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IFN Working Paper No. 1222, 2018

# **The Collaborative Innovation Bloc: A New Mission for Austrian Economics**

Niklas Elert and Magnus Henrekson

# The Collaborative Innovation Bloc: A New Mission for Austrian Economics

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*Abstract:* We argue that scholars in the Austrian tradition of economics should incorporate the notion of a collaborative innovation bloc into their study of spontaneous market order. We demonstrate how successful entrepreneurship depends on an innovation bloc of this kind, a system of innovation that evolves and within which activity takes place through time. The innovation bloc consists of five pools of economic skills from which people are drawn or recruited to form part of a collaborative team, which is necessary if innovation-based venturing is to flourish. The five skills are entrepreneurs, early- and later-stage-financiers, key personnel, and customers. Through real-world examples, we show how the application of the collaborative innovation bloc perspective could help make Austrian economics more concrete, relevant and persuasive, especially in regard to policy prescriptions.

*JEL Codes:* B53; D20; G32; L23; L26; O33.

*Keywords:* Austrian Economics; Entrepreneurship; Innovation; Institutions; Schumpeterian entrepreneurship; Spontaneous order.

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## 1 Introduction

In this paper, we show how Austrian economists can become more concrete regarding the innovation process and the institutions that enable that process while holding true to the school's realistic assumptions about human behavior and economic coordination in the spontaneous market order. To demonstrate this, we borrow from a Swedish research tradition labeled the Experimentally Organized Economy (EOE, see e.g., Eliasson 1996; see Johansson 2009 for a synthesis). At the heart of this school of thought is the notion that the entrepreneurial process that causes the market order to evolve is inherently collaborative: To pursue their innovative projects, entrepreneurs engage in cooperation with a number of actors, whose complementary skills drastically increase the probability that an innovation-based venture will be successful.

The actors are drawn from several skill pools, which together form what we call the *collaborative innovation bloc*. Competition between various collaborative teams will bring about an evolution of the collaborative innovation bloc and ultimately result in innovation and economic growth. This perspective holds, we believe, great promise as a means to strengthen the Austrian understanding of how innovations come about in a modern market order and how the institutional underpinnings of that order should evolve (or change) in order for an economy to achieve more innovation and prosperity.<sup>1</sup> In large measure, the institutional framework determines the incentives for people to acquire and utilize their skills. Due to the complementarity of skills, institutions may have a more substantial effect on innovation and growth than suggested by an analysis that focuses on a single actor (cf. Phelps 2007, p. 553).

By making the market order more concrete, suggestions on how policy and institutions should be tailored will also become more concrete and therefore more persuasive. After describing the *collaborative innovation bloc* in detail, we will demonstrate this by going on to identify a number of (quite concrete) institutions that foster the emergence of a collaborative bloc that is beneficial for innovation and economic growth. More importantly, however, our analysis shows a constructive way of thinking about

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<sup>1</sup> The EOE perspective shares many features with the more recent literature on entrepreneurial ecosystems (Stam 2015; Autio 2016) and the national system of entrepreneurship approach (Acs et al. 2014), but we can trace its roots back to the works of Swedish economists Johan Åkerman and Erik Dahmén; see Erixon (2011) and Dahmén (1970). While the other perspectives offer valuable insights, they seldom make a clear distinction between actors and institutions, and “the institutional variables that are used, such as technology absorption, gender equality, R&D spending, and depth of capital markets, are not institutional variables; they are outcomes resulting from the evolution of the economic system in a given institutional setup” (Braunerhjelm and Henrekson 2016, p. 101).

innovation and its relationship with economic policy. For instance, our analysis will make clear that even when financial markets are fully deregulated, other institutions, such as the tax system or rules governing pension savings schemes, may influence how well financial markets can cater to the needs of entrepreneurs.

## **2 The collaborative innovation bloc: a primer**

According to Boettke (2008), the “study of the market order is fundamentally about exchange behavior and the institutions within which exchanges take place” (cf. Buchanan 1979, pp. 17–37; Hayek 1976, pp. 108–109). In this order, the entrepreneur is a figure of particular importance, often seen as responsible for creating and expanding businesses by identifying and exploiting new opportunities (Kirzner 1973). Thus, the institutions governing the entrepreneur’s behavior are highly relevant for economic prosperity, as argued by, e.g., Boettke and Coyne (2009), who, in line with many others within and outside the Austrian tradition, highlight the importance of well-defined and enforceable private property rights, the rule of law, and a moral code of behavior that legitimizes these practices. However, exactly *how* these institutions affect the spontaneous market order and entrepreneurship remains somewhat of a mystery.

The problem is not exclusive to the Austrian variety of institutional economics. As noted by Rodrik (2007), most institutional work in economics can identify well-functioning institutions only at a high level of theoretical abstraction, while offering little in the way of concrete policy advice. We hope to lower the level of abstraction by introducing the collaborative innovation bloc and explicating its role for the realization of successful entrepreneurship. By demonstrating how actors drawn from each skill pool in the structure need to collaborate for an innovation-based venture to have a high probability of success, we show how the EOE perspective can enrich Austrian economics.

Many have thought it apt to describe market coordination as a matter of collaboration. For example, Rubin (2014) argues that economists of all stripes should become explicit about this fact, pointing out that core economic concepts, such as specialization and the division of labor, are about cooperation rather than competition. Adam Smith (1976 [1776], p. 23, 26) made a similar point when speaking about how he obtained his woolen coat through “the assistance and cooperation of many thousands.”

However, Klein (2012, p. 75) argues that the term cooperation is inapt for describing these activities, stating that if people “wish to praise the free market system as a system

of cooperation, [...] they had better be prepared to explain how two people who have no mutual consciousness, who know nothing of each other, can be said to be cooperating.” Here, he draws on Hayek (1988, p. 19), who maintains that “[c]ooperation, like solidarity, presupposes a large measure of agreement on ends as well as on methods employed in their pursuit. It makes sense in a small group whose members share particular habits, knowledge and beliefs about possibilities.” At the very least, a distinction must be made between what Klein (2012) calls mutual coordination between people who know each other and the concatenate coordination of the market – the latter being the type of coordination that Hayek and other sees as the chief economic problem to be explained (Hayek 1945; Knight 1951).

That being said, we must not lose sight of the fact that for innovation to take place and for entrepreneurs to be able to operate, they must *cooperate* extensively with others (in the sense of mutual coordination). In fact, we contend that a large measure of the entrepreneurial process, which guides the evolution of the spontaneous order (Buchanan 1979), would not take place were it not for the presence of the collaborative innovation bloc surrounding the entrepreneur. That said, each such collaborative team competes against other collaborative teams, which results in a competitive pressure that creates favorable macro-level outcomes.

An innovation is commonly seen as the implementation of a new or significantly improved product or process, a new marketing method or a new organizational method in business practices (OECD 2010). Furthermore, innovations always start out as ideas, and any entrepreneur striving to generate, identify, select and commercialize them must overcome innumerable hurdles, ranging from technological complexity and uncertainty to high initial investment costs and fierce competition. It is not surprising, then, that successful innovative entrepreneurship is rare (Hall and Woodward 2010) and that most new business ideas fail within a few years (Delmar and Wennberg 2010). To potentially be successful, the entrepreneur requires resources from a support structure that contributes both financial and human capital. If the skill pools in the collaborative innovation bloc are of a sufficient mass, they enable the formation of a collaborative team around an innovation. The competition between such teams is essential for the selection of successful innovations that can be produced and distributed on an industrial scale as rapidly as possible. Put differently, this system of selection involves the joint mitigation of two errors (Eliasson 2000, p. 220; cf. Sautet 2000).

The first type of error relates to spurious discoveries that occur when an individual has misread the data, partially or completely, and consists of allowing failed projects to survive for too long. Such errors tend to become systematically eliminated as “market experience reveals the unfeasibility of some (hitherto sought after) courses of action and the (hitherto unnoticed) profitability of other courses of action” (Kirzner 1997, p. 71). The second type of error is that of rejecting winners. Such missed opportunities often result from over-pessimism on the part of entrepreneurs or other actors. The two types of errors are linked and omnipresent. For example, accepting a project that one should reject makes it impossible for someone to use the resources that go into that project in an alternative project. Collaborations in the innovation bloc are essential for identifying and correcting such errors early and at the lowest cost possible.

The nature of knowledge, especially the fact that it is often tacit and non-communicable, makes the gathering of skills a daunting task even in the best of circumstances.<sup>2</sup> Nevertheless, these skills exist and are deployed in virtually all market-based economies. The number, variety, and character of actors determine the shape and intensity of the competition between collaborative teams as well as the incentives to learn, experiment and collaborate. Hence, these features are essential to the understanding of what type of innovative output will be realized, but in general, it may be said that a minimum critical mass and variety of skills is needed before innovation-based venturing can have a high probability of success. When employed successfully, the entrepreneurial meta-skill of gathering these skills makes it possible over time to turn an innovation into a good or a service that is produced and sold on an industrial scale, in competition with innovations created by other collaborative teams. This process generates economic growth in the *experimentally organized market economy*. It does not go against the standard Austrian account; instead, it complements it by fleshing it out and making it more concrete.

For now, we contend that collaborative innovation blocs emerge spontaneously in modern economic systems, provided that the right institutional conditions are at hand. However, ticking off the items on the usual institutional laundry-list – stable property rights, the rule of law, and so on – is seldom enough. Some bottlenecks are far less obvious and require better knowledge of the workings of the innovation bloc. In the next section, we will describe the characteristics of each skill in the structure in detail, with a

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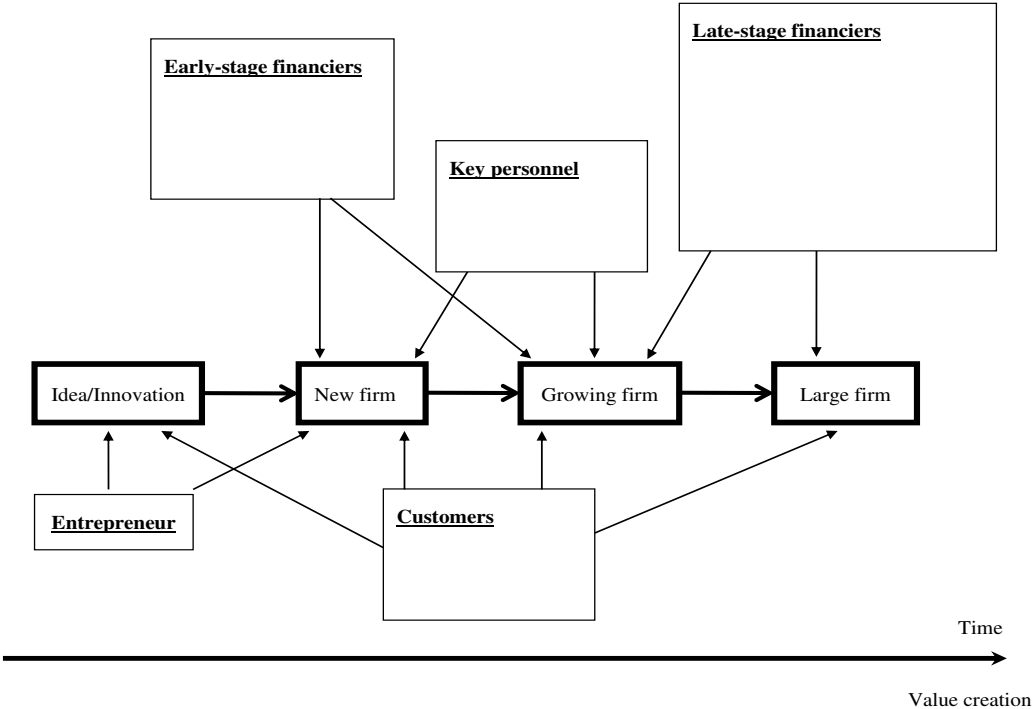
<sup>2</sup> Even the holders of knowledge in the skill structure may be unaware that they possess it or be unable to articulate it – even when they are able to use it in the right circumstances (cf. Pongracic 2009, pp. 55–56)



particular emphasis on how actors communicate such knowledge and how collaboration comes about.

Figure 1 provides a schematic overview of the structure and the collaborative contributions required over time for a new idea to translate into a growing firm, eventually reaching maturity (as described by, e.g., Fenn et al. 1995 and Gompers and Lerner 2001).<sup>3</sup> The skills in the bloc can be divided into five categories: the entrepreneur, key personnel, early-stage financiers, later-stage financiers, and customers.

Figure 1 The collaborative innovation bloc.



<sup>3</sup> This version is substantially updated and modified compared to Eliasson’s original contributions; it is trimmed in some respects but extended in other respects. See Elert et al. (2017) for an application involving seven competencies and Eliasson and Eliasson (1996) for a seminal application.

Even in this simplified form, the reader hopefully gets an idea of the complexities involved and the interconnectedness of the necessary skills. Certainly, the details of the commercialization process vary, but frequently, the process begins when the entrepreneur identifies a potential opportunity in interactions with demanding customers, which he or she then strives to develop into an innovation that can be commercialized. Generally, the early commercialization phase mainly involves entrepreneurs and, to a lesser extent, key personnel. In this experimental stage, uncertainty is high and venture financing critical.

Venture financing by early-stage financiers usually propels the project into a scale-up phase, in which conjectured entrepreneurial profits can be realized (that is, if the project makes it this far). At this stage, the entrepreneur requires a greater number of key personnel, often with highly specialized skills, while later-stage financiers assume responsibility for financing, which (depending on sector) may be substantial. Moreover, actors can work alongside each other or overlap during different phases.

In parallel, competitors begin to imitate the innovation if they perceive it to be promising, and the market grows in an operational scaling-up of activities, which is the result of differential growth and market selection (Metcalf 1998). Eventually, the process becomes stable (Witt 1996), and the market takes the form of a monopoly, an oligopoly or a competitive situation involving more actors. Where the process ends up depends on the outcome in the previous steps, but it is safe to say that organizational behavior, strategy, and business models will at this point have become relatively uniform and standardized. Entrepreneurial profits are often considered to be exhausted by this point, with only normal profits and normal risk remaining (Dopfer and Potts 2009). That said, the scope for innovation is by no means exhausted: Firms can, for example, introduce more efficient production and distribution methods or change the attributes of a good or a service to enhance its value.

### **3 The skills in the collaborative innovation bloc**

In this section, we describe the characteristics of each skill in the collaborative innovation bloc. We put particular emphasis on how knowledge is communicated between actors and how collaboration emerges. After describing the skills, we will briefly restate our argument, underlining the conclusions we have made so far.

### ***3.1 The entrepreneur***

The Austrian emphasis on the market as an open-ended process shaped by entrepreneurial discovery and learning has had a tremendous influence on entrepreneurship scholars (e.g., Shane and Venkataraman 2000; Minniti and Bygrave 2001). While Kirzner's (1973) emphasis on entrepreneurial alertness and the discovery of opportunities is undoubtedly important, so is the Schumpeterian view of the entrepreneur as a creator of new combinations of knowledge (Klein 2008).

At the same time, the EOE perspective highlights that to achieve the aforementioned objectives, the entrepreneur must collaborate with others – in fact, Schumpeter (1989 [1949], p. 261) argues that the entrepreneurial function “may be and is often filled cooperatively.” Most perspectives of entrepreneurship acknowledge this fact. Notably, the perspective of the entrepreneur as a persuader (McCloskey and Klamer 1995; Cosgel and Klamer 1990) highlights the importance of the entrepreneur formulating and conveying a vision and building trust among collaborators as well as backers. Likewise, there is the idea that entrepreneurs are jacks-of-all-trades: rather than being specialized, they require a breadth of skills to handle the variety of tasks they face (Lazear 2004).

Importantly, entrepreneurs need a clear idea of what skills they lack and how to procure them – that is, with whom they need to collaborate if they are to realize their projects. In fact, in a Hayekian (1945) world of tacit and dispersed knowledge, the entrepreneurial firm can be said to act like a knowledge-integrating institution. Production of any kind requires the complex integration of multiple types of knowledge, which cannot be accomplished by completely specified contracts or repeated market transactions. Hence, there is a need for organizations such as the business firm and, we argue, for the place of the entrepreneurial founder within a structure of complementary skills.

The view presented above helps us see that entrepreneurs regularly create new collaborative teams, both searching for and attracting the skills they perceive necessary to realize their projects. In this role, they do not only benefit from existing collaborative blocs, but are also essential for the creation of new blocs and the evolution of existing blocs. For example, an institutional infrastructure supporting entrepreneurship often emerges as a product of a critical mass of entrepreneurship in an industry or set of related industries (Stam and Laamboy 2012).

### ***3.2 Key personnel: specialists and professional managers***

The perspective of the firm as a knowledge-integrating institution, and of entrepreneurship as a meta-skill responsible for gathering the remaining skills in the structure, allows us to approach the category of key personnel from a somewhat novel perspective. This category ranges from professional managers to skilled specialists, production staff and front-line personnel, each of which contributes essential skills that the entrepreneur requires. Several factors determine whether they are employed or operate as independent consultants. The most obvious factor is perhaps that of transaction costs, which are thought to set the limits of vertical integration.

Coase (1937) famously described firms as islands of planning in a sea of market relationships. The reality is somewhat different. While a firm is planned and designed, in the sense that someone started it, its “evolutionary, unpredictable and non-determinate process of growth and change will lead to a firm structure which is at least to some degree a consequence of human action, though not of human design” (Pongracic 2009, pp. 46–47). Similarly, the Hayekian knowledge problem within firms is consistently present, and it increases with the size of the organization (Foss 1997). Due to its nature, entrepreneurs and managers cannot centralize the tacit knowledge held by employees, but in order to survive, firms must successfully coordinate their internally dispersed knowledge. At the same time, the entrepreneur must contend with the knowledge problem of the market. In other words, he or she faces a double Hayekian knowledge problem (with respect to markets and employees), and in times of firm growth and development, this problem is of particular significance since the knowledge held by employees is then of the utmost importance (Sautet 2000).

To a large extent, this means that entrepreneurs and managers act as collaborators rather than as planners. At the heart of the issue is to allow the most informed employees to act upon the knowledge only they possess, in order to promote intra-firm learning and local discoveries (Foss 1997). This, in turn, will give firms the greatest ability to react quickly to change and encourage innovation. While decentralization risks yielding poorer incentives and efficiency compared to hierarchy, its benefits are greater flexibility and innovativeness (the creation of new knowledge), which, in times of rapid market change, may be too costly to ignore. Entrepreneurs and other firm actors must determine this trade-off themselves (Pongracic 2009, pp. 69–70).

With regard to the skills that key personnel contribute, their relative importance is difficult to determine. R&D teams and technical specialists are seen as key to innovation in much of the mainstream entrepreneurship and economics literature. Innovative activities are considered the result of systematic and purposeful efforts to create new knowledge by investing in R&D, followed by commercialization (Audretsch et al. 2006; Chandler, 1990). From our perspective, the ancillary idea that more R&D spending is the tool that will promote innovation reveals an overly mechanical view of how the economic system works, and it constitutes an overemphasis on R&D relative to other means of innovation, such as learning-by-doing, networking and combinatorial insights (Braunerhjelm 2011). By contrast, the Austrian perspective, if anything, seems to underemphasize the role of R&D, mainly because of its focus on Kirznerian arbitrage. The truth of the matter is likely to be found in between these extremes.

As Bhidé (2008) argues, high-level ideas, once produced, are readily available to anyone. Hence, tacitness does not hinder such ideas from being picked up by outsiders. Turning them into a commercially viable product is another matter, and it does not involve much in the way of high-level R&D; therefore, although high R&D spending can be a necessary component of a thriving economy, it is far from sufficient. Bhidé (2008, pp. 150–151) goes on to state that

the commercial success of innovations turns not just on the attributes of the product or know-how, but on the effectiveness and efficiency of the innovator's sales and marketing process. This point is utterly obvious to those in the business world.

In addition, as an entrepreneurial venture grows, professional managers with the expertise of taking the business into a mature stage characterized by large-scale production and distribution become essential. A core issue is that of mitigating the internal Hayekian knowledge problem that confronts a large firm (Sautet 2000) and creating common rules and shared meanings that facilitate the discovery, exploitation, and sharing of local knowledge while also preventing misuse and conflict (Ghoshal et al. 1995). The entrepreneur can possess such skills himself, but when he does not and is unable to perceive that these skills are lacking, venture capitalists and other financiers may have to take matters into their own hands and replace the current management, as discussed below.

In *Table 1*, we summarize the key personnel categories of an entrepreneurial venture.

*Table 1* Key personnel categories.

<b>Agent</b>	<b>Role</b>
Experienced managers	Increasingly important as a firm grows.
R&D specialists	Not quite as important as commonly believed.
Sales/marketing specialists	Crucial for spreading the innovation on an industrial scale.

### ***3.3 Early-stage financiers***

While Austrian economists probably go too far in underemphasizing the importance of R&D, they do have a point when noting that “while knowledge is a limit, capital (the available amount of savings) is a narrower limit” (Rothbard, 2009 [1962], p. 542). High-level ideas, once produced, may be readily available to anyone, but they can be employed in production only if there is sufficient (physical and financial) capital to put them to use. Therefore, financing is of crucial importance in the innovation bloc; we differentiate between early-stage and later-stage financiers since the needs of a new, high-risk venture are quite different from the needs of a mature firm. With few exceptions, external equity financing is necessary for any entrepreneurial firm to develop and grow into a significant industry player. This is particularly likely in industries and in times characterized by rapid technological change. Furthermore, if network effects can enhance the industry and the value of the innovation, rapid growth financed by external equity becomes paramount for securing a leading position.

This is not to deny that the incipient phase is often financed by the founder’s assets, possibly complemented by loans from family and friends. Fairly soon, however, more capital is likely needed, and debt finance is unavailable because of the high risk and typically negative cash flow. Experience shows that at this stage, input from business angels can become instrumental. In addition to contributing financial resources, they provide tight screening and close monitoring of the firm’s progress, which markedly reduces moral hazard problems (Landström and Mason 2016). VC firms, which rarely participate in the earliest stages of the development of an innovative firm, would have far fewer companies to choose from were it not for the earlier contributions by business angels.

VC firms are limited partnerships that raise their funds from institutional investors. Institutional investors enter into an agreement with a VC firm as limited partners, and the senior managers of the VC firm act as general partners. The lifetime of such partnerships is pre-determined (typically between eight and ten years), and while they supply some 99

percent of the capital, the limited partners play no active role in the management of their investments. In addition to an annual management fee, the general partners receive a sizable share of any future capital gains (typically 20 percent above the so-called hurdle rate), an arrangement that provides high-powered incentives for the general partners. VC firms then convert high-risk opportunities to a more acceptable risk level through portfolio diversification. As a result, they can align the incentives of all three agents: investors, VC firms, and founders.

The VC function is often performed by individuals with extensive experience in the industry in which they invest (Busenitz et al. 2014). They identify entrepreneurs and their projects, determine whether and how much to invest and decide how the investment should be valued. Importantly, they also contribute critical skills to the entrepreneur, such as management expertise and market knowledge, and access to their business networks. If need be, they can also enforce change and appoint new management better equipped to lead the company.

From the perspective of the entrepreneur, it is crucial that equity financing be offered at a reasonable cost so that he or she retains a sizable ownership share despite raising external equity. VCs know that they must strike a balance between demanding as high an ownership share as possible and avoiding impairing the incentives of the founder and other key personnel whose skills and continued engagement are crucial for the future development of the firm. Moreover, they need to make credible that they will not exploit their position to hold up the founder at a later stage if it becomes apparent that the venture is highly likely to become successful (Malcolmson 1997). Such credibility is achieved by the fact that such behavior would damage the reputation of the VC firm.

Venture capitalists often take on the role of mentor to the entrepreneur (MacMillan et al. 1989), where learning and the exchange of knowledge and skills lie at the heart of the collaboration between early-stage financiers and entrepreneurs. Thus, venture capitalists become crucial to the entrepreneur's formulation and revisions of plans related to the entrepreneurial project. A relationship built on trust and reciprocity may provide a means through which each party obtains optimal access to the other's knowledge (De Clercq and Sapienza 2001). The relationship itself may thus be considered a specialized resource that generates new knowledge (Madhok and Tallman 1998) and, ultimately, what Dyer and Singh (1998, p. 662) call supernormal profit, which the partners can create only through their joint contributions.

While a venture capitalist may benefit from an entrepreneur’s alertness to unexploited opportunities or ability to combine new resources, the entrepreneur may benefit from a venture capitalist’s reputation or access to valuable networks. A varied and competent VC industry is, therefore, a crucial aspect of the early-stage selection machinery of the innovation bloc.

Table 2 summarizes the different agents that may be involved in early-stage financing, whether they have an active role in the investment decisions and governance of the firm, where the funds come from, and who the final beneficiaries are.

Table 2 Early-stage financiers.

<b>Agents making investment decision/Investors</b>	<b>Active or passive</b>	<b>Source of funds</b>	<b>Final beneficiaries</b>
Founder(s)	Active	Own assets, retained earnings	Private individuals
Family and friends	Passive	Private financial savings	Private individuals
Business angels	Active	Own wealth from previous entrepreneurial venturing	Private individuals
Venture capital firms	Active	Institutional investors + small share from general partners	Mostly current and future pensioners and savers

Note: Active or passive describes whether the agent contributes actively to the governance of the firm.

**3.4 Later-stage financiers**

Early-stage competent equity financiers are rare, especially outside the high-tech sector. Moreover, to incentivize the few who do exist, well-functioning exit markets that lower the risk for VC firms by increasing the liquidity of their assets must be in place to enable them to unload their investments when their operation has run its course (Eliasson 2000). Such markets are also crucial for entrepreneurs: Further large equity infusions are typically required if they are to proceed from the early uncertain venture phase and reach a stage where scale economies can be reaped through efficient production and distribution and eventually turn a venture into a sizable firm.

Actors in secondary (exit) markets have similar skills and carry out similar functions as venture capitalists in terms of financing and the transmission of knowledge and skills, but this selection occurs at a later stage, when entrepreneurs and venture capitalists want to exit from their investments. Hence, these new actors evaluate firm performance, assess whether there are potential profits in assuming control and replace the entrepreneur and top management in the case of sustained inferior performance. This is not an uncommon type of plan correction. After all, if the person who errs is unable to perceive the error and



is not removed from the steering wheel, a more alert or creative competitor may bid resources away from the firm and correct the error, to the benefit of everyone (cf. Mises 1981 [1922]).

Today, a trade sale – selling the firm to another firm, usually a firm in the same industry – is the most common way of exiting. In this case, full control over the firm is handed over to the buyer, and the entrepreneur/founder leaves the business with substantial financial assets. These assets make it possible for him or her to start new firms or act as a business angel or venture capitalist. A trade sale is likely an indication that some crucial skill is lacking in the firm in its existing form, making an independent scale-up of its operations unfeasible.

Traditionally, wealthy industrial families have controlled large firms. Frequently, they do so with the help of mechanisms such as dual-class shares and pyramiding, which give them control exceeding their actual equity share (Morck 2005). Sometimes, such control is exercised through a listed closed-end investment fund, which acts as a blockholder specialist of large listed firms. Owner activists are another type of agent, who, by means of a sizable ownership block in public firms, prompt value-enhancing strategic changes in mature firms. Owner activists raise money from pension funds and other institutional investors on terms similar to the ones used by venture capitalists.

While VC firms are early-stage financiers, buyout firms fill a similar function in later funding stages – for instance, if the firm does not become public through an IPO or if the firm becomes delisted because the buyout actors reckon that they would be able to create more value if the firm became private again. Buyout firms are structured like VC firms, and the relevant agents are incentivized in the same way, although funds and investments are generally much larger. Evidence suggests that buyouts lead to a reallocation of resources to more productive uses (Tåg 2012), partly by bringing in better knowledge of management practices (Bloom et al. 2009).

In addition to these investors, who take an active part in or wholly control the governance of the firm in which they invest, there are passive investors, such as pension funds and open-ended stock market funds as well as physical persons who own listed shares directly. Such “gray” capital is usually invested with the premise that a company should follow the market trend; this is sound behavior for actors wishing to minimize their risk, but it is doubtful that it will engender radical innovations (Erixon and Weigel 2016, p. 63). That said, each owner category in the secondary market has a role to play in the

collaborative innovation bloc. For example, whether active owners in secondary markets will act forcefully depends, in no small measure, on whether they can expect an infusion of passive capital if the firm develops well.

Hence, the actors in exit markets come in multiple shapes, as summarized in *Table 3*. The table also indicates whether these actors take an active part in the governance of the firms in which they invest, where the funds come from, and who the final beneficiaries are.

*Table 3* Later-stage financiers.

<b>Agents making investment decision/Investors</b>	<b>Active or passive</b>	<b>Source of funds</b>	<b>Final beneficiaries</b>
Wealthy individuals/families	Active	Wealthy individuals/families	Private individuals/families
Closed-end investment funds	Active	Control bloc held by family plus equity investors	Controlling family and other equity holders
Stock-market activists	Active	Institutional investors + small share from general partners	Current and future pensioners, savers
Buyout firms	Active	Institutional investors + small share from general partners	Current and future pensioners, savers
Competitor/trade sale	Active	Own funds, retained earning	Owners of buyer
Institutional investors	Passive	Pension plans, open-ended stock-market funds	Current and future pensioners, savers
Savers investing in stock-market portfolio	Passive	Private financial savings	Individual savers

*Note:* Active or passive describes whether the agent contributes actively to the governance of the firm.

### **3.5 Customers**

Entrepreneurs govern the temporal allocation of the existing resources in a modern economy; they decide whether to engage in an intertemporal reallocation of resources away from the production of consumer goods in the near future and toward the more roundabout production of capital goods that will yield consumer goods in the more distant future (Manish and Powell 2014; cf. Böhm-Bawerk 2010 [1891]). In doing so, however, they are not governed by their own time preferences but by those of consumers.<sup>4</sup> While only the sellers of goods and services of consumer goods are in direct contact with consumers, they transmit the orders received from the public to everyone engaged in higher-order production (Mises 1998 [1949], p. 270).

<sup>4</sup> Intertemporal coordination – producing the right consumer goods at the right time – is facilitated by the market’s price system, which communicates the time-preferences of consumers to entrepreneurs, helping to inform their decision of how to allocate resources intertemporally.

Hence, consumers are the ultimate arbiters of an innovation's success (and thus make the final selection), but they hardly even appear in the cast in most accounts of innovation. The omission is regrettable, according to Bhidé (2008), who asserts that the benefits of lower-level venturesome consumption often remain in the country where it occurs. A nation's "venturesome consumption" – the willingness and ability of intermediate producers and individual consumers to take a chance on and effectively use new know-how and products – may be as crucial as its capacity to undertake high-level research.

That being said, it is impossible to know the demand for a new good or service in advance. Frequently, entrepreneurs face a daunting task in persuading potential buyers that what they are offering is worthwhile. Usually, however, the role of alert and interested customers is essential to the supply of innovative products: A sophisticated, active demand is a *sine qua non* for industrial success and the emergence of a well-functioning collaborative innovation bloc (Porter 1990). This is not surprising, since modern markets for industrial goods and services are typified by open-ended relational contracts and long-term demand-supply relationships between business partners who know each other (Kasper et al. 2014).

Especially in the early stages, *demanding collaborators* function as particularly important sources of information regarding consumer needs and preferences, provided that they are representative of a large group of customers. Sometimes, they even act as strategic partners who take an active part in the development and commercialization of products, thus having a decisive influence on the development and design of new products (Bhidé 2008, p. 27). This user role is prevalent in industries that produce technical appliances and scientific instruments (von Hippel et al. 2011). Large enterprises rich in capital can also function as competent venture capitalists and finance product development. They often play this role when qualified venture capitalists are absent, but this substitution is imperfect because it restricts such financing to technologies close to those of the existing industry (Eliasson 2000). Radical innovations are unlikely to come about in this manner.

The key categories of customers are summarized in *Table 4*.

Table 4 Customers.

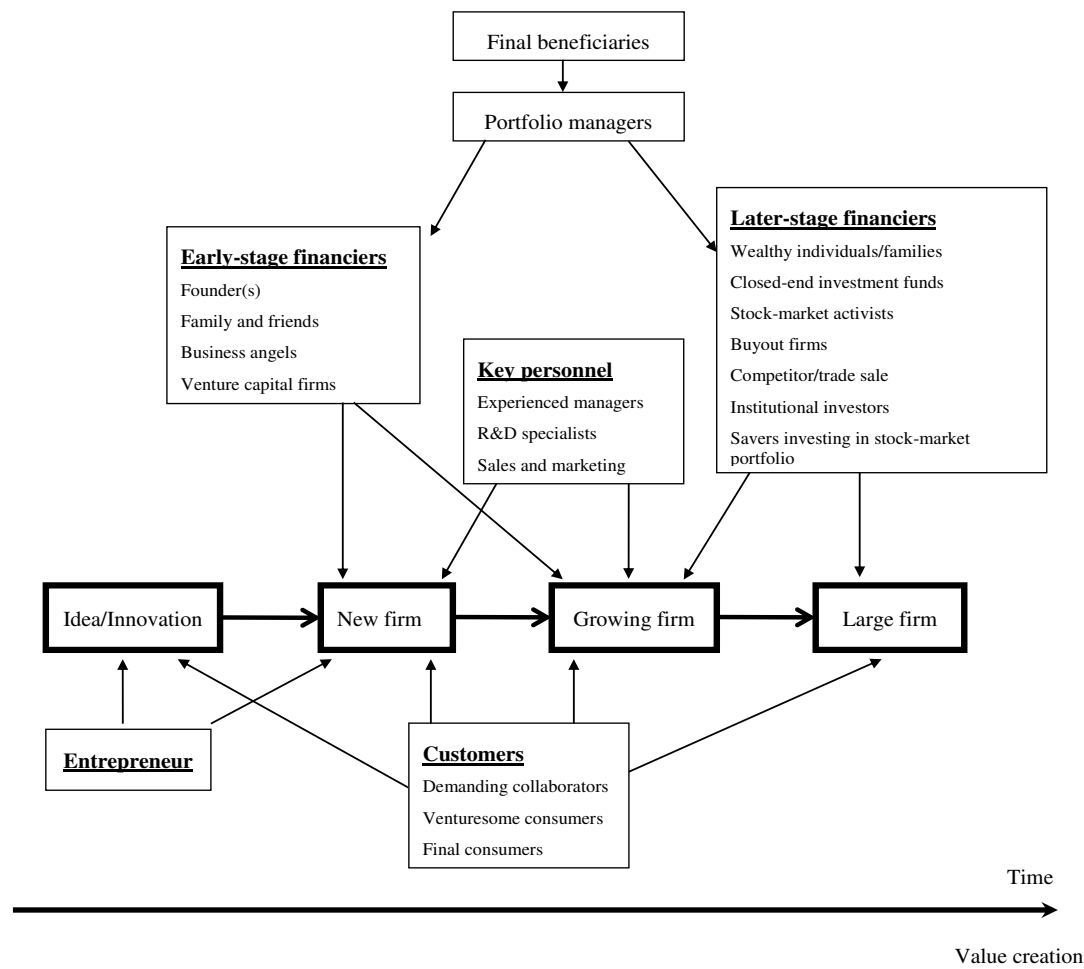
<b>Agent</b>	<b>Role</b>
Demanding collaborators	Crucial role as source of early-feedback and sometimes of finance
Venturesome consumers	Risk-taking consumers whose feedback is essential to the plan adjustment of an innovative venture
Final consumers	Make the final selection, choose between saving and consumption

### ***3.6 The collaborative innovation bloc – a detailed overview***

Figure 2 offers a more detailed version of the collaborative innovation bloc, summarizing the insights from this section. We now observe the vital interplay between final beneficiaries and the actors in the first and secondary markets of financing as well as the main categories of key personnel and customers. For innovation to have a high probability of reaching its full potential, the collaborative innovation bloc must acquire sufficient size and depth to reach a critical mass, i.e., have sufficiently large pools of each skill from which actors can be recruited to fulfill each function in the collaborative team. A lack of requisite skills or an important actor category may significantly impede or even prevent the collaborations from taking place.

Part of what it means to be an entrepreneur is to be able to gather these other skills and productively combine them. However, this task is arcane for any individual without the necessary breadth and depth of the collaborative innovation bloc. This is where economic policy and the institutional framework underpinning the innovation bloc come into play. We turn to this issue in the following section.

Figure 2 The collaborative innovation bloc – a detailed overview.



Note: Financing by founders (using their assets or retained earnings) and by passive individual and institutional investors (in either phase) are not included in the diagram.

## 4 The EOE perspective and institutions

Silicon Valley stands out as an example of a geographical area dense with collaborative innovation blocs, where all the necessary actors are present and actively contribute to the activation and commercialization of scientific discovery. An important question is whether such an innovation bloc can only emerge spontaneously, as a result of the actions of entrepreneurs and other actors, or whether it can be designed by policymakers, at least to a degree. The short answer is that it depends on the initial conditions faced by the actors that could potentially comprise the collaborative innovation bloc. These initial conditions are seldom close to what can be labeled optimal; a central role for policy is therefore to remove bottlenecks that hinder the emergence of a sufficient mass and variety of one or several skills in the structure.

The protection of private property rights, as well as the rule of law and a high level of trust, are relevant for all actors in the innovation bloc and the market process more broadly. Deficiencies in these factors negatively impact all agents in the innovation bloc. Other institutions are more skill-specific; they mainly affect the broader innovative system through their effect on one particular skill.<sup>5</sup> Below, we illustrate how the innovation bloc can be used systematically as a reliable foundation to identify the institutional bottlenecks that must be removed for more innovative entrepreneurship to take place and to increase its payoff by facilitating its subsequent scale-up. The primary strength of the approach is that it is actor centric and makes the conditions for the actors on the ground its starting point.

### *4.1 Entrepreneurs: the effect of taxation*

When pondering the determinants of the supply of entrepreneurship, it is important to reckon with Baumol's (1990) notion that core entrepreneurial talents are used to maximize individual utility, not social welfare. Hence, the rules of the game or the institutional setup gives rise to a "social structure of payoffs," which in turn determines whether entrepreneurship is allocated to productive, unproductive or destructive purposes. That being said, what seem to be non-productive forms of entrepreneurship are sometimes best considered second-best *productive* responses to suboptimal institutions (Douhan and Henrekson 2010; Elert and Henrekson 2016, 2017; Lucas and Fuller 2017).

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<sup>5</sup> Discussing these issues in detail is beyond the scope of this paper. We refer the reader to a book in which we have done just that (Elert et al. 2017) with respect to the collaborative innovation bloc in the U.S. and the European Union.

Taxes are of immense importance for entrepreneurship, but the fact that no specific tax on income from entrepreneurial effort exists in practice complicates matters. Entrepreneurial income is taxed in several different forms, notably as labor income, business income, current capital income, or capital gains. These taxes may affect entrepreneurial activities differently.

A high tax rate on business profits discourages equity financing and encourages debt financing if interest costs are tax deductible (Huizinga et al. 2008). Since debt financing is less costly and more readily available to larger firms, high corporate tax rates coupled with tax-deductible interest payments disadvantage potential entrepreneurs (Davis and Henrekson 1999).

Furthermore, the return on entrepreneurship largely accrues in the form of dividends and capital gains from ownership stakes in the firm. A high tax rate on dividends punishes new ventures, locks in retained earnings, and traps capital in incumbent firms, thereby obstructing the capital flow to the most promising projects (Chetty and Saez 2005). That said, most of the economic return from successful high-impact entrepreneurial firms accrues to owners in the form of a sharply increased value of their shares rather than as dividends or interest payments to the owners. Thus, the taxation of capital gains on stock holdings greatly affects the incentives of potential high-impact entrepreneurs and their (equity) financiers (Cumming 2005; Da Rin et al. 2006). Differences in the standard tax rates on dividends and capital gains among developed countries are vast, but there are also country-specific, highly idiosyncratic divergences from these standard rates (Grant Thornton 2016).

Finally, tax rates and tax rules applying to the income of key personnel and early-stage financiers is of great importance for the prospects of entrepreneurs to recruit the right people and raise the necessary capital to realize their vision. We discuss these tax effects in the following two subsections.

Small firms, individuals' startups, public markets, angel investors and external equity played essential roles for financing innovation and R&D projects as early as the 18<sup>th</sup> and 19<sup>th</sup> centuries (e.g., Lamoreaux and Sokoloff 2007; Bakker 2013). In those days, taxes on entrepreneurship were negligible. The trend gradually changed in the 20<sup>th</sup> century as innovation shifted toward in-house R&D within large, mature firms. An important factor was the advantages enjoyed by mature incumbents in financing R&D using retained earnings, cross-subsidization and internal diversification. During this era, large

corporations were seen not only as more efficient producers but also as the leading engines of technological change.

By the 1970s, effective tax rates on business income came to differ tremendously by source of finance and ownership category in rich countries. Debt was the most tax-favored form of financing, and new equity issues the most penalized. Direct business ownership positions (by individuals and families) were taxed much more heavily than other ownership categories. The wave of tax reforms that swept the OECD in the 1980s reduced these differences (Jorgenson and Landau 1993). The tax reforms likely paved the way for a fundamental change in the industrial organization of innovation.

The late 1970s saw a resurgence of entrepreneurship and external finance of industrial R&D at the expense of large incumbents, particularly in the U.S. (Audretsch and Thurik 2000; Mowery 2009). Startups increased their share of R&D, and VC emerged as a leading source of finance for technological innovations. Researchers have mostly attributed this break with previous trends to a reduced importance of economies of scale driven by technological change and consumer preferences. Piore and Sabel (1984) famously dubbed this change “the Second Industrial Divide.”<sup>6</sup>

These explanations are valid but not exhaustive. Tax policy also powered the increased importance of startups and external equity relative to mature incumbents. Owner-level taxes are less critical for mature firms using retained earnings as the marginal source of finance. By contrast, taxes on capital gains and stock options matter more for entrepreneurial firms relying on the human capital of key employees and the infusion of equity from external investors. It is likely that tax policy helps explain the structural shift back toward more “Schumpeterian” innovation and entrepreneurship in recent decades.

#### ***4.2 Key personnel: labor market regulations and wage-setting institutions***

The EOE perspective shows that the diffusion of innovations hinges critically on the movement of skilled people. Hence, if the labor market does not work like a market, one can expect little radically new industry formation or innovation. In that respect, licensing and other overly extensive regulations may curb the rate of innovation and hamper productive entrepreneurship (Kleiner 2006). Today, Europe has over 5,000 regulated professions involving over 50 million people, and according to the European Commission

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<sup>6</sup> For an overview of studies providing corroborating evidence on these points, see Wennekers and Thurik (1999) and Carlsson (1999).



(2015, p. 7), “many of these regulations are now disproportionate and create unnecessary regulatory obstacles to the mobility of professionals, lowering productivity”. We can also note substantial cross-country differences in labor market regulations and wage-setting institutions in developed economies, especially between Anglo-Saxon countries and Southern European countries (Elert et al. 2017). These differences drastically affect the supply of key personnel to the innovation bloc.

Employment protection legislation (EPL) increases the opportunity cost that prospective employees face in moving to a high-risk startup (Ho and Wong 2007; van Stel et al. 2007), and it also increases the entrepreneurial firm’s recruitment cost. Labor security mandates also fall more heavily on younger, smaller, and less capital-intensive employers – categories in which entrepreneurial firms are overrepresented – and entrepreneurship is higher in countries in which hiring and dismissing employees is relatively easy and inexpensive (Niehof 1999; OECD 2003; van Stel et al. 2007). This is likely because severance payments and strict regulations governing dismissals keep entrepreneurs from adjusting their workforce in response to market fluctuations and changes in required skills, thereby increasing the risk of their projects (Audretsch et al. 2002).

The Anglo-Saxon countries stand out as having the least stringent EPL even though most other countries in the EU have liberalized their legislation for permanent employment in recent decades (Skedinger 2010). Overall, permanent and temporary employment legislation remains quite strict in most Mediterranean and Continental European countries. With regard to temporary contracts, Sweden and Germany stand out for their substantial liberalization over the past 20 years; notably, these are two of the top-performing EU countries in terms of employment (Elert et al. 2017). However, while less stringent legislation for temporary employment contracts enables an essential channel for job creation, it is a second-best solution: A large discrepancy in the degree of protection between permanent and temporary contracts offers a comparative advantage to low-skill industries in which employees are highly substitutable. Such industries tend to be less innovative and have lower productivity.

The extent to which benefits (health insurance, pension plan) relate to current employment matters greatly. If the tie is strong, the opportunity cost of leaving a safe job in an incumbent firm can be prohibitive. Decoupling such benefits from employment would increase labor flexibility and lessen the risk that workers and potential

entrepreneurs become “trapped” in large companies by reducing fears of losing adequate health insurance and other employment benefits.

Finally, there is considerable variation across industrialized countries as to where wages and other components of the employee remuneration packages are determined. Notably, the proportion of employees covered by collective bargaining in the 28 EU states plus Norway varies immensely.<sup>7</sup> In addition, the room for granting stock options as a means to incentivize people by letting them have a share of the future capital value they have been hired to create varies greatly across countries.

In summary, all these factors affect the supply of key personnel to the collaborative innovation bloc. Furthermore, several institutional complementarities come into play, making it doubtful that policy reforms made in isolation would work. To improve the supply of key personnel, policymakers should not only remove onerous EPL but also design social security institutions that enable the portability of tenure rights and pension plans as well as a full decoupling of health insurance from the current employer.

#### ***4.3 Early-stage financiers: the Silicon Valley case***

The seed to today’s Silicon Valley was sown in the mid-1950s, when William Shockley, the inventor of the transistor, left Bell Labs in New York to start a firm to develop and produce silicon transistors. He decided to locate the firm in Palo Alto, where he grew up, and where the closeness to Stanford University meant access to highly qualified labor (Klepper 2016). However, success was far from immediate. This was partly because there were no readily available contracts providing the right incentives to key individuals but also because VC was unavailable for the new firms.

Lack of access to VC was not unique to Silicon Valley; before the 1980s, the development of a VC industry in the U.S. was hindered by high capital gains taxes, which amounted to some 50 percent on nominal returns. In addition, the ‘prudent man rule’ barred pension funds from investing in securities issued by small firms, new firms or VC funds.

A set of interconnected reforms broke this idle state, paving the way for the evolution of a more beneficial innovation bloc. First, corporate gains taxes were drastically reduced in two steps to 20 percent. Second, new legislation in 1979 allowed pension funds to invest

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<sup>7</sup> See <https://www.worker-participation.eu/National-Industrial-Relations/Across-Europe/Collective-Bargaining2> (accessed April 21, 2018).

in high-risk securities that were issued by small or new companies and VC funds (Misher 1984; Fenn et al. 1995). Simultaneous changes in the taxation of stock options around 1980 allowed owners to defer tax liability until they sold their stocks (instead of when they exercised the options), which meant that the options could be used to incentivize key personnel.

Absent these reforms, it is difficult to imagine the U.S. VC industry's impressive growth in the ensuing decades or the contractual forms that are such a fundamental part of how Silicon Valley operates (Gilson and Schizer 2003). These changes made it possible to harmonize the incentives between actors in a manner that reduced unacceptably high risk to manageable levels while minimizing the risk of insider trading and moral hazard. The reforms had a revitalizing effect throughout the collaborative innovation blocs. We should emphasize here that important complementarities exist between different tax rates. For example, the low effective taxation of gains on employee stock options appears to be necessary to develop a large VC sector (Henrekson and Sanandaji 2018). In addition, when channeling institutional capital into the entrepreneurial startup sector, finding efficient substitutes for VC firms is difficult.

Taxation that punishes VC financing is, in fact, one of the most critical bottlenecks to remove if countries and regions are to achieve viable collaborative innovation blocs. This insight is highly relevant for the European Union, where the formal VC industry is modest in size compared to its U.S. counterpart (Lerner and Tåg 2013; Da Rin et al. 2006). Possibly as a consequence, U.S. firms grow faster than their European counterparts, which are more likely to remain small (Scarpetta et al. 2002; Henrekson and Sanandaji 2016).

#### ***4.4 Later-stage financiers: the Swedish case***

During the postwar period, until the 1980s, Swedish economic policy stymied the supply of later-stage financiers. Real effective taxation on individual ownership of financial assets typically exceeded 100 percent, and corporate taxation strongly favored debt financing and financing through retained earnings (Du Rietz et al. 2015). Moreover, the system obliged financial institutions to invest most of their assets in bonds and largely barred foreign investors from investing in Swedish stocks, whereas bank lending to the corporate sector was strictly rationed (Davis and Henrekson 1997). As a result, large corporations became increasingly dominant; their share of the business sector grew exceptionally large compared to other countries, and the bulk of innovations took place in

large Swedish firms (Granstrand and Alänge 1995). The mirror image was a low rate of new firm formation and very few new firms that grew large.

Stock market capitalization fell below 20 percent of GDP in the late 1970s, and *Tobin's q* fell below 30 percent (Södersten 1984). Under such circumstances, exit markets disappeared, and thus, there were virtually no new IPOs or new equity issues by existing firms.

During the 1980s and early 1990s, policymakers dismantled the rules and regulations that had hampered later-stage financing. Financial markets were deregulated, and all foreign exchange controls and restrictions on foreign ownership were lifted. Pension funds, including the large government pension funds, were now free to invest as much as they wanted in the public stock market. A major tax reform more than halved the personal tax rate on capital income, and the corporate tax code no longer favored retained earnings more than marginally.

The effects, reinforced by a sharp reduction in inflation, were dramatic. Stock market capitalization skyrocketed to some 150 percent of GDP (the stock market return index increased 56 times from 1980 to 2000), there was a record number of newly listed firms (Holmén and Högfeldt 2005), and many new firms grew from small to large (Andersson et al. 2016). Furthermore, together with the UK, Sweden came to have the largest buyout sector in Europe (Tåg 2012). Buyout firms have been instrumental in enabling successful spin-outs of numerous divisions from old incumbents. In many cases, these spin-outs have outgrown their parents.

#### ***4.5 Customers: product market regulations***

The presence of competent customers, especially of the venturesome type proposed by Bhidé (2008), is in large measure a result of a society's broader cultural attitude. This view attributes the innovative success of the U.S. to Americans' great willingness to employ and implement novelties in their role as customers, even when both costs and benefits are uncertain. Policymakers can scarcely affect such cultural propensities in the short or medium term; what they can do is to make sure that individuals willing to engage in this type of behavior can do so. Bhidé (2017) highlights this as a problem in the field of medicine, where the Food and Drug Administration (FDA) "has been mandated to make choices about the safety and effectiveness of drugs and new devices on everyone's behalf."

More generally, cross-country evidence reveals that restrictive product market regulations slow the diffusion of best practice production techniques across borders and the incorporation of new technologies into the production process. One channel through which this occurs is the adoption of ICT, where anticompetitive product market regulation is found to have a negative and significant effect (Conway et al. 2006). Thus, product market regulation can be said to hamper the ability of customers to behave in a competent and venturesome manner.

In recent decades, governments of developed countries have deregulated product markets with the aim of increasing market contestability and providing more opportunities for private entrepreneurship within sectors such as telecommunications, energy production, transportation, and financial services. The scope for new high-impact entrepreneurship has thus increased dramatically. However, despite several rounds of product market deregulations, developed countries still exhibit substantial differences in the extent of product market regulation. The Netherlands, the UK, and the U.S. have the most lenient product market regulations, and generally, Western European countries score better than Eastern European and Mediterranean countries.

It is essential that market regulations incentivize customers to act competently and, more generally, incentivize actors in the collaborative innovation bloc to innovate and experiment to the greatest extent possible. In that respect, a trend of note is the increasing recognition by welfare states that ensuring access to health care and other social goods and services does not require the government to produce them. The Dutch example reveals that it may even be possible to eschew public financing: Health care insurance is fully privatized in the sense that all private suppliers are forced to offer a standardized policy at a (competitive) price, while all citizens are obligated to buy such a policy (Schäfer et al. 2010). Such a measure may increase the scope for citizens to act as venturesome customers.

However, drafting appropriately balanced regulations is easier said than done; the regulatory framework sometimes favors interest groups rather than the general public interest (Stigler 1971; Wagner 2014). Thus, it gives rise to large fixed costs that effectively bar smaller actors from entering the market (Begley 2005) or falls short of its objectives in other ways. Technological change may also turn regulations into obsolete constraints at best and into barriers to new entrants at worst, rendering adaptations to changed conditions more difficult.

## **5 Discussion and conclusion**

Austrian economics could, if it merged with the EOE perspective, become uniquely well equipped to address questions related to the institutional preconditions to innovation. While many of our claims have been stated elsewhere (inside or outside the Austrian tradition), we are, to our knowledge, the first to synthesize them and integrate them into a concrete picture of the innovation process, through the use of the EOE perspective. In doing so, we contribute in several ways to Austrian economic theory.

### ***5.1 Contributions***

First, we enrich the Austrian notion of coordination by emphasizing the role of the entrepreneur as a collaborator. Much of this collaboration, we argue, takes place within collaborative innovation blocs; putting the spotlight on the interactions between actors in a bloc improves our understanding of how and why entrepreneurial plans are formulated and revised through time. By highlighting in detail the functions necessary for an efficient innovation bloc to emerge, we make policy prescription (aimed at removing institutional bottlenecks that impede it) considerably more concrete.

Second, while Austrian economics insists on the intertemporality of the production process, and therefore on the importance of savings, little attention is usually given to the actors who, as intermediaries, provide entrepreneurs with the financial resources they need to realize their projects. The EOE perspective does just that, by distinguishing between early- and later-stage financiers and describing the diverse roles they fill in the innovation process. This, we argue, gives an increased understanding of the many institutional conditions that must be fulfilled to enable the supply of these functions in the innovation bloc.

Third, Austrian economics has placed great emphasis on final consumers as the “captains” of the market system through their consumption of first-order goods. In such a manner, they perform the final selection in determining whether an innovation is successful. The EOE perspective helps us see that the role of consumption is richer than that; the role of early-stage, demanding collaborators may be crucial not just for financing but also for altering the entrepreneurs’ awareness of what is possible, thereby helping them detect and correct previously unforeseen errors. In addition, an emphasis of the “venturesomeness” of individual consumers helps elucidate the many harms to innovation blocs caused by product and service regulations that impede consumers from taking on this role to the best of their ability.

Fourth, in our analysis of the role of key personnel, we are explicit about the knowledge problem that exists within firms – an environment where the coordinative role of prices is limited. By showing how coordination and intrapreneurship can be achieved in such settings, we enrich Austrian theory and highlight the importance of institutions (notably in the labor market) that enable the entrepreneur to attract the required skills and incentivize the skill holders to the best extent possible.

## ***5.2 Limitations***

For several reasons, evaluating and improving the workings of a collaborative innovation bloc is no easy matter. First, we should note that in this perspective (as well as that of the spontaneous market order more generally), there is a tension between the non-teleological nature of such an order (the order has no purpose, only its participants do) and the act of evaluating a collaborative innovation bloc according to some criterion (Buchanan and Vanberg 1991).

Second, it is not apparent which criterion to choose or how to adequately measure it. That this is so for a system whose primary problem is one of knowledge coordination should come as no surprise: By its very nature, tacit knowledge is impossible to write down or measure in anything remotely akin to a simple statistic. The drawbacks of patents as a measure of innovation are well known (Boldrin and Levine 2013); a more encompassing approach is likely more fertile. That said, while there are attempts to measure a country's level of innovation through indices (e.g., European Union 2016), such indices are complex aggregates that may hide more than they reveal.

Third, and importantly, it is one thing to identify institutional bottlenecks and another to remove them. In the case of the Silicon Valley VC reforms discussed in section 4.3, politicians did not undertake the changes to promote a skill cluster such as Silicon Valley; that no one foresaw the serendipitous consequences is unsurprising given the complexities of the collaborations taking place in an innovation bloc. An actor with in-depth knowledge of the workings of an innovation bloc may, of course, engage in institutional entrepreneurship, e.g., by lobbying for regulatory changes. However, such activity is often costly and thereby effectively unavailable to new and small firms. Hence, it is often undertaken by large corporations attempting to shape government regulations in ways that are favorable to them (Hillman et al. 2004; Lawton et al. 2013), not to create a blossoming collaborative innovation bloc.

Certainly, some forms of “top-down” change may emanate from public policy initiatives that use private-sector entrepreneurship as a source of ideas on how to create an economic environment conducive to value-enhancing activities in the face of uncertainty (Leyden and Link 2015). However, the EOE perspective takes for granted that no specific agent inside or outside of the innovation bloc is in charge; no one “owns it” or understands more than a fraction of its inner workings (cf. Autio 2016), with the implication that no one necessarily feels responsible for ascertaining the efficient functioning of the ecosystem. The lack of ownership of collaborative blocs is a central reason why top-down “command-and-control” approaches should be undertaken with great humility.

### ***5.3 The EOE perspective: a new mission for Austrian economics***

Successful collaborative innovation blocs cannot be planned top-down, but deliberate economic policy is not irrelevant: bad policy can effectively bar the emergence of collaborative innovation blocs, and good policy can increase the likelihood that they will emerge and flourish. That said, the EOE perspective makes clear that the quest to develop an optimal set of legal rules ignores the continuous change, innovation, and adaptation of organizations in a competitive environment, which calls for a never-ending search for efficiency-enhancing adjustments and modifications of the institutional framework within which the various agents in the innovation bloc form their collaborations.

If such a search is not undertaken, there is considerable risk that extant collaborative innovation blocs cease to function and that potential innovation blocs never emerge. By focusing on such issues, Austrian economics could prove invaluable and demonstrate its relevance for innovation and economic growth in the 21<sup>st</sup> century. To do so, we have argued that it should incorporate the EOE perspective into its body of thought. We hope that this contribution will provide the spark that makes such incorporation possible.



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