       | 3 |
|                                 | Plant-Meat  | 3           | 2     | 5      | 5         | 4      | 4     | 2       | 1       | 5 |
|                                 | Lab-Grown   | 4           | 4     | 4      | 4         | 2      | 4     | 2       | 3       | 5 |
| Average                         | 4           | 2.67        | 4.33  | 4.33   | 2.33      | 4.33   | 2.33  | 2       | 3.67    |   |
| Significance (R&D)              | Plant-Dairy | 3           | 2     | 2      | 4         | 5      | 3     | 2       | 2       | 4 |
|                                 | Plant-Meat  | 3           | 2     | 2      | 5         | 5      | 3     | 1       | 1       | 4 |
|                                 | Lab-Grown   | 5           | 1     | 2      | 5         | 5      | 3     | 1       | 1       | 4 |
| Average                         | 3.67        | 1.67        | 2     | 4.67   | 5         | 3      | 1.33  | 1.33    | 4       |   |

The economic development index is similar in the selected regions, where only command ideologies seem to score lower compared to free-market and mixed ideologies. This fact will be included in the following country selection process. The above-shown data is further presented in Figure 7. The X-axis determines the significance for commercialisation (future market size and growth), whereas the Y-axis illustrates the significance for future R&D development. The current market size is visualised by the varying size of the bubbles.

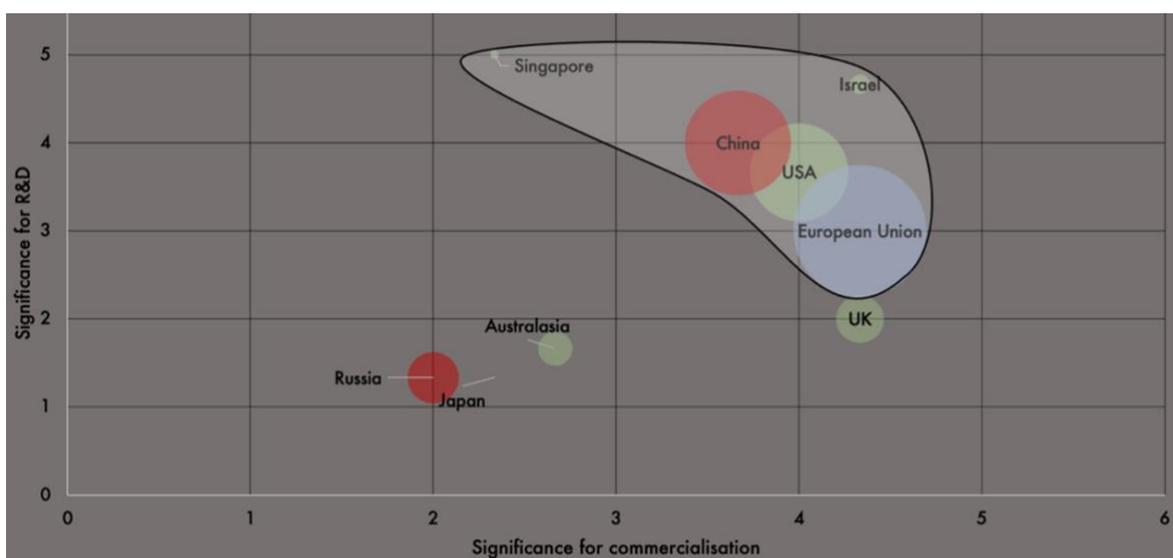


Figure 7. Key regions in the ADP industry according to their significance (created by authors)

To conclude, the findings identified Singapore, Israel, China, the USA, and the EU as the most relevant markets<sup>2</sup>. Russia, Japan, and Australasia seem to be not significant enough for the purpose of this research. Although the UK is considered a key market, free-market ideologies will be represented by the USA due to its higher relevance. Singapore and Israel's market size seems to be relatively low, but their high adoption rate and tech-savviness increase their relevance for investigating R&D policies and market expansion. As aforementioned, the countries' general economic status might have a significant influence on sustainability policy development. Hence, developing countries are represented by China.

### **4.3 Data Collection**

This study is based on existing policies and their context. Connecting the data collection with the above-justified qualitative study we will use multiple data collection approaches. Most information is collected through secondary desk research. To enrich the information and increase its reliability and validity, this secondary data is combined with primary data gathered from expert interviews.

Secondary data was collected from publicly available documents, covering information such as statistics, trends and patterns, policy roadmaps, and policy memos. We used databases, such as Google Scholar, Research Gate, Wiley, Statista, Lund University's library, the OECD database, and the countries' respective official websites for policies and amendments. The search for specific keywords, such as 'regulation in the dairy', 'policy in plant-based alternatives', 'food policy', 'novel food legislation', aided to facilitate the data collection process. Although details might be omitted, the scope of this thesis limits the data collection process to the most relevant information on policies and thus aims for a holistic overview. As outlined, we also considered societal trends, specifically the increasing concern on sustainability<sup>3</sup>. The secondary data collection was crucial for preparing for interviews by gathering basic information about policies, amendments, and their development, and built the fundament for empirical research.

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<sup>2</sup> The country selection was influenced by the research project's purpose which might have biased the results. Specific countries were mentioned which were supposed to be analysed. Nonetheless, the relevance of the markets first had to be identified and further specified.

<sup>3</sup> Policies during the early development process are confidential and thus not available for this study.

Semi-structured interviews were conducted to discuss specific topics employing information gathered from the literature review, methodology, and preliminary framework. Furthermore, flexibility was maintained to follow up on new insights. This aided to collect all necessary data, close knowledge gaps, and leave room for interpretation (Lowe, 2005). This is in line with Bell et al. (2019), arguing that semi-structured interview questions can be adjusted according to their relevance to new information. Other qualitative sources, such as observations, were perceived as inferior as the depth of information could not have been provided.

Three interviews were conducted and selected with the non-probabilistic method and a purposive selection process (Cresswell & Cresswell, 2018; Lavrakas, 2008). The interviews were carried out upon the completion of the literature review and the preliminary framework. One interviewee was engaged as general policy experts across identified regions, and two interviewees were focusing on policy development within the ADP industry in a particular region. The interviewees on the industry's side were particularly interested, which underlines the significance of this study. The inclusion of a general policy expert in the interviews allowed us to gather neutral and holistic insights. The snowballing of previous respondents has enabled the enrichment of information sources in specific areas of interest (Naderifar et al., 2017).

According to the purposive selection, all interviewees were selected on the following criteria: (1) the persons should have knowledge about the traditional and alternative dairy industry. (2) Their professions should be linked to strategic management, business development, and/or innovation. (3) The interviewees should possess knowledge about policies in particular regions. (4) The respondents should have up-to-date information, which is why their latest knowledge about the industry and affecting policies should not root back to more than three months prior to the interviews. This aids to distinguish between relevant and outdated information as well as identify industry experts who are working within the desired fields. The first contact was established to 14 potential interviewees via email and LinkedIn. Three respondents were suitable according to the selection criteria. Although Cresswell and Cresswell (2018) emphasised that four to five interviews are needed for case studies, Charmaz (2006) pointed out that data collection (in this case expert interviews) can be considered sufficient if the gathered data has reached a saturation point. We observed this phenomenon and are confident that our findings from the three conducted interviews are adequate.

The interviews were structured according to an interview protocol (see Appendix D), containing 11 open-ended questions, whereas the number has been aligned with Cresswell and Cresswell's (2018) recommendations. Due to the complexity and extensive range of the topic, the respondents were separated into two categories. The first category was applicable for general policy experts and was thus distinguished from the second category who were experts with specific industry knowledge. Subsequently, the interview protocol was also split into two parts. The first part covered general information and policy development comparisons across regions, whereas the second part consisted of questions that were only to be answered by dairy industry experts. The preliminary framework as well as the pre-defined research questions aided to develop the questions, being in line with Cresswell and Cresswell's (2018) data analysis framework and supporting the improvement of information validity reliability. The interview protocol was enriched with probes, examples, and follow-up questions to receive more in-depth insights. Although this approach risks biased responses, it was deemed most appropriate to receive necessary data. Lastly, the probes were standardised and only hinted towards a general knowledge field to mitigate the risk of biases and inconsistencies.

After conducting all three interviews, a sufficient amount of data was generated. Within the frame of this research, the multiple sources of information allowed triangulation and improved the confidence of its adequacy to answer the research questions. Nonetheless, additional interviews with experts from other fields, positions, and organisations, might have helped to receive further insights. The interviews have been conducted via video chat (Zoom) due to geographical distances and the ongoing COVID-19 pandemic. On average, the interviews lasted about 45 to 60 minutes due to the varying number of necessary follow up questions. After receiving consent from the interviewees, they were recorded and fully transcribed with help of a computer software program, in which irrelevant information was deleted. The post-processing of each interview lasted around two hours. Both authors have been present, aiding to reach the desired information quality as the involvement and note-taking was well balanced.

Overall, the interviews have deepened findings from secondary data and proved that this type of data collection was sufficient. They have contributed to the study but were perceived as complementary to secondary data. In a case where the execution of an expert interview was not feasible, findings from the secondary data were considered sufficient. Table 6 provides an overview of the conducted interviews, respondents, process, and interviews' relevance justification.

It is noteworthy that the respondents do not represent official statements by their institutions. The utilised quotes are thus personal opinions, based on their experience and expertise. As a result, these quotes are valid, but should not be misinterpreted as facts from institutions. This is in line with the epistemological viewpoint, which is further explained in section 4.5 (Fleming & Zegwaard, 2018). The interviewees specifically requested to be referenced as individuals, resulting in the exclusion of organisations in the quotations. However, to justify the relevance, adequacy, and expertise, the organisation is deemed significant to mention. All interviewees actively agreed on this approach.<sup>4</sup>

Table 7. Interview overview (created by authors)

| <b>Interviewee Reference</b> | <b>Organisation</b>          | <b>Interviewee position</b>                      | <b>Field of interests and relevance</b>         | <b>Interview Process</b> | <b>Date</b> |
|------------------------------|------------------------------|--|---|--------------------------|-------------|
| <b>Interview A</b>           | <i>GFI</i> USA               | Senior Policy Analyst                            | ADP policies in USA and state-level             | Semi-structured (Q 1-11) | 10/05/21    |
| <b>Interview B</b>           | Embassy of Sweden in Beijing | Counsellor for Agricultural and Forestry Affairs | Agricultural policies in China                  | Semi-structured (Q 1-11) | 14/05/21    |
| <b>Interview C</b>           | <i>ESIR</i>                  | Member of Expert Group                           | General policies, political behaviour EU, China | Semi-structured (Q1-7)   | 03/05/21    |

#### 4.4 Data Analysis Procedure

The collected raw data from interviews and secondary research is not sufficient to develop appropriate discussions and subsequently draw conclusions. As a result, Cresswell and Cresswell (2018) suggest analysing the information to ‘make sense out of text and image data’. In contrast to quantitative studies where identified variables are analysed, qualitative studies require deconstruction of the available information and reconstruction to create adequate outcomes (Cresswell & Cresswell, 2018).

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<sup>4</sup> Additional information on the interviews and their selection process are depicted in Appendix D and E.

Cresswell and Cresswell (2018) propose three pillars of data analysis to support validity and reliability. First, procedures shall be performed simultaneously. For example, already performed interviews are analysed and transcribed before completing the collection process. Second, data is supposed to be winnowed which results in raw and modular data to decrease the topic's complexity. Third, computer software programs are utilised for data analysis and storage and subsequently formulate them in written findings that will be used for analysis and discussion. The authors provide an overview of the data analysis process in qualitative research, which will be followed but adapted to cater to the research's objectives.

As Cresswell and Cresswell (2018) suggested, the raw data, such as transcripts and secondary data, shall be organised before their analysis. Nevertheless, the data analysis already commences during the literature review, which also resulted in the creation of a preliminary framework. In line with the aforementioned recommendations, the transcription is performed with a computer program, namely Otter.ai, and stored using Microsoft Teams, along with the secondary data. The modular raw data is then hand-coded with 'in vivo' labelling to allow structuring and further investigation. Furthermore, themes are created with the previously identified labels. Cresswell and Cresswell (2018) hereby propose to create up to seven themes with either predetermined, emerging, or a mixed approach that serves as "major findings in qualitative studies" (Cresswell & Cresswell, 2018, p. 269). In this study, these themes are mostly deriving from Walt & Gilson's (1994) policy analysis framework and are predominantly predetermined.

Additionally, Cresswell & Cresswell (2018) propose for 'sophisticated' research it is crucial to further exploit themes by creating different levels and connecting them in different contexts. This indicates that the gradual themes are further split into specific subjects. This process aids in both separating information for a regional investigation and synthesising these insights, aiming for the creation of policy themes that can be observed across countries. The identified data analysis process aids to view themes from different angles and capture diverging opinions from authors and interviewees, subsequently supporting the quality of the study whilst mitigating the risk of omitting relevant data (King, 2004, cited in Losbichler & Schatz, 2019). This framework improves the relevance and presentation of primary and secondary findings (Saunders, 2011).

Nonetheless, this data analysis framework has shortcomings. Cresswell and Cresswell (2018) see the data analysis process as strictly sequential. This is mainly suitable for narrow topics with precise relevance indicators. The identified themes may open new subjects to be investigated, which might allow us to frame information differently and gain further insights through additional analysis. Furthermore, the author's process might not be suitable for a multiple comparative case study due to the limitation on clustering data to one specific theme. To tackle the contextual weaknesses and maintain the topic's complexity, James et al.'s (2017) framework for qualitative comparative analysis (QCA) is utilised, pointing out that the data analysis process is iterative, while also allowing for the possibility to create multiple labelling.

Hence, we incorporate the iterative process into Cresswell and Creswell's (2018) framework. This is considered beneficial due to two reasons. First, the analysis process might require back and forth investigation due to the issue's complexity and broad range of information. Second, it allows for simultaneously conducting multiple data analyses without order restrictions.

It is noteworthy that Other potential frameworks exist. In light of this research, numerous frameworks were investigated but were perceived as inferior. For example, Yin (2014) has created a data analysis approach comparable to Cresswell and Cresswell's. However, Yin (2014) suggests including additional cases after concluding to gain additional insights. Due to this research's scopes, Yin's (2014) framework is thus not applicable. As a result, Cresswell & Cresswell's (2018) adapted data analysis framework will be utilised. Hereby, the abductive approach is supported by the theme and sub-theme creation. The described steps will support the required objectivity and relevance of data selection and ensure that necessary information will not be omitted.

#### **4.5 Validity and Reliability**

In qualitative research, validity and reliability are crucial factors determining the study's meaningfulness, accuracy, and credibility, making it important factors influencing the study (Cresswell & Cresswell, 2018; Saunders, 2011). The authors explain that the focus should not be only on the generalisability of the study, but particularly aiming for accuracy and adequacy in process, method, and approach, which should be consistent with other literature. Qualitative validity is hereby referred to as evidencing "trustworthiness, authenticity, and credibility" of the study, while qualitative reliability is defined as proving the "consistency and stability" (Cresswell & Cresswell, 2018, p.274; Yin, 2009).

Cresswell and Cresswell (2018) identify numerous ways to improve validity and reliability but only focus on a general qualitative approach. In contrast, Yin (2003) specifically elaborates on comparative case studies. He proposes four dimensions, namely construct-, internal-, and external validity, as well as reliability (Yin, 2003). We will ensure the validity of this research in the following ways:

First, data triangulation is conducted by combining evidence from different sources of secondary information about a particular topic. This is consistent with Cresswell and Cresswell's (2018) suggestion of establishing themes with chunks of information from different sources in the data analysis procedure. However, the triangulation of data is limited due to the topic's research scarcity. We validate secondary data with primary data through expert interviews, also named 'member checking' (Cresswell & Cresswell, 2018). Additionally, the preliminary findings of the study are presented to key stakeholders of the research project. Potentially, review and follow-up interviews are conducted to ensure the authenticity of preliminary findings.

Second, the information is treated objectively. Although data needs to be framed for concluding, a viewpoint from different angles will help to remain objective during the data interpretation process. Moreover, discrepant information will be also presented to clarify counteracting arguments. Third, external auditors and peer debriefers will be included in the revision process. This aids to identify potential gaps and discrepancies during argumentation.

Fourth, the reliability of the study must be ensured. Cresswell and Cresswell's (2018) and Yin (2003) agree on the following tactics: first, all necessary steps during the research process must be documented by setting up a research guideline, including an interview protocol (see Appendix D) and interviewee selection. Furthermore, in-depth analyses and a review of themes and codes aid to reframe the subjects and view them from different angles. Although Cresswell and Cresswell (2018) argue that a generalisation of a qualitative study is not intended, Yin (2003) underlines that, in comparative case studies, a certain generalisability must be ensured. For example, the case study should be generalisable and consistent with further research about additional cases, such as other regions. Hence, we intend to develop a final framework that applies to other regions, and potentially to other industries with similar characteristics, which is in line with the research aim.

## 4.6 Ethical Considerations

A researcher must ensure correct ethical behaviour and minimise issues that might arise during the research process. Fleming and Zegwaard (2018) outlined the importance of ethical considerations in multiple case studies. To decrease biases and increase validity and reliability, we will follow the ontological perspectives of bounded relativism, making the outcomes depend on how we and our sources perceive the gathered information. Moreover, the constructionist epistemology argues for generating the truth from a topic's contextualisation (Wariwo et al., 2020).

Fleming and Zegwaard (2018) pointed out that researchers need to obey ethical expectations. When collecting data from individuals, it must be ensured that ethical rights were not violated. First, conflicts of interest are clarified. At the beginning of the primary data collection, our positions as researchers were explained to the interviewees, including researchers' educational background, research objective, and relationship with other stakeholders. Second, the interviewee consent must be ensured, which is similar to a 'contract' between interviewers and interviewees. This includes informing the interviewees about the research questions, data processing, analysis procedure, and the expected results.

As this research includes several interviews containing potentially sensitive information, we counteract the risks with explicit communication before the interviews. The participants actively need to agree to an interview (opt-in) and always have an opt-out option. All participants will receive a one-page statement, containing information of guiding questions, the purpose, and how we intend to utilise this information. Furthermore, we will ask participants to give their permission to take notes and record the conversation. The interviewees will receive a transcript, listing the information we intend to further utilise to ensure their validity and the exclusion of sensitive information. Third, the risks of anonymity, confidentiality, and harm are also acknowledged. As we cannot ensure participant anonymity, we will apply participant confidentiality, thus keeping personal information (for example, name, contact addresses) confidential. If necessary, for research and validation purposes, an interviewee must actively agree on publishing personal data. The risk of harm entails, for example, emotional harm and resource loss (for example, time). We will keep the time consumption of preparation, execution, and post-processing for the interviewees to a minimum to avoid emotional harm in the form of stress. Lastly, the interviews will be structured flexibly, where participants can refuse to respond to our questions. (Fleming & Zegwaard, 2018; Cresswell & Cresswell, 2018)

## **5. Empirical Results**

The following chapter aims to collect necessary data to answer the main research question of investigating the legislative development in the ADP industry. The structure follows the sub-research questions. In the first section, the countries are separately analysed, combining data from secondary desk research, primary interviews, and previous findings deriving from the literature review to answer research question one. To limit redundancy and increase validity, only information in line with either two interview respondents, or existing literature, has been presented.

Certain limitations have affected the data analysis. First, due to the scope and general limitations of this thesis, the number of policies to consider has been reduced. This aided to maintain high relevance and the subsequent exclusion of less relevant policies. Second, the ongoing COVID-19 pandemic has made legislators implement short-term policies to stabilise the economy. As this thesis focuses on the future outlook of the ADP industry, COVID-19 related policies are thus excluded. For detailed findings of policy development across regions, see Appendix A. The second section compares the findings and identifies differences and similarities between the regions, including their specific influencing factors, to answer research question two. Lastly, the preliminary framework is revised according to the findings deriving from empirical research.

### **5.1 ADP Development in Different Regions**

The following section is structured with help of the identified preliminary framework, separately analysing the predeterminations (political economic ideology and economic status) and perceptions (intra-societal demand and sustainability viewpoint), and synthesising them into the country's policy instrument mix. Additionally, Nair's (2019) framework is utilised, highlighting the most relevant policies per country in each quadrant. However, before analysing the findings, it is noteworthy that the actors involved are similar in all countries. Each policy either directly or indirectly involves traditional and alternative dairy firms, the society, and naturally the government of the respective country (Röös et al., 2018). Additionally, the development process is tantamount to Galli et al.'s (2020) framework (Walt & Gilson, 1994). Most of the data is confidential, which is why only existing policies and publicly available amendments can be employed.

### 5.1.1 *The European Union*

The EU develops policies on a regional level that apply to all member states. The overarching legislative body creates policies concerning trade, economic, agricultural, and environmental issues. The “European Union seeks to promote the wellbeing, security, and interests of the citizens”, which indicates that the member states are comparable. As a result, the EU will be considered as one region. (European Union, 2021).

*Predeterminations.* In general, the EU is highly developed, characterised by striving for efficiency, sustainability, and paying relatively lower attention to economic growth. The EU partly develops policies on a regional scale, and Petr’s (1987) four main objectives are developed and carried out across the member countries. In this context, the EU’s agricultural development goals and environmental policies are set by the department of Common Agricultural Policy (CAP) (European Commission, 2021c).

*Perceptions.* The societal demand with regards to dairy products is, as in many other countries, shifting towards animal friendliness and sustainability. Despite the relatively high traditional milk consumption per capita in the region, the rise of flexitarianism and veganism among consumers displays a high growth potential for ADP (CLAL, 2021; Rööös et al., 2018).

Nonetheless, the adoption rate is rather low. In the EU, ADP resemble around 15% of all dairy products sold, partly due to dairy products being deeply integrated into the history and culture (Marasque, 2020; European Commission, 2021c; Mordor Intelligence, 2021). However, around 43% of EU citizens consume both traditional products and ADP, implying that the industry transformation is getting more traction (ProVeg e.V., 2020). A survey by ProVeg e.V. (2020) indicates that next to the common drivers of sustainability, curiosity seems to be one of the main reasons to buy ADP, indicating readiness for change in consumer preferences. On the other hand, the dairy industry is highly affected by price instabilities, making small and local farmers dependent on direct payments and subsidies to ensure long-term survival (OECD, 2020a). Lastly, “*Europe is environmentally technology-[driven], and [is a leader in] products having a high level of environmental sustainability ambition*” (Interview C). Thus, the societal demand for sustainability combined with the four key objectives of the mixed ideology has influenced policy development towards highly efficient and sustainable food production (Petr, 1987).

*Policy instrument mix.* Due to the aforementioned price instabilities, the high bullwhip effect, as well as the low bargaining power of suppliers, local farmers are affected the most (Sammuel, 2013; Porter, 2004; špička, 2013). The EU has set policies supporting the dairy industry by providing direct payments, price controls, tariffs, and others (Augère-Granier, 2018). The governmental spending for R&D, however, is rather low, focusing solely on efficiency and sustainability improvements instead of product innovation. As interviewee C stated, “*In Europe, we had a goal for investing 3% of our GDP in R&D, [but] we haven't reached that goal*”. Consequently, its ‘farm to fork strategy’, aiming for an increase in subsidies for research and innovation for novel foods, might also not be achieved (Byrne, 2020).

As a result, sustainability and efficiency are of utmost importance, whereby product innovation and substitutes are neglected as it would compromise the policies in place and potentially harm local farmers which are perceived as protected by legislators (Kanger et al., 2020). Specific policies exist to increase the market share of dairy products by inhibiting product substitutes to attract consumers. For example, Article 17 Annex VII indicates that agricultural products are solely allowed to be called ‘butter’ or ‘milk’ when it fulfils specific criteria, of which ADP does not (European Commission, 2019). Amendment 171, an extension of this article, might further limit the commercialisation potential of ADP as it prohibits comparisons between dairies and alternatives. Furthermore, the EU has set regulations for the admission of ‘cultivated meat’ which must be approved by the European Commission, but none of those alternatives have been approved and commercialised yet (Byrne, 2020). Lastly, policies and amendments aim to improve transparency along the supply chain to protect and decrease confusion among consumers. Labels, such as origin, sustainability, and unhealthy additives, are existing but might transform from ‘recommended’ to ‘required’ (European Commission, 2019; Augère-Granier, 2018; OECD, 2020a).

*Conclusion.* The EU is attempting to stabilise the dairy market. High subsidies and direct payments combined with price controls aim to ensure the long-term survival of farmers but might lead to sectoral inefficiencies. Many policies exist to support traditional dairy products, but few to foster their alternatives. It seems the EU does not emphasise the market potential of substitute products and their advantages in terms of sustainability and consumer demands, whereas the latter appears to grow constantly (ProVeg International, 2020). Instead, it protects traditional farms and producers from losing further market share and ensures employment.

This is due to the high significance of EU dairy production for exports and their self-sufficiency, but also due to the mentioned negative impact for local and small-scale farmers (OECD, 2020a; European Commission, 2021c). The findings confirm that the government considers ADP to be of less priority, indicating that their market share needs to increase further to spur government awareness. On the other hand, the EU has allowed commercialisation for insect-based proteins, namely mealworms, which suggests an increasing strategic adaptation by the CAP (European Commission, 2021b). Lastly, the EU’s amendments entail threats (clear separation of traditional dairies and ADP), but also opportunities for ADP (labelling of sustainability). However, the findings agree with Leialohilani & de Boer (2020), who argue that policies in place as well as their absence ‘negatively impact’ innovation in the dairy industry due to specific restrictions and discouragements of ADP firms. Table 8 summarises the findings according to Nair (2019).

Table 8. Policies in the EU (created by authors)

| EU                       |             | Change to Status Quo in Policy Responses   |   |
|--------------------------|-------------|--|---|
|                          |             | <i>Low</i>   | <i>High</i>   |
| Change in Policy Context | <i>High</i> | <p><b>Coping</b></p> <p>High support and market interventions for traditional dairy farmers (i.e., subsidy, tariff)</p> <p>Effort to limit the use of traditional dairy terms to ADP</p>         | <p><b>Adaptive</b></p> <p>none</p>  |
|                          | <i>Low</i>  | <p><b>Incremental</b></p> <p>Subsidies for more sustainable traditional dairy</p> <p>Increase value chain transparency and clear labelling between sustainable and less sustainable products</p> | <p><b>Transitional</b></p> <p>High sustainability targets</p> <p>Permit to commercialise some novel food (i.e., insect-based)</p> |

### 5.1.2 Israel

*Predeterminations.* Israel is considered a free-market economy with a tendency towards mixed ideologies. The country is evaluating a decrease in barriers for international trade, but currently keeps tariffs high to protect domestic production. This accounts for, for example, agricultural products, such as traditional dairies and beef. In the last years, the Israeli government was placed in a transition period, putting amendments and reforms on hold. Nonetheless, numerous reforms are planned for adjusting dairy price targets, reducing customs and tariffs, and increasing subsidies and supports for dairy and ADP firms. Herewith, Israeli legislators aim to transform towards a free-market economy. (OECD, 2020b)

*Perceptions.* The adoption of the Israeli dairy market for ADP is high. The growth rate outperforms traditional dairies, and market reports consider the ADP sector's sales as nine times higher than traditional products (Axworthy, 2021). This is mainly due to the high environmental and sustainability concerns, healthcare awareness, and emerging lifestyles, such as veganism (Shah, 2018). Moreover, the country has little arable lands available, which has been continuously exposed to droughts and other crises, endangering the food supply for citizens. Based on these factors and the tendency towards free-market economies, the government and many firms are researching alternative sources of nutrition, benefiting the ADP industry. Especially lab-grown products are emerging, whereas plant-based substitutes are already commoditised for a longer period (OECD, 2020b). The Israeli government actively collaborates with public and private companies, such as start-ups, to become a pioneer in the ADP industry. For the government, sustainable and healthy nutrition is of high interest, which is resembled by numerous programs to foster vegetarian diets (Kachel, 2016).

*Policy instrument mix.* As mentioned, sustainability and environmental awareness increase. Although the agriculture sector only accounts for a low percentage of the country's total GHG emissions (4%), similar labelling attempts as in the EU are in place, targeting sustainability, health, and transparency along the value chains (OECD, 2020b). Just as the EU, Israel's dairy industry shows high price volatility and is subsidised by the government in form of direct payments and price controls. Specific import tariffs and direct payments exist to stabilise the industry, which are increasingly often dismissed for a short period, resulting in high competition for the domestic industry. However, the country aims for exploiting the industry potential, and supports the R&D of improving traditional agricultural products (OECD, 2020b).

The Israel Dairy Board Research Fund (DBRF) is a governmentally subsidised research programme, targeting subjects, such as animal welfare, nutrition, and quality assurance (Israel Dairy, 2018). Additionally, Israel emphasises the innovation of novel foods, such as ADP, accounting for around 20% of overall government spending for agriculture. The ADP industry plays a significant role and entails the high potential for the country's food supply shortages, aiding the goal of becoming market leaders and main exporters of ADP (OECD, 2020b). Israel currently invests in subsidies for R&D for alternative sources of nutrition, assisting start-ups in the development of new and improved products as well as production processes for both traditional products and ADP. Especially lab-grown innovations are highly attractive due to their potential for the country's sustainability goals and their limited land availability. The recent establishment of a governmental body to oversee operations in the lab-grown sector is an "encouraging step towards the commercialisation of cultivated meat in one of the world's most tech-forward nations" (Byrne, 2020). The country is expected to follow regulatory recommendations by the US or the EU. In total, the government compensates for 30% to 70% of all costs to start-ups and academic research with subsidies. However, Israel is also directly supporting the traditional dairy industry to slow the 80% decline of dairy farmers in the past 20 years, which might lead to further market distortions. (OECD, 2020b)

*Conclusion.* ADP are highly adopted in Israel. The government invests in alternative sources for nutrition and compensates for incurring costs to a large extent. The recent agricultural drought has leveraged the country's attempts of becoming market leaders in substituting industries (OECD, 2020b). Both the market growth and government support make the country highly attractive. Furthermore, the governmental motivation for sustainability in the agriculture sector reveals a high potential for R&D that might contribute to an industry transformation, both for the efficiency of traditional dairies and also the development of their substitutes. Connecting this to Israel's attempt of transforming to a free-market economy and becoming market leaders whilst altering the support for traditional dairies, it is evident that Israel is highly attractive when investigating expansion opportunities for ADP.

Table 9. Policies in Israel (created by authors)

| Israel                   |             | Change to Status Quo in Policy Responses   |  |
|--------------------------|-------------|--|--|
|                          |             | <i>Low</i>   | <i>High</i>  |
| Change in Policy Context | <i>High</i> | <b>Coping</b><br>High support and market interventions for traditional dairy farmers (i.e., subsidy, tariff)               | <b>Adaptive</b><br>High subsidies for R&D in ADP and its efficiency  |
|                          | <i>Low</i>  | <b>Incremental</b><br>Subsidies for sustainability, decreasing tariffs, clear labelling, upcoming reform of dairy policies | <b>Transitional</b><br>Strong promotion of sustainability and health |

### 5.1.3 The USA

*Predeterminations.* As a country representing the free-market ideology, the general nature of policies in the US is characterised by limited interference and involvement of the government, providing flexibility for market forces to determine and influence economic development. The country is well-known for its liberal approach to the provision of goods and services, where political leaders are generally more hesitant on imposing regulations on an industry (Interview A). Nevertheless, being aware of the risk of ‘winner-takes-all’ side-effects that can lead to problems, such as inequality or natural resources exploitation, certain regulations are imposed to counteract market failures (Schilling, 2017; Blainey & Normile, 2004; Salomon, 1986).

*Perceptions.* As in other western countries, the American population has developed an increasing concern for sustainability. As Interviewee A emphasised, “[the American] consumers love alternative protein products [...], demand is [...] skyrocketing. [...] So, the perception of alternative products is [...] really good”. This positive response is partly due to the environmental superiority of ADP, combined with other reasons such as health concerns, animal welfare, and taste (Interview A). However, the viewpoints seem to polarise (Clay et al., 2020). On the one hand, it is acknowledged that the rising popularity of ADP can set the course towards more sustainable development in the sector.

On the other hand, the US is one of the worlds' major traditional dairy producers. As a study by Ipsos (2019) revealed, despite a relatively high environmental awareness among American citizens, the majority believes that the *FDA* should restrict plant-based beverage companies from using the word 'milk' on product labels. The main arguments of these viewpoints were mostly about consumer protection regarding nutritional aspects of the products, clear and transparent food labels, and the protection of the traditional dairy industry, including farmers (The National Law Review, 2021; Leach, 2021). Despite the tendency of legislators to be hesitant on imposing regulations, label censorship for ADP has been an exception, where plenty of legislators explicitly said that label censorship is necessary to protect the incumbent industry (Interview A).

*Policy instrument mix.* Two major themes of policies were identified. First, the policy mix targets label censorship (Interview A). The country is currently re-evaluating the existing food policies, such as the *FDA*'s regulation for products' standard of identity (The National Law Review, 2021). This request came from the National Milk Producers Federation (NMPF), aiming to (1) enforce existing 'imitation' labelling requirements against non-dairy substitutes for dairy foods and (2) codify *FDA* policies to restrict the use of a standardised dairy food's name, such as 'milk', which is tantamount to the *DAIRY Pride Act* (The National Law Review, 2021; Leach, 2021). Other policy developments are mostly targeting standardisation of identity, favouring the traditional dairy industry in protecting their competitive advantage. For example, a *USDA* policy on food substitutes requires firms to label their product as 'imitation' when the item is nutritionally inferior to the traditional products (Abrell, 2019). These developments have steered an ongoing debate between the dairy and ADP players (Leach, 2021). This is aligned with Interviewee A who stated, "[that] there are a variety of states that are considering label censorship legislation". It is perceived that the interest in label censorship decreases, and generally has low impact (Interview A). Many supporters of ADP are working against such regulations, and the *FDA* commissioner has announced that it will review and modernise its standard of identity for dairy products (Interview A; Kux, 2018).

The second theme discusses R&D funding. In contrast to the first theme that tries to inhibit the ADP development, the US Appropriations Committee recently showed their support to provide parity in funding for ADP research, which potentially translates to a substantial government budget allocation for ADP R&D (Interview A).

This type of government support is considered important and long-term oriented, which will help accelerate the ADP industry (Interview A). As interviewee A elaborated further, “[...] lots of other countries have funded R&D on the [ADP, but] I suspect that the US appropriation on this will be larger than what a lot of other countries have allocated [...]. So, we are maybe [...] a little bit behind [...] in terms of [...] timing, but the amount will be [...] substantial.” Other policies were imposed to address the procurement of ADP in public institutions, revealing the opportunity for a broader acceptance of ADP in the country (Interview A; New York Laws, 2019).

*Conclusion.* The American population has a generally high awareness of environmental issues and is mirrored in the change of consumer preferences on dairy products. However, for policy development, the viewpoints appear to be polarised, resembled by different types of governmental interventions trying to accommodate both sectors. On the one hand, the government aims to protect the incumbent industry through explicit support for traditional dairy industry players with the argument of farmer and consumer protection, and nutritional aspects. On the other hand, a recent development in policymaking has shown increasing interest to support the development of ADP through R&D budget provision. These government responses are shown in Table 10.

Table 10. Policies in the USA (created by authors)

| USA                      | Change to Status Quo in Policy Responses |   |  |
|--------------------------|--|---|--|
|                          | <i>Low</i>                               | <i>High</i>   |  |
| Change in Policy Context | <i>High</i>                              | <p><b>Coping</b></p> <p>Regulations to protect:</p> <ul style="list-style-type: none"> <li>-Dairy farmers (DAIRY Pride)</li> <li>-Traditional dairy players (amending labelling regulations)</li> </ul> | <p><b>Adaptive</b></p> <p>Government support for R&amp;D in ADP</p>                          |
|                          | <i>Low</i>                               | <p><b>Incremental</b></p> <p>Review and modernise standards of identity for dairy products</p>  | <p><b>Transitional</b></p> <p>Public institutions to provide plant-based product options</p> |

#### 5.1.4 China

Since China is the only command ideology in this research, the following section provides in-depth insights into the policy development and relationships between different parties.

*Predeterminations.* China is characterised by high government involvement in shaping different facets of the society, including market dynamics. While many argue that this high involvement is often at the expense of market forces or efficiency, The GOC has been successful to defy such arguments (Huang and Yang, 2017). This is proven by the strong economic growth that the country has been enjoying in the past decades. Despite the governmental ‘top-down approach’ in determining the country’s objectives, the provincial authorities are largely independent and flexible in execution (Interview B; Interview C). This intends to spur competition among provinces and SOEs with a ‘high risk, high reward’ scheme, as common in a free-market economy (Interview C). Nevertheless, some inefficiencies exist in the system, as this flexibility and ‘experimentation’ might also lead to high uncertainty and lower transparency (Interview B; Rangarajan, 2000). The firm-policy dynamics are resembled by SOE’s receiving support from the government (Interview B; Interview C). As Interviewee C emphasised, “... companies that are closer to the government, for example, [...] might get cheap or free land or [...] preferential access to funding.”

*Perceptions.* In China, the rising middle-income population is apparent and has led to increasing awareness of sustainability and health consciousness (Interview B; Interview C). This trend is translated into consumption patterns, where, for instance, people are concerned about clean water and healthy food (Interview C). For dairy consumption, the Chinese population has historically been a major consumer of plant-based dairies, such as soymilk, partly because the majority (85%) of Chinese citizens is lactose intolerant (ProCon, 2020). Hence, plant-based drinks can be considered a staple food in the country, but the traditional dairy market remains relevant. Considering the high population and nutritional concerns, traditional products will remain a significant sector in the country’s long-term plans (Interview B). Since 2006, the country has released the ‘double protein’ strategy in the ‘Shanghai declaration’ – a concept of balanced-diet unique to China – that promotes high-quality combinations of both soy- and milk-protein (GOC, 2017).

From a sustainability perspective, the GOC aims for ‘greening’ the economy by emphasising less on the country’s economic growth and moving towards more sustainable development (Interview C). Nonetheless, sustainability may be considered to be of secondary priority, while food security, economic welfare, and nutrition are most important (Interview C). As Interviewee B stated, “[Regarding the governmental effort to boost the productivity of both traditional dairy and ADP], I think [the Chinese government has sustainability aspect in mind], but maybe on a different priority level. So, stabilising food security [...] would be the top priority and sustainability might be at a different level.”

*Policy instrument mix.* Many regulations focus on the traditional dairy industry, such as on imported and domestic dairy products, labelling, and claims (Ettinger et al., 2020; Cao, 2021). The Chinese dairy market is one of the most attractive across the globe, factor to its high population, and poor reputation of domestic dairy products. This has led to an enormous demand for international products, but strict and constant changes in regulations and standards have complicated the situation (Cao, 2021). Moreover, although the Chinese population is not extensively consuming traditional dairies, the Chinese government promotes consumption to improve public health and nutrition. Currently, China’s per capita consumption is only a third of the national dairy recommendation. In this context, government policies aim to increase domestic production by nearly 50% until 2025 (Wan et al., 2019).

Policies addressing the development of ADP appear to be scarce and are in an earlier development stage. Although some policies address plant-based food regulations, covering issues such as an appropriate labelling for commercialisation, its regulatory scheme remains unsettled. For example, it is under negotiation whether descriptions such as ‘artificial’, ‘imitated’, ‘plant-based’, and ‘veggie’ shall be used, and whether ADP are allowed to be referred to as ‘milk’ or ‘sausage’ (The National Law Review, 2020). It is noteworthy that the GOC published draft measures for food labelling, but clear regulations are non-existent, revealing a unique opportunity for the industry to experiment with labelling (The National Law Review, 2020). Nonetheless, Interviewee B argues that the observed policies intend to drive an incorporation of ADP into the system, underlined by the GOC’s encouragement to use plant proteins as one of the main nutritional bases in the mid-term future (GOC, 2017). The increasing soy production, the absence of clear regulations, and the promotion of plant-based dietary programs are proof of this awareness.

The country is among the largest soymilk consumers. Initially, the government mostly focused on cereal crops, such as corn, resulting in limited soybean supply. As a result, soybean imports were liberalised to keep tariffs low, resulting in a high import (Jamet & Chaumet, 2016). Nevertheless, Chinese authorities aim to reduce its corn reserves and subsidise farmers to grow soybean. However, China’s policy on imported soybean remains liberalised due its increasing demand for both human consumption and animal feed (Jamet & Chaumet, 2016).

*Conclusion.* Considering the nature of the command economy, the government’s involvement in determining market dynamics has been high, which however merely affected market forces and did not result in market inefficiencies. Instead, the government has been successful in fostering industry prosperity. In terms of sustainability, citizens have shown an increasing awareness of environmental issues. However, the policy development in China for ADP is limited. Current policies are mostly targeting national food regulations and efforts to improve the productivity and efficiency of national dairy production. Nonetheless, the few observable government interventions are hinting towards the future potential of ADP development. The specific absence of policies contributes to the high potential. Lastly, the Shanghai Declaration’s double protein strategy appears to be relevant for future nutritional plans of the government and will foster both sectors.

Table 11. Policies in China (created by authors)

| China                    |             | Change to Status Quo in Policy Responses   |   |
|--------------------------|-------------|--|---|
|                          |             | <i>Low</i>   | <i>High</i>   |
| Change in Policy Context | <i>High</i> | <b>Coping</b><br>Import regulations  | <b>Adaptive</b><br>Increasing domestic soybean production<br>Shanghai Declaration                                     |
|                          | <i>Low</i>  | <b>Incremental</b><br>Regulations on national food standards (i.e., quality and labelling)<br>Improving efficiency on traditional dairy production | <b>Transitional</b><br>Promotion of public health and nutrition.<br>Liberalisation of international trade for soybean |

### 5.1.5 Singapore

*Predeterminations.* Singapore is representing a laissez-faire ideology, where transactions between market actors in the economy are free or almost free from any form of economic interventions. In contrast to other regions, Singapore is not dependent on the domestic agricultural sector, factor to its low domestic production leading to high imports for food provision (Lucas, 2020). This is mirrored in Singapore's food policy practices, focusing on a consistent foreign supply of safe food and agricultural products. As a result, Singapore does not impose any quotas or tariffs on these items (Lucas, 2020). As the country has emerged to be one of the globally most advanced nations, many innovations are based in Singapore, making it a front-liner as a potential hub for food and Agri-tech innovation (Byrne, 2020; Ho, 2021).

*Perceptions.* Singapore shares similarities with western countries, shaped by high sustainability awareness. The country has researched ways to ensure sustainable food production to minimise its dependence on other countries for food provision. Furthermore, Singapore has a high rate of vegan and flexitarian citizens, resulting in a high adoption rate of ADP. Singaporeans consume more ADP per capita than the majority of countries (Shah, 2018). The health promotion and environmental protection across the country has made Singapore highly advanced in terms of nutrition, sustainable production, and animal welfare (Byrne, 2020).

*Policy instrument mix.* The economic ideology and the intra-societal demand as well as environmental viewpoints have affected the country's standpoint on ADP and positioned them among the market leaders and major supporters. The attempts for becoming innovation hubs in the ADP industry is apparent and proven by the SFA's approval of Eat Just's (a US-based food start-up) cell-cultured chicken commercialisation, making it a pioneer in the sale of lab-grown meat (Byrne, 2020; Lucas, 2020). Moreover, Singapore's government is in the development stage of a regulatory framework to govern novel food production for human consumption, which will cover new products, such as cell-based meat and ADP (Lucas, 2020). Recently, the country has established a new department called 'Future Ready Food Safety Hub' (FRESH), aiming to improve food safety research, support food science capabilities, and accelerate commercialisation of novel foods. The organisation is part of the city-state's plan to bolster food security and lead sustainable food innovation in Asia (Ho, 2021). Lastly, legislators have set a S\$100 billion plan for sustainable local food production for self-sufficiency and to increase the country's resilience to climate change (Ho, 2021).

*Conclusion.* As the country is not an agricultural producer, Singapore is highly dependent on international trade for the provision of food. The Singaporean government increases its effort to reducing dependence by becoming a market leader in ADP and Agri-tech innovation. This translates to the recent government interventions, aiming to enhance the development of novel food, which has resulted in preferential R&D subsidies. As the citizens generally share similarities with western communities characterised by increasing concerns on health and sustainability, the penetration of ADP is high, making it the first country to legalise the commercialisation of cell-based meat. The path Singapore sets for specific products might be generalised in the future, making ADP dominant.

Table 12. Policies in Singapore (created by authors)

| Singapore                |             | Change to Status Quo in Policy Responses |  |
|--------------------------|-------------|--|--|
|                          |             | <i>Low</i>                               | <i>High</i>  |
| Change in Policy Context | <i>High</i> | <b>Coping</b><br>None                    | <b>Adaptive</b><br>FRESH Department for R&D for ADP and other novel food<br>High subsidy for ADP R&D                                   |
|                          | <i>Low</i>  | <b>Incremental</b><br>None               | <b>Transitional</b><br>Approval to commercial novel food<br>Promoting health and sustainability<br>Regulatory framework for novel food |

Concluding the separate analyses, it is observed that all sample regions appear to take different paths for the industry transformation, which is in line with findings of the literature review. Nonetheless, legislators are becoming increasingly aware of ADP and their advantages. Currently, it is observable that some countries actively promote the R&D of ADP, whilst others seem to protect traditional products. Lastly, all countries are developing towards an adoption of ADP and thus an industry transformation, but with a different priority and pace. Hereby, it is noteworthy that none of the countries is striving for a monopoly situation of ADP, as traditional dairies shall remain relevant in the market.

## 5.2 Regional Comparison

After separately analysing the countries, the findings are synthesised to answer research question two. The following chapter summarises the gathered information of the ongoing policy development in the ADP industry, and identifies observable differences and similarities between the cases. Figure 8 scales each country.<sup>5</sup>

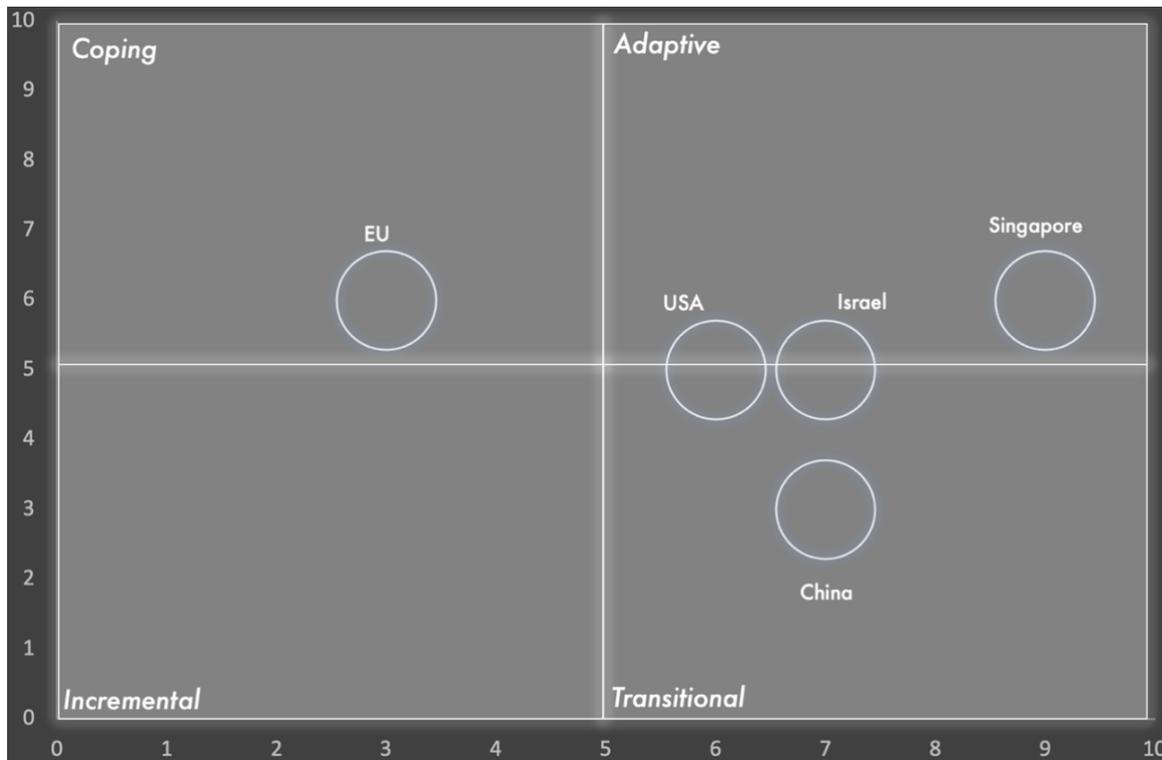


Figure 8. Comparative policy matrix (created by authors)

The rationales and reasons of the pursued development are identified and aid to develop a description of specific patterns. Connecting chapter 4.2 ‘country selection’ with the findings of the previous section, it is identified that further relevant characteristics are (1) the relevance in the traditional dairy market, (2) the societal adoption towards ADP, (3) the general size of the dairy market, and (4) existing policies. Table 13 is further utilised by incorporating relevant findings from chapter 5.1.

<sup>5</sup> Although the positioning of the countries is based on empirical analysis, researchers’ biases and subjectivity might have affected the outcome.

Table 13. Revised Country comparison (created by authors)

| Country / Factor                   | USA                       | Israel                    | Singapore | EU     | China        |
|------------------------------------|---------------------------|---------------------------|-----------|--------|--------------|
| Market size (in mio USD)           | 82000                     | 3100                      | 636       | 150000 | 95000        |
| Development                        | 0,94                      | 0,91                      | 0,91      | 0,90   | 0,75         |
| Market ideology                    | Free                      | Free                      | Free      | Mixed  | Command      |
| Significance market potential      | 4                         | 4,33                      | 2,33      | 4,33   | 3,67         |
| Significance R&D                   | 3,67                      | 4,67                      | 5,00      | 3,00   | 4,00         |
| Traditional dairy market relevance | 5                         | 2                         | 1         | 5      | 5            |
| Societal adoption towards ADP      | 3                         | 5                         | 5         | 3      | 4            |
| Size                               | 4                         | 2                         | 1         | 3      | 5            |
| Policy Matrix                      | Adaptive,<br>Transitional | Adaptive,<br>Transitional | Adaptive  | Coping | Transitional |

The empirical research has shown that policies are designed to be most in favour for ADP firms in regions with fewer opportunities for governmental interference, less significance of the traditional dairy sector, and a high focus on sustainability within the country. In other words, a region with fewer opportunities for governmental interference and a low relevance in traditional dairy production, but simultaneously strongly focusing on sustainability, seems to be more likely to implement policies fostering the development of ADP. When a region has a strong dependence on the traditional dairy industry, legislators seem to inhibit the industry transformation. Countries with less dependence on the domestic traditional dairy sector pose fewer protection efforts. In contrast, large dairy-producing countries are likely to continue the protection of traditional dairy firms until ADP are achieving a high adoption rate in the general society, eventually leading to a delayed industry transformation (Interviewee A).

However, this assumption does not apply to all countries. For example, although China has a relatively large traditional dairy market, the country has shown a high willingness for adaptation and a complete incorporation of ADP in the national food security programme. Additionally, societal pressures also play a significant role. For instance, the US government's decision to provide R&D funding for both traditional dairy and ADP indicates that, although traditional dairies are of high importance, the country could not neglect the increasing demand for ADP, resulting in policies that aim to accommodate both industries. This confirms that the industry transformation is subject to all four aforementioned factors, but that their contribution to the overall frame of ADP and traditional dairies is varying. However, the main driver is not the countries' political economic ideology, but rather their societal demands (Easton, 1953).

To conclude, the sample regions share patterns of development towards an adoption of ADP into the dominant food system. As a result, legislators either proactively engage in the industry transformation (Israel, Singapore, China), or respond reactively when being exposed to changing consumer preferences (USA, EU). Patterns indicate that the societal transition towards sustainability majorly contributes to the industry transformation. In free-market ideologies, the demand is directly incorporated, while in command ideologies, societal demands are noticed and complied to as well. In mixed ideologies, the state has limited but sufficient tools to intervene in the market, making the dairy sector ‘inefficient’ due to past decisions, but the intra-societal demand is pushing towards ADP in these countries as well (Rangarajan, 2000; Easton, 1953; Kahnemann & Tversky, 1979)).

### **5.3 Revision of the Framework**

Combining previous findings with the literature review, the dairy industry transformation is subject to specific factors. Due to new insights during the empirical analysis, the preliminary framework requires adaptation. Although economic development plays a significant role in terms of sustainability, the countries follow comparable goals. For example, despite China’s relatively low economic development, it behaves similarly to developed countries in terms of sustainability goals and dismissing economic growth as first priority. Consequently, the revised main influences are (1) relevance of dairy production (agricultural economic relevance), (2) intra-societal demand, (3) opportunities for market interventions (political economic ideology), and (4) legislative long-term goals (sustainability).

In the end, the pace of the ongoing industry transformation in specific countries varies but occurs in all legislative systems. It also depends on the path dependency of the countries, their culture, history, and other multiple equilibria (Clarke, 2016), as exemplified by China’s tradition of consuming ADP.

To conclude, the preliminary framework requires adaptations. First, the Economic and Technological status is replaced by the relevance of dairy products to the countries’ economy. Second, the overarching factor of path dependency is added, both influencing the relationship between these factors, but also serving as a ‘black box’ shaping the general perception and framing of ADP at the core of all factors. Lastly, the findings imply that it is not whether the dairy industry transformation will be successful, but rather how the pace of the transformation varies according to the aforementioned factors.

Notably, the revised framework (depicted below) might apply to other industries as well. By changing context specificity, the four key factors might be utilised in different sectors, not only the food industry but also other industries. It is recommended to analyse policy development and conduct a regional comparison with the following factors: (1) general relevance of the industry to the country in terms of production and consumption, (2) contextual viewpoint under which the industry transformation is promoted, for example, sustainability, (3) intra-societal demands and demographic changes, and (4) political economic ideology of the country. Lastly, specific attention should be paid to the country's path dependency, and the causal factors for change (see Figure 5).

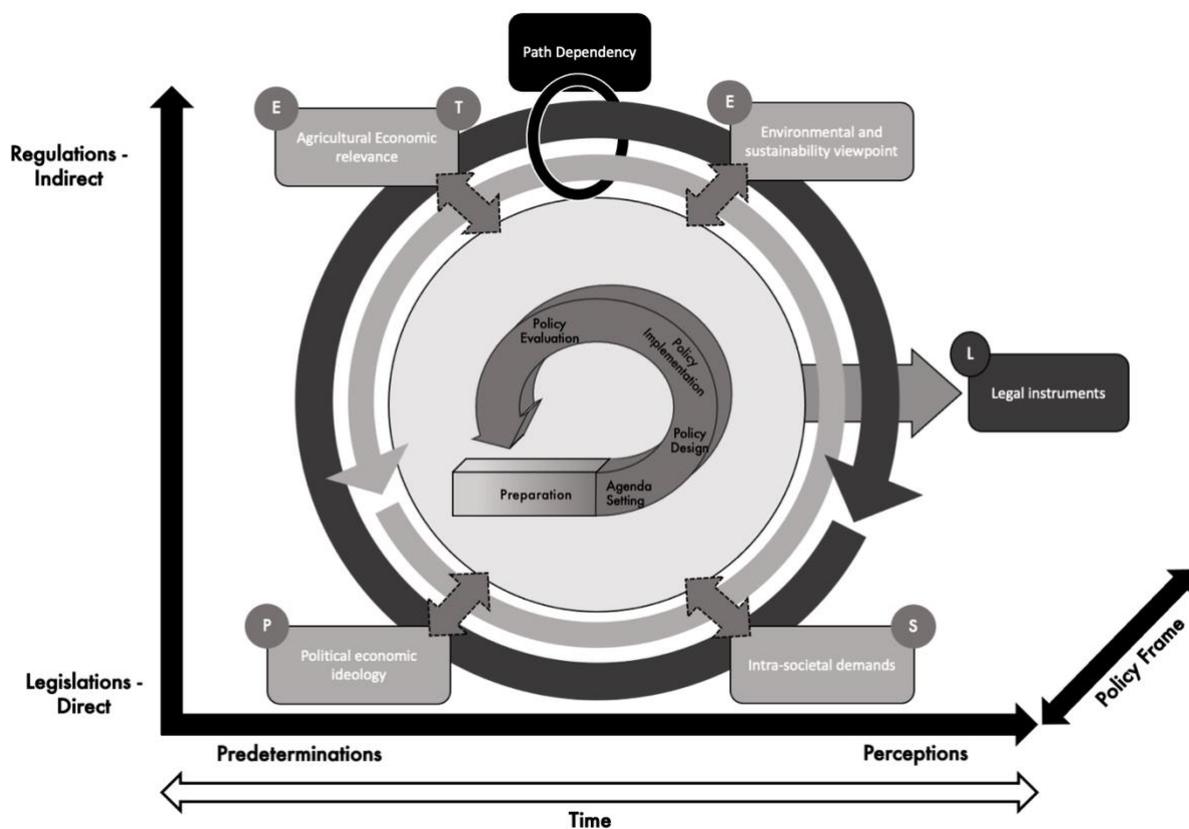


Figure 9. Revised Framework: Factors influencing policy development within a country (created by authors)

## 6. Discussion

The previous chapter has answered research questions one and two by highlighting recent development in the ADP industry in different regions and identified observable similarities and differences between the countries. Due to the fragmented and modular nature and general research scarcity, the findings from this study are perceived to be complementing previous studies for further advancing the topic. The outcomes of the empirical analysis have helped to revise the preliminary framework by imposing key factors of the dairy industry transformation.

During the analysis and literature review, four policy themes were observed that are of relevance for the high majority, or all the sample regions. The following section depicts these themes and aids to discuss the findings, and the framework is tested by analysing the legal instruments according to the four key factors. Lastly, research question three is answered by providing specific recommendations for ADP firms. The identified themes are *market interventions*, *label censorship*, *striving for health and sustainability*, and *R&D support*. It is noteworthy that the themes are not mutually exclusive but are interconnected.

### 6.1 Market Interventions

The traditional dairy industry appears to be highly unstable in certain regions (OECD, 2020a). This price volatility combined with the bullwhip effect significantly affects the dairy farmers, forcing governments across the world to establish policies for both direct and indirect market interventions, such as price controls and customs. These patterns are observable in all regions, independent from the economic ideology. China subsidises dairy farmers to incentivise expansion, and the USA, Israel, and the EU support dairy firms to ensure their long-term survival, including employment (Wan et al., 2019; Leach, 2021; European Commission, 2021c; Israel Dairy, 2018). Multiple reasons exist, which however differ across countries. In the USA, the decreasing market share pressures dairy farmers. In the EU, the fluctuating demand and trade restrictions to Russia have led to a plummeting demand. Meanwhile, in Israel, climatic catastrophes affect the whole agricultural sector, and price fluctuations result in an unattractive market situation. Singapore is exempted from market interventions as the domestic market for traditional dairies is nearly non-existent, making the country highly dependent on agricultural imports (Lucas, 2020).

These market interventions have led to a sectoral inefficiency, making firms highly dependent on governmental support. Ending the support will have a significant impact on the traditional dairy industry, as exemplified by Israel: a frequent pausing of trade restrictions and direct subsidies pressure the price of dairy products, which is one reason the number of domestic dairy firms has decreased by 80% in recent years (Israel Dairy, 2018).

Consequently, the government's support to the traditional dairy firms might have negative impacts on the ADP industry, as their competitive advantage concerning sales price has decreased. For example, the aforementioned market interventions by the EU have led to stabilised and low prices for traditional dairies. These actions have aided traditional dairy farmers but led to economic disadvantages as ADP companies do not receive the necessary resources for growth. Nonetheless, the shift in societal demands results in a decreasing demand for traditional dairy products, forcing legislators to re-evaluate policies. For example, the USA recently has approved a bill to support ADP R&D after being convinced by both ADP firms as well as societal demands, but it is noteworthy that the USA currently supports both sectors.

## **6.2 Label Censorship**

Another theme characterising the policy development in the ADP industry is label censorship. This policy aims to prohibit the use of traditional dairy terms such as 'milk', 'cheese', or 'yoghurt' for ADP. This policy is mainly driven by the traditional dairy industry as a defensive move towards the rapid development of ADP. The main argument for this policy is two-fold.

First, farmers' protection. A country with high relevance of traditional dairies is characterised by a high number of farmers, and the increasing popularity of ADP will potentially negatively affect the farmers' livelihood. Traditional dairy industry firms use this argument to propose the label censorship as an effort to protect farmers (The National Law Review, 2021; Leach, 2021). Second, nutritional concerns and consumer protection. Traditional industry players argue that ADP are nutritionally inferior compared to traditional milk, and labelling ADP with dairy terms will mislead consumers. They further elaborate that consumers might not be aware of the different nutritional content of the two products which might lead to a lower intake of protein among consumers (Leach, 2021).

For example, the EU's amendment 171 entails a significant threat for ADP firms as it restricts commercialisation and marketing of these products. Although the bill contradicts many European goals towards sustainability, the lobbying of traditional dairy firms has convinced legislators. As a response, ADP firms have been working against such policies. Companies, such as Oatly, have raised their opposition to regulators, arguing that ADP consumers are aware of the differences between traditional dairies and ADP (Southey, 2021). Moreover, they aim to attract consumers by increasing their awareness about these policies, arguing that traditional dairy industry firms attempt the protection of the industry at the expense of sustainability goals (Oatly, 2021). Nonetheless, label censorship is apparent in all observed economic ideologies, although losing significance in some regions. For example, the US hints labelling issues will remain relevant, but their enforcement seems unlikely (Interview A).

### **6.3 Striving for Health and Sustainability**

Sustainability has been a crucial factor for existing literature as well as for this study (Clay et al., 2020; Rööös et al., 2018; Huang & Yang, 2016). This theme has been observed in all of this study's countries, but the extent of sustainability compliance varies with observable differences between highly developed and emerging countries (Poore & Nemecek, 2018). Despite the key factor of agricultural relevance for a country, the sustainability theme seems to be exempted as it applies to all countries in all regions, whereby the political economic ideology does not play a significant role as well. In this thesis, ADP were proven to be relatively more sustainable than traditional products, hinting towards the necessity of improving the industry's efficiency and environmental impact, and promoting more sustainable substitutes. ADP appear to be capable of decreasing the carbon footprint of the dairy industry, which is aligned with previous researchers (Rööös et al., 2018; Poore and Nemecek, 2018; Clay et al., 2020).

First, the industry is shifting towards sustainability due to intra-societal demands (Clay and Yurco, 2020; Clay et al., 2020). Its high influence on the market and policy development suggests that the sector is gradually affected by societal shifts (Rööös et al., 2018). Second, the promotion of health and sustainable nutrition, as well as the rise of flexitarianism and veganism among consumers, has accelerated the industry transformation in various regions. Governments across the world impose sustainability goals and are developing strategies for the dairy sector, but with different emphasis.

## 6.4 Research and Development Support

Although not apparent in all regions, R&D supports seem to be a major theme in dairy policy development. The progress of this aspect is considered to be most important and can determine the long-term future of ADP (Interview A). This kind of governmental support is considered beneficial due to three reasons. (1) ADP will be of benefit for the environment, public health, as well as animal welfare, which is in line with observed governmental goals to foster sustainability and nutritional balance. (2) ADP can be a driving force for domestic economic growth due to increasing demand. (3) The ADP sector is characterised by a ‘high-risk, high-reward’ scheme and is still pre-competitive, resulting in the need for multidisciplinary R&D to overcome growth barriers and achieve widespread adoption. (Smith et al., 2021)

Considering that ADP are still an emerging industry, the governmental decision for or against providing R&D support will determine which countries and/or firms might gain first-mover advantage. In Israel and Singapore, governments have positioned themselves as supportive for the provision of assistance for ADP R&D. In fact, the establishment of FRESH in Singapore and similar R&D supports in Israel both intend to facilitate R&D within the sectors and provide a permit to the commercialisation and future development of lab-grown ADP (Ho, 2021; Kachel, 2016). While the US government has shown similar interest in supporting ADP, the EU seems not to follow this decision in the short- and mid-term future.

Despite the US government’s plan to support R&D funding for ADP is still in an early stage, the budget allocation is expected to be substantial (Interview A). In China, similar policies are apparent, and the general development of government interventions will benefit the sector (GOC, 2017). This translates to intensive governmental support, aiming for an increase in production and efficiency of soybean and other plant-based materials. Meanwhile, the EU seems to increasingly focus on protecting the traditional dairy industry and hence lacks a concrete plan for ADP R&D. In general, it is arguably important for ADP firms to continuously pay attention to the policy development of R&D support.

## 6.5 Recommendations for Businesses

Considering that businesses could be impacted by policies, it should be in their interest to maintain awareness of regulations and aim for influencing legislators and their policy instruments. Although different views exist on how businesses should interact with governments, firms should recognise that policies are often an important lever to achieve their goals, especially in sustainable and social matters. Political decisions might catalyse integrating both profit incentives and social impacts into their business activities. Therefore, managing their relationships with governments (local, state, national, and international) effectively is crucial. The following section depicts practical recommendations that firms may pursue as a response to policies, aligned with the previously identified policy themes.

### 6.5.1 *Government-related Strategies*

*Business lobbying.* Firms can lobby in multiple ways, either directly to a central government, state legislatures, and branch level agencies, or through the companies' government relation specialists, industry associations, as well as a combination of those means. This tactic can have a high influence on public policies. Through this endeavour, firms can potentially influence ADP legislations. For example, firms should persuade policymakers to incentivise traditional dairy farmers to transition towards the production of ADP through subsidies, technical assistance, and others. Firms can also induce the government to increase their support for ADP development through R&D funding.

This can be done through, for example, negotiations with the government to provide funding for firms' internal R&D, or the establishment of governmental research programs where government agencies play an active role during the process. The example of the USA highlights that firms should proactively engage in discussions with the government in all regions, especially in the EU, to restrict amendments and foster the sector's growth. As discussed, this can be performed either directly or indirectly through an association. For example, Oatly's participation in the petition against amendment 171 highlights that the larger the association, the more likely it is to convince legislators to limit negative outreach (Oatly, 2021).

*Interest group participation.* Interest groups play a significant role in nearly all government systems. Consisting of individuals or arranged organisations, they intend to gather interests and facilitate communication with the government. By participating with interest groups supporting their position, ADP firms can work with other entities, such as for advancing sustainable businesses, which can have a positive impact on ADP firms. This can be done through, for example, memberships in associations, or supportive *NGOs*. This effort will potentially gain more weight and aid to alter policies and amendments, compared to the impact of a stand-alone company. Active participation in an interest group might be accommodating for a company's effort when it comes to lobbying. For example, GFI US has been working with ADP firms to communicate their collective views on the current policy development regarding label censorship (Interview A).

*Political donations.* Firms might also use campaign contributions to support the company's position and influence policies and regulations and to achieve the firms' objectives. The companies' funds allocations for lobbying and campaign contributions can provide them a pronounced voice in the political system and on policies that can affect ADP. However, the nuance and effectiveness of this political strategy should not be disregarded. Its feasibility depends on the regulations in particular countries, as some countries might restrict or limit their practice (International IDEA, 2019). It also potentially affects the company's brand reputation, due to varying views about the relationship between firms and legislators, which can change consumer's perception and affect the company's overall performance (Gittel et al., 2012). Lastly, it might not yield high returns (Ansolabehere et al., 2004).

### 6.5.2 *Industry-related Strategies*

*Supporting the transition to sustainable production.* As previously discussed, farmers' protection is one of the major arguments against ADP development. Therefore, despite the ADP industry's relatively low dependence on traditional dairy farmers, they should not be ignored as farmers' protection is often mirrored in regulations. Hence, firms should proactively support traditional dairy farmers to moving towards ADP. This can be done through, for example, providing technical assistance and training for dairy farmers to rotate with other crops that are beneficial for ADP production. In terms of implementation, ADP firms may conduct this strategy independently or through partnership with *NGOs* and governments.

*Enhancing sustainable consumption.* Consumers play a significant role for future ADP development (Clay et al., 2020). The increasing awareness of consumers should be amplified by marketing the product's benefits to increase market share. Furthermore, an increasing consumer awareness could lead to direct citizen activism among consumers, which can assist ADP firms to protest against restricting policies from the government, and potentially against subsidies for the traditional dairy industry. This can be done, for example, through marketing campaigns on the positive environmental impact of ADP compared to traditional products, utilising scientific statements. Moreover, to further enhance sustainable consumption, improving the ADPs' product performance in terms of product quality, taste, nutrition, and accessibility is crucial.

*Partnering for better and greener growth.* Companies should proactively pursue engagement with other ADP industry players, such as processors or packaging manufacturers. In general, these collaborations can be established to share R&D expenses, for example by targeting new product innovations and efficiency improvements within the value- and supply chain to both lower costs and decrease the carbon footprint. When feasible, partnerships between ADP and traditional dairy firms are recommended. Considering that the transition from traditional dairy to ADP is granular, partnering with the incumbent might be beneficial to accelerate the progress. This can be done through, for example, joint-ventures, strategic alliances, mergers and acquisitions, and collective research organisations (Schilling, 2017). However, firms should be aware of partnership-related regulations such as anti-trust law, or other partnership risks, such as the potential exposure of the firm's sensitive information, including proprietary technologies (Schilling, 2017).

## **7. Conclusion**

The aim and purpose of this study have been to analyse political behaviour and its development in different regions. Hereby, the following research question was formulated:

**“What is the legislative development path of alternative dairy products?”**

To address the research question, a multiple comparative case study has been orchestrated by identifying policy instrument mixes of legislators. Understanding the rationale was considered crucial, resulting in the application of four key factors, namely (1) intra-societal demand, (2) economic development, (3) political economic ideology, and (4) sustainability and environmental viewpoint. These factors serve as inputs for policy development and are interconnected with each other.

However, the findings of empirical research have led to different insights, resulting in the revision of the four components. First, the economic development is replaced by the relevance of domestic production and consumption. The sampled countries in this case study are comparable according to their economic development, whereas China is the least developed country. However, China pursues tantamount goals when comparing the policy instrument mix to more developed regions. Nevertheless, economic development remains an important factor in sustainable industry transformation, and it is suggested that the factor of sustainability and environmental viewpoint includes the economic development, as it influences the former. Second, it has been observed that despite strong similarities in the four key factors, policy instruments differ. Hence, the theory of path dependency is applied, reasoning the diverging behaviour of comparable regions.

### **7.1 Theoretical Implications**

The findings of this thesis aimed to contribute to the two identified theoretical research gaps and suggest specific implications for future academic research. First, Clay et al.'s (2020) suggestion of the legislative relevance in the ADP sector combined with the research scarcity in this field has been addressed. In existing literature, the emergence of ADP was scrutinised on consumer demands and demographic shifts but disregarded the role of governmental policies, which was pointed out as a crucial factor by other literature (Clay et al., 2020; Leialohilani & de Boer, 2020; Rööös et al., 2018).

After practically analysing the four key factors, it was evident that intra-societal demands are one of the most relevant levers, thus agreeing with Easton's (1953) systems theory of societal influence on legislative responses. Nonetheless, by analysing country-specific factors, it has been proven that the path dependency of countries is also important when identifying the background of political decisions. As a result, the revised model aids to understand policy development in the dairy sector. By altering situational factors, such as agricultural relevance, the framework might be also applicable to other industries.

Second, existing literature has lacked comparative approaches between countries and the modularity, and context specificity in existing research has impeded comparisons. Although existing literature outlined that the emergence of ADP differs across regions, none of the identified research has analysed regional differences in policy development and merely societal changes for dairy consumer preferences.

After reviewing existing literature, we have identified causal drivers for change which resulted in a framework aiding to understand political responses based on predetermined influences. By using this framework in combination with the causal drivers, different regions could be compared, and the rationales of political responses were identified whilst the maintaining a holistic overview. The comparisons have revealed that legislators treat mature industries with special care, as exemplified by the countries' dairy sector and its history, altering legislative decision-making. It has been confirmed that although countries differ in policy development approaches, these differences are neglected and the intra-societal and extra-societal demand are the most relevant drivers for change, which is, in this case, the megatrend of sustainability.

## **7.2 Practical Implications**

As discussed in the problematisation, most of the existing literature does not provide practical implications for businesses. To address this practical gap, this study aimed to provide recommendations firms shall pursue. This study is of significance to all stakeholders, but specifically to ADP industry firms who envision accelerating the growth of the ADP sector.

Considering that the traditional dairy industry is mature and well-established, altering the dominant system might require more time and effort. This study emphasised the important role of legislators that can accelerate or inhibit the transformation from one sector to another, in this context from traditional dairies to ADP.

Therefore, current issues and future policy development in the traditional dairy and ADP sectors were provided. This can serve as a guideline for a firm's strategic planning process regarding the industry transformation into a more sustainable regime.

Although the study focuses on the USA, the EU, China, Singapore, and Israel, the study has provided an extensive comparison that might be relevant and generalisable in other regions. The study concludes that the industry transformation is not perceived as a complete shift from one sector to another, but that both sectors are substitutional and thus will co-exist. This might result in an integration of ADP into the dominant food system in the long term, which is in line with the findings from previous literature. Furthermore, the study has discussed five factors influencing the policy development process. Understanding these factors is relevant not only for academic scholars aiming to conduct further studies on the ADP industry and others but also for practitioners who investigate general policy development.

Lastly, the study provided practical business implications, which were divided into government- and industry-related strategies. The findings confirm that this research is significant for strategic management, as the comprehension of policy development will contribute to the firms' potential in exploiting the industry transformation and subsequently to adjust their business model. Managing the firms' relationship with governments is thus considered essential for the future development. Practical government relation tactics were discussed, such as business lobbying, political contributions, and interest group participation.

These tactics are relevant methods taken by firms and companies to engage collaboration with legislators and hence should not be neglected. Moreover, recommendations related to the firms' value chain were discussed, specifically targeting producers, consumers, and competitors. To conclude, it is argued that this study served the purpose of addressing practical implications.

### **7.3 Limitations and Implications for Future Research**

The study has been subject to several limitations, which opt for future research. First, the methodological approach has been qualitative with an explorative aim. Additionally, the research scarcity resulted in the necessity of an extensive literature review. By utilising this research in future studies, additional factors might be perceived as relevant and incorporated into the framework.

Due to research scarcity, quantitative testing was disregarded, and future studies should identify correlations between policies and the four factors, as well as the different regions' policies. The execution might result in a more objective view on the identified factors, observations, and practical implications, which might be of high benefit to both academic scholars and managers involved in strategic decision-making. Furthermore, the framework should be tested in different contexts apart from the food industry to identify more precise implications.

Second, the nature of secondary data has influenced the outcome of this research. As policy development is highly confidential, the available data limited itself to publicly accessible documents and expert interviews. The future development of policies has been forecasted, however with limited accuracy. Future data and internal information might result in a different outcome of this thesis. As a result, future research should regularly investigate policy development in the given regions and aim for additional internal legislative information.

Third, because most of the gathered information was in the context of ADP, the study might lose relevant insights from the traditional dairy industry. Therefore, a further study that views the issues from the perspective of traditional dairy industry firms will potentially increase the overall value of the analysis and provide a more comprehensive understanding of the discussed transformation. This limitation is mirrored to the rather general recommendations for the ADP industry only, but not for traditional dairy firms. To address this issue, further research focusing on an analysis on how the traditional dairy industry should cope with the ongoing transformation can be valuable. Moreover, the discussed recommendations can be both generalised and further specified. For the recommendation's generalisability, a quantitative study might shed light on the practicality of each recommendation. Meanwhile, for the specificity purpose, a company-based case study might show how particular strategies can be implemented based on the company's internal resources.

Fourth, the difficulties to find interviewees might have impacted the sufficiency of the gathered information, and hence engaging more in primary data collection is advised. Considering that the research was conducted amid the COVID-19 pandemic, the gathered information and findings might be blurred as countries have implemented 'coping' policies. Hence, comparative studies addressing the issue in different timeframes (for example, before-, during-, and post-COVID-19) potentially improves the nuance of the discussed issues.

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## Appendix A – Policy Development in Different Regions

### Policies and amendments in the European Union

| Content  | Context  | Process                | Type                   | Nature of Response |
|--|--|------------------------|------------------------|--------------------|
| Government high support and market interventions for traditional dairy farmers (i.e., subsidy, tariff, price control, direct payment for farmers, and other instruments)   | The international market in the EU for dairy is shrinking due to the Brexit. In order to ensure sufficient supply, the max limit of production shall be raised | Imposed                | Economic Instruments   | Coping             |
| Government regulation on Standard of Identity to enforce existing "imitation" labelling requirements against ADP and limit the use of dairy terms, such as "milk", "yogurt", and "cheese"                                | Dairy defensive move with the argument for consumer protection, nutritional aspect of ADP, and dairy farmer protections  | Proposal for amendment | Regulatory Instruments | Coping             |
| Government regulation on clear and specific geographical region for product labelling  | Intransparency of product origin   | Proposal for amendment | Regulatory Instruments | Coping             |
| Government regulation for transparent labelling, such as designation of origin, description of product including raw materials, evidence of traceability, contribution of sustainable development, packaging information | Increasing pressure for clean and transparent labelling  | Proposal for amendment | Regulatory Instruments | Coping             |
| Government subsidies to increase the sustainability of the traditional dairy sector, through for example, genetics and precision livestock farming, etc.   | Dairy defensive move to increase its sustainability aspects  | Imposed                | Economic Instruments   | Transitional       |
| Government's regulation to restrict ADP to be named the same as traditional dairy products. This means that dairy terms are exclusively reserved for milk products.  | Dairy defensive move with the argument for consumer protection, nutritional aspect of ADP, and dairy farmer protections  | Imposed                | Regulatory Instruments | Coping             |
| Government support for transitioning to sustainable production in general  | The increasing concern on sustainability and environmental issues in general level, not specific for ADP and dairy industry                                    | Imposed                | Regulatory Instruments | Coping             |

## Policies and amendments in Israel

| Content   | Context  | Process | Type                                | Nature of Response |
|---|--|---------|-------------------------------------|--------------------|
| Many government support and market interventions for traditional dairy farmers, such as subsidy   | There has been an ongoing trend where many farmers are leaving out the agricultural sector. Hence, certain government supports are provided to dairy farmers to ensure their livelihood and avoid further decreasing number of farmers                       | Imposed | Regulatory and Economic Instruments | Coping             |
| High subsidies for ADP research and development, including cost-share scheme where 30-60% of total costs of the agriculture start-ups are subsidized by government and government encouragement for industry-research collaboration for ADP | Israel is referred to as the 'start-up' nation. Many start-ups are currently exploring the opportunity in R&D. This is amplified by decreasing arable land for agriculture in the country. Hence, the country wants to be the hub for future food innovation | Imposed | Economic Instruments                | Adaptive           |
| Government's price control to minimize the dairy's price fluctuation  | There has been an ongoing trend where many farmers are leaving out the agricultural sector. Hence, certain government supports are provided to dairy farmers to ensure their livelihood and avoid further decreasing number of farmers                       | Imposed | Economic Instruments                | Coping             |
| Government's decision to allocate 20% of its agricultural budget to ADP research and development  | Israel is referred to as the 'start-up' nation. Many start-ups are currently exploring the opportunity in R&D. This is amplified by decreasing arable land for agriculture in the country. Hence, the country wants to be the hub for future food innovation | Imposed | Economic Instruments                | Adaptive           |
| Government's promotion on public health and nutrition   | To improve the health and nutrition aspect in the country  | Imposed | Regulatory Instruments              | Transitional       |
| Government policy to regulate clear labelling for food safety regarding sodium, fat, sugar, etc.  | To ensure clear labelling for general food and to avoid mislabelling   | Imposed | Regulatory Instruments              | Coping             |

## Policies and amendments in USA

| <b>Content</b>   | <b>Context</b>  | <b>Process</b>                  | <b>Type</b>                                 | <b>Nature of Response</b> |
|--|---|---------------------------------|---|---------------------------|
| FDA regulation on Standard of Identity to enforce existing "imitation" labelling requirements against ADP and to codify FDA policies to limit the use of dairy terms   | Dairy defensive move with the argument for consumer protection, nutritional aspect of ADP, and dairy farmer protections | Proposal for amendment          | Regulatory Instruments                      | Coping                    |
| State-level laws to ensure the provision of plant-based alternatives at public institutions, such as hospital, jail, etc.  | To ensure accessibility for plant-based alternative products  | Already imposed in some states  | Regulatory Instruments                      | Transitional              |
| Federal Food, Drug, and Cosmetic Act to regulate that food shall be deemed to be misbranded if (a) false or misleading label (b) offer for sale under other name (c) imitation of another food (g) representation as to definition and standard of identity. | To ensure clear labelling for general food and to avoid mislabelling  | Imposed                         | Regulatory Instruments                      | Coping                    |
| USDA policy to regulate the application of "imitation of another food" labelling when the product is nutritionally inferior.   | To ensure clear labelling for general food and to avoid mislabelling  | Imposed                         | Regulatory Instruments                      | Coping                    |
| FDA regulation on standard of identity, including the definition of dairy, meat, and poultry products.   | To promote honesty and fair dealing in the interests of consumers   | Imposed, but under reevaluation | Regulatory Instruments                      | Transitional              |
| FDA request for modernization of standards of identity for dairy products.   | To review and modernize its regulations for standards of identity   | Under reevaluation              | Regulatory Instruments                      | Transitional              |
| DAIRY Pride Act that require non-dairy products made from nuts, seeds, plants, and algae to no-longer mislabeled with dairy terms, such as milk, yogurt, and cheese  | Dairy defensive move with the argument for consumer protection, nutritional aspect of ADP, and dairy farmer protections | Under reevaluation              | Regulatory Instruments                      | Coping                    |
| US House Committee on Appropriations' support to the R&D of alternative proteins   | To provide parity in funding for both traditional and ADP sectors   | On going process                | Economic Instrument and R&D and Development | Adaptive                  |

## Policies and amendments in China

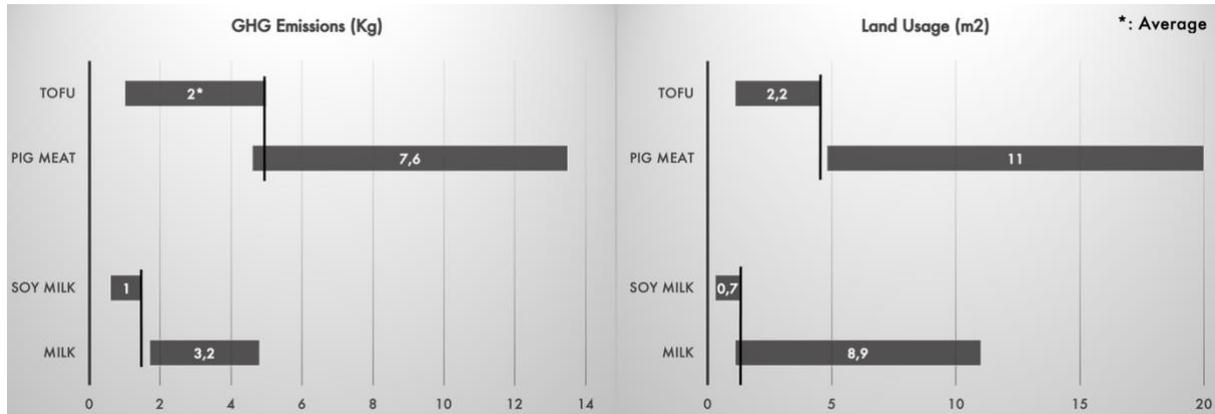
| Content  | Context  | Process | Type                   | Nature of Response |
|--|--|---------|------------------------|--------------------|
| Many regulations are on dairy national food safety standards, imported dairy products, domestic dairy products, labeling and claims for dairy products, obligation checklist for exporters of dairy products | Chinese dairy market has been one of the most desirable markets across the globe. The huge population and poor reputation of domestic dairy products has led to an enormous demand for overseas dairy. | Imposed | Regulatory Instruments | Coping             |
| MARA and other eight departments published the Opinions on Further Advancing the Rejuvenation of the Dairy Industry (the Opinions)   | To improve the productivity and efficiency of the traditional dairy industry as part of the government plan to enhance dairy consumption for nutritional reasons                                       | Imposed | Economic Instruments   | Coping             |
| SAMR published the draft Measures for Supervision and Administration of Food Labeling  | To ensure clarity in labelling   | Imposed | Regulatory Instruments | Coping             |
| Governmental support on increasing the productivity and efficiency on the soybean and other plant-based sectors  | To fulfill the rising demand for plant-based drinks and food that have been traditionally high in the country, partly due to the high lactose intolerance  | Imposed | Economic Instruments   | Adaptive           |
| Sanghai Declaration on "Double Protein Strategy"   | To accommodate the consumption and production of both traditional dairy and ADP in the country   | Imposed | Economic Instruments   | Adaptive           |
| Government's promotion on public health and nutrition  | To improve the health and nutrition aspect in the country  | Imposed | Regulatory Instruments | Transitional       |

## Policies and amendments in Singapore

| <b>Content</b>   | <b>Context</b>   | <b>Process</b> | <b>Type</b>            | <b>Nature of Response</b> |
|--|--|----------------|------------------------|---------------------------|
| SFA's approval on the commercialization of cell-cultured chicken   | Singapore has very little local agriculture production, hence Singapore is highly dependent on imports for its food requirements. As a result, Singapore's food laws, policies, and enforcement practices are decidedly focused on ensuring consistent foreign supply of safe food and agricultural products | Imposed        | Regulatory Instruments | Transitional              |
| SFA plans to develop a comprehensive regulatory framework to govern novel food production for human consumption  | Singapore has very little local agriculture production, hence Singapore is highly dependent on imports for its food requirements. As a result, Singapore's food laws, policies, and enforcement practices are decidedly focused on ensuring consistent foreign supply of safe food and agricultural products | On going       | Regulatory Instruments | Transitional              |
| The establishment of Singapore body Future Ready Food Safety Hub (FRESH) to accelerate food safety research, support food science capabilities, and enable regulatory responsiveness to speed up the commercialisation of novel foods. | The country aims to be the leader for sustainable food and agri-tech innovation  | Imposed        | Regulatory Instruments | Adaptive                  |
| Singapore's S\$100 billion plan to adapt to a climate stricken future, to future food R&D  | The country aims to be the leader for sustainable food and agri-tech innovation  | Imposed        | Economic Instruments   | Adaptive                  |

## Appendix B – Sustainability Aspects and ideology examples

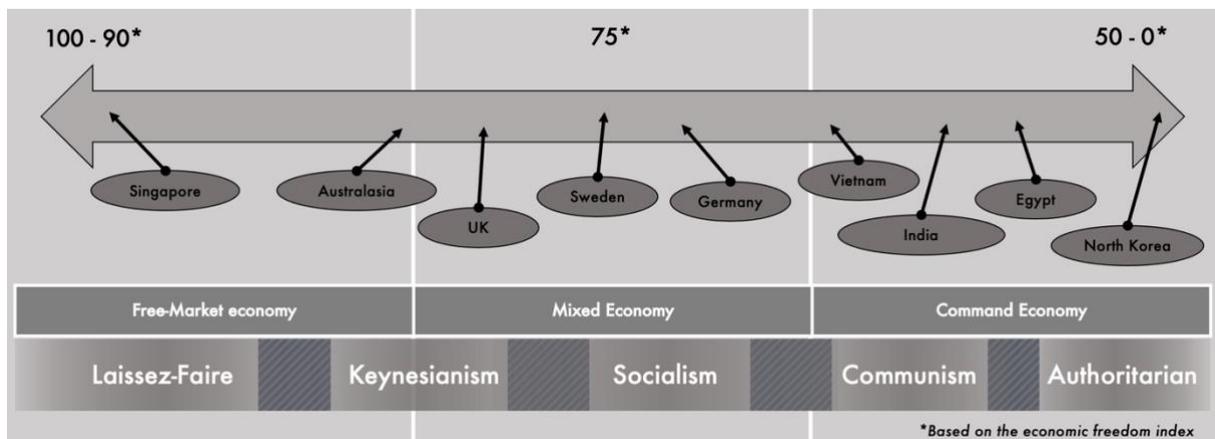
### Traditional versus alternative dairy products



Source: Own illustration, based on Poore & Nemecek (2018)

The above illustration shows the spread of sustainability in GHG and Land usage to produce 1000g of protein (top), or 1 litre of milk (bottom). As one can see, the gaps between the products are low. To conclude, previous argumentation has argued in favour to an undergoing industry transformation through sustainable disruption. However, the sustainability concerns are higher in developed countries, in which the crucial pillar of sustainability with regards to ADP is fragile.

### Representative countries according to their ideologies.

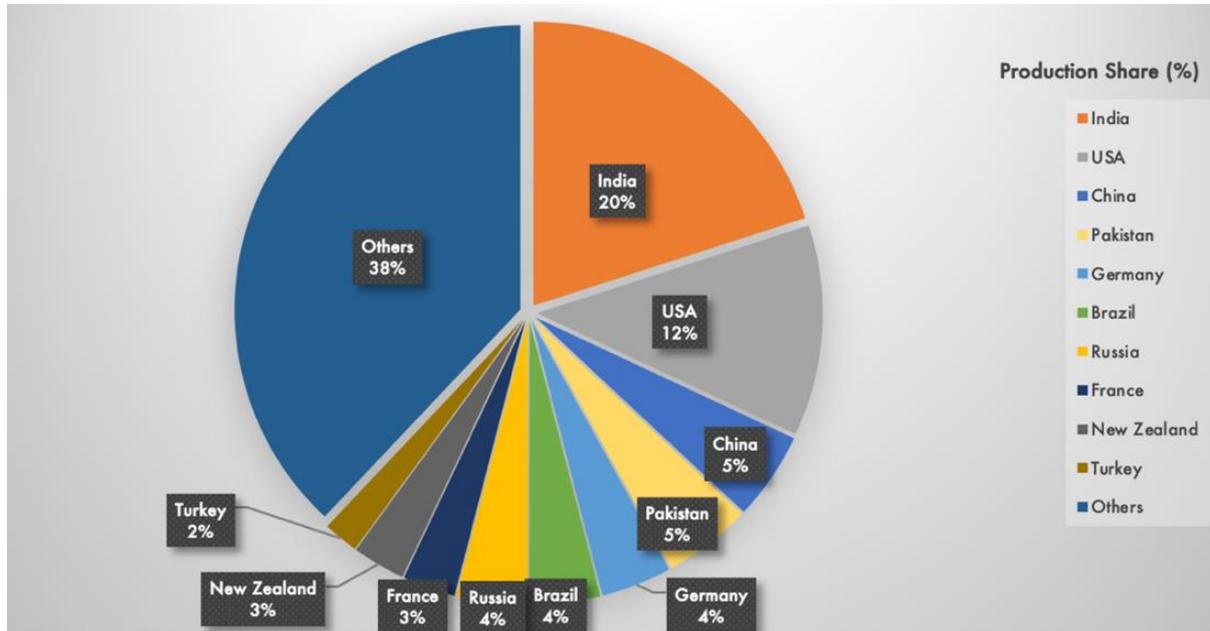


Source: based on Trentman, 1998; Index of economic freedom, 2021

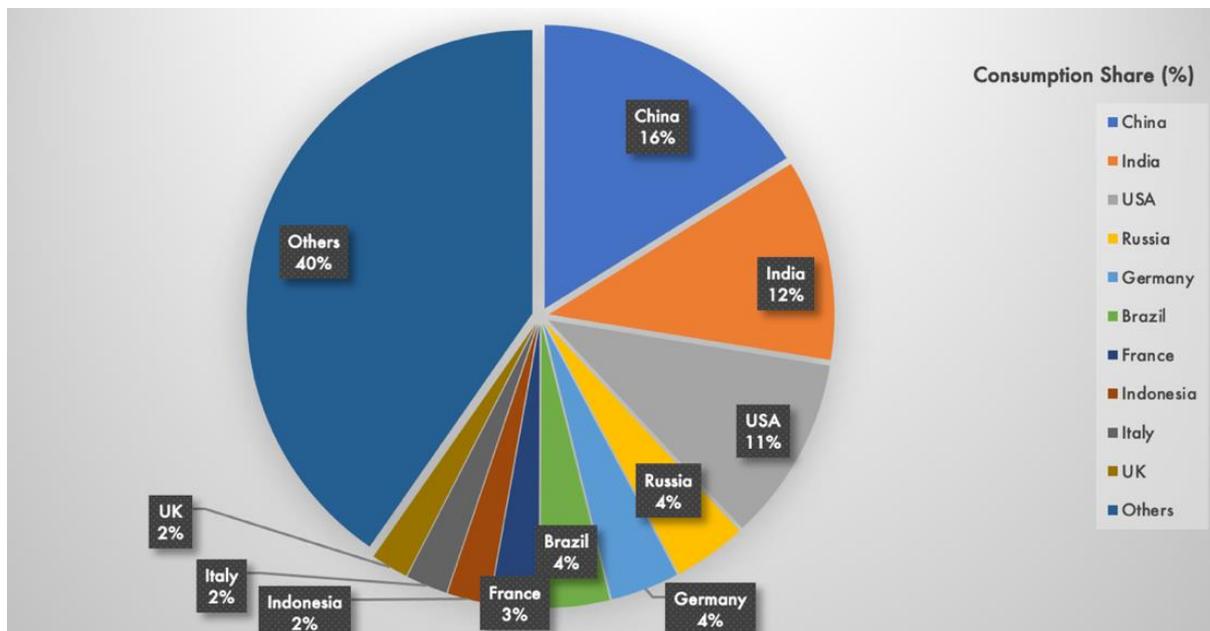
The above figure summarises the findings and compares the three economic political ideologies. The exemplifying countries were selected based on the economic freedom index and the countries' familiarity. Hereby, regions either with a strong tendency towards one cluster, or a residence in-between two ideologies were selected. Lastly, Petr's (1987) findings of purely mixed ideologies displays blurring lines. For example, countries following Keynesianism might reside in free markets, whereas others should rather be placed in mixed economies.

## Appendix C – Major Producing and Consuming Countries of Dairy Industry

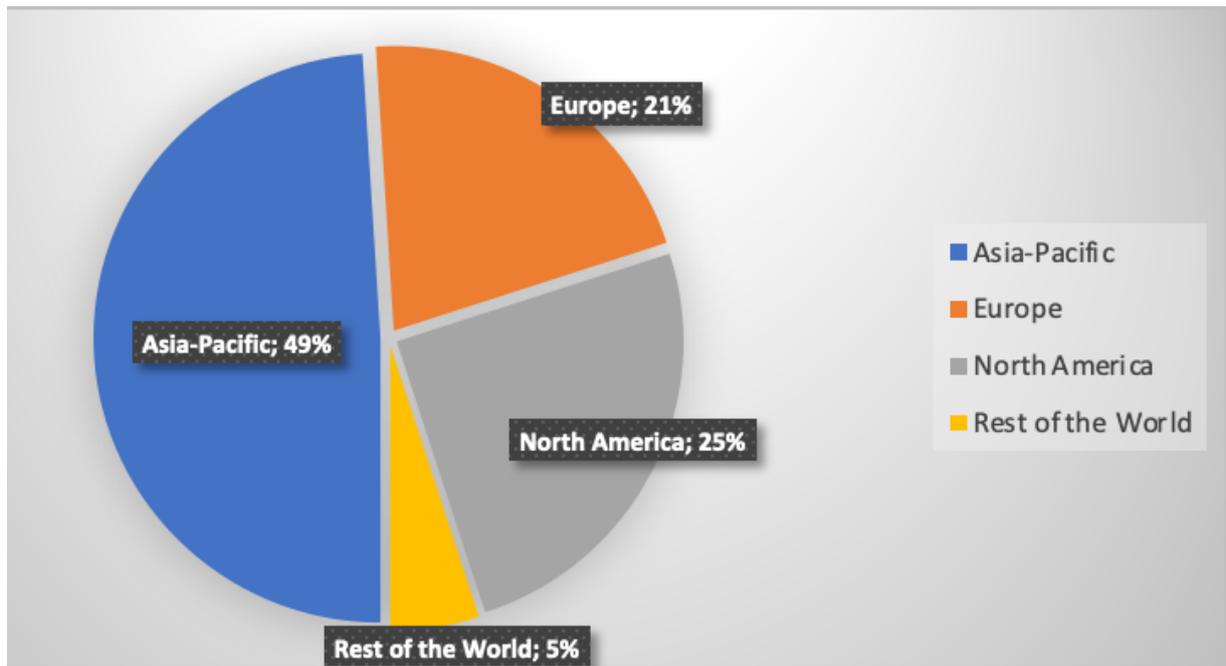
Market share for **production** per country (based on literature review)



Market share for **consumption** per country (based on literature review)



Market share for ADP per region (based on literature review)



## Appendix D – Interview Protocol

Step 1: Opening and thank you

Step 2: A brief intro about the thesis

“We are writing our thesis about the policy and regulatory development in different regions regarding the alternative dairy products, focusing on China, EU, USA, Singapore, and Israel. So, from this interview, we aim to identify the policy development in China's dairy industry and its alternative dairy products. Hopefully, this can help us to understand how this policy development will limit or accelerate the transformation within the sector.”

Step 3: Permission to record the interview

“So, before we start the interview, can I ask for your permission to record the interview? This is only for our note-taking purposes.”

Step 4: Interview

| Questions   | Topics   |
|---|--|
| <b>Respondent Profile</b>   |  |
| 1. Please tell us about your previous experience in policy development in [country]<br><i>Probes:</i> what roles and what areas/industries?<br><i>Follow up:</i> To what extent do you have insights on the current development of policy in [country]  | Relevancy of the informant background  |
| <b>Policy Making and Development in General</b>   |  |
| 2. Can you please explain what are the general local context and characteristics of policy making in [country]? Especially related to policies that address and affect industry players.<br><i>Probes:</i> How strong is the magnitude and influence of policies will affect certain industry and its players in [country]    | General local context and characteristics of policy making and development in different regions  |
| 3. In terms of the influence of societal demand on policy, can you please explain how strong are the impact of societal demand will influence policy in [country]?<br><i>Example:</i> We see there is a trend of ‘westernization’ of customers in China, in how far will this trend affect policy development in the country. | The influence of societal demand and trend on policy making and development in different regions |
| 4. Can you explain how are the relationship between policy makers and firms in general in [country]?<br><i>Probes:</i> How are the dynamics?  | The influence of policy on business  |
| <b>Policy Making and Development Regarding Sustainability and Environmental Issue</b>   |  |
| 5. When discussing about the trend of increasing concern on sustainability and environmental issue, can you please explain how is the general social perception on this issue both in [country]?  | General perception of people in [country] about sustainability and environmental issue           |

|   |  |
|---|--|
| 6. How does this perception differ compared to the appetite of the policy maker in viewing this sustainability and environmental issue?   | General perception of policy maker in [country] about sustainability and environmental issue |
| 7. Are you aware of any newly or will be imposed policy/regulations/other government programs in regard to sustainability and environmental issue in [country]?   | Policy mixes and its development on sustainability and environmental issue in general        |
| <b>Policy Making and Development in Dairy and Alternative Dairy Industry (note: only if interviewees have the expertise on the issue)</b>   |  |
| 8. What are the most recent policies and regulations that have been adopted or soon will be implemented in these regions regarding the dairy industry and the alternative dairy products?<br><i>Probes:</i> actors, content, context, and process<br><i>Probes:</i> What is the rationale and perception behind these policies and regulations? | Policy mixes and its development on dairy and alternative dairy industry?                    |
| 9. In how far did these policies and regulations change compared to the recent past?<br>10.   | Historical development of the policy   |
| 11. How have the industry players been responding to this policy/regulation/other government programs?<br>12.   | Influence of policy making and corporate strategy  |
| 13. What might the mid-term and long-term future policy development in dairy and non-dairy look like?   | Future development of policy in dairy and alternative dairy                                  |

Step 5: Closing, information on relevant contacts for follow up interview, ask for any anonymity/NDA request, thank you.

## **Appendix E – Initial email with potential interviewees**

Subject: Lund University School of Economics and Management – Research Project on Alternative Dairies and Policies

Dear, [name]

We hope this email finds you well. We are Dedy Sijabat and Nicholas Banneke, and currently finalising a master's degree in International Strategic Management at Lund University, Sweden. We are drafting our thesis about the policy and regulatory development in different regions regarding the alternative dairy products, specifically focusing on the USA, Europe, China, Singapore, and Israel.

Based on our initial research about your organization, [organization name] seems to have strong insights, expertise, and knowledge about the dairy alternatives industry, especially for plant-based alternatives. Moreover, we perceive your institution to be well-informed about the policy and regulatory development of the mentioned industry. As we are pursuing an overview about the ongoing development, both regional and global, we would be honoured to interview you and have your organisation as part of our information sources. As [position], we believe you can provide us with valuable information that can be relevant and useful for our research and analysis.

We want to gather knowledge and insights about the development of policies in the previously mentioned regions. Hence, we would like to structure the interview in a semi-structured way to give us more flexibility for posing potential follow-up questions where necessary. Nevertheless, the main discussion points during the interview are the following: 1) What are the most recent policies and regulations that have been adopted or soon will be implemented in these regions regarding the dairy alternative products? 2) What is the rationale and perception behind these policies and regulations? 3) What are the special facts or local contexts to consider when discussing and analysing these regions? 4) How far did these policies and regulations change compared to the recent past? 5) What might the mid-term and long-term future policy development look like?

Overall, we aim to map the policy development of dairy alternative dairy products in different regions. This subsequently aids to understanding how policy development will limit or accelerate the transformation within the dairy industry regarding alternative dairy products. Therefore, we will also base our discussion on initial findings from our desk research about the topic and hope the interview will provide us with further insights. We believe you may find our thesis beneficial for your own work, too, therefore we are more than happy to share it with you once it is completed. Also, we are solely interested in your knowledge and insights about the topic and thus, no technical questions and other sensitive information will be asked. Nevertheless, requests for non-disclosure agreements and anonymity will be also accommodated. We are conducting the interviews within the next 3 weeks, so please let us know if you have any time to talk and we can set up a meeting. The interview will take roughly 30 minutes to an hour. We understand if you don't have time and would be very thankful if you can redirect us to another colleague instead. We are really looking forward to hearing from you.

Many thanks, Dedy, and Nicholas

**Appendix F – A policy analysis framework by Walt & Gilson**

