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Enabling Creative Destruction

An Entrepreneurial Ecosystem Approach to Policy

Erik Stam

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U.S.E. Research Institute
Kriekenpitplein 21-22, 3584 EC Utrecht, The Netherlands Tel: +31 30 253 9800, e-mail: use.ri@uu.nl www.uu.nl/use/research

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Enabling Creative Destruction - An Entrepreneurial Ecosystem Approach to Industrial Policy

Erik Stam
Utrecht School of Economics
Utrecht University

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Abstract
Creative destruction is important for long term economic development, but hard to target with industrial policy. How to stimulate creative destruction? In this article, we set out with a critique of existing industrial policy approaches and make a plea for a "backing challengers" industry policy, which enables the creation of innovative start-ups and Schumpeterian creative destruction. This "backing challengers" policy is least likely to fall prey to the usual information and vested interest problems of industrial policy. We construct an entrepreneurial ecosystem approach to policy, which provides a synthesis of scientific insights into entrepreneurship and economic development, and a more adequate complex system perspective on the economy. We also offer diagnostics for developing policy in consultation of and collaboration with public and private stakeholders. In this way the design and implementation of policy is informed by scientific knowledge on entrepreneurial ecosystems, but also local knowledge about the context-specific bottlenecks, and involvement of the relevant stakeholders that is necessary for a successful implementation of policy.

Keywords: Entrepreneurial Ecosystems; Industrial Policy; Government Failures; Market Failures; Innovative Start-ups; Creative Destruction

JEL classification: L26, L52, L53, M13, O10, O20

Comments welcomed to: E.Stam@uu.nl

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1. Introduction

Innovative start-ups are the embodiment of Schumpeter's creative destruction (Schumpeter 1942; Baumol 2002). They are the drivers of structural change in the economy (Kuznets 1966), creating new high productivity activities and destroying low productivity activities (Foster et al 2001; Metcalfe and Ramlogan, 2006). However, this process of creative destruction by innovative start-ups is very fragile and its success depends strongly on the context in which it takes place: the entrepreneurial ecosystem (Acs et al. 2017). For stimulating this process of creative destruction we need insight into the nature of the innovative start-ups themselves (Colombo and Grilli, 2005; Stam and Wennberg, 2009) and especially in their context, which provides more direct levers for policy intervention (Autio et al., 2014; Colombelli et al., 2016). The entrepreneurial ecosystem comprises a set of interdependent actors and factors that are governed in such a way that they enable productive entrepreneurship (Stam 2015). It takes the ecosystem analogy from the phenomenon of eco*logical* systems, and applies this to improve our understanding of eco*nomic* systems (Stam 2018b). An entrepreneurial ecosystem approach supports the shift from entrepreneurship policy to policy for an entrepreneurial economy (Thurik et al., 2013; Stam and Bosma, 2014).

The aim of this article is to provide a scientifically grounded policy approach to effectively stimulate innovative start-ups at the micro level and creative destruction at the macro level. The contribution of this article is threefold. First, based on a critique of existing industrial policy approaches, we provide a taxonomy of industrial policies and show the relative advantage of a "backing challengers" type of industrial policy. Second, we construct a – entrepreneurial ecosystem – conceptual model that provides insight into the causal mechanisms involved in stimulating creative destruction. Third, we offer an entrepreneurial ecosystem approach to policy.

Why should we have industrial policy? It has for a long time been questioned whether or not we should forbid or preclude industrial policy. The argument has been that government failures preclude effective and efficient industrial policy. We acknowledge and specify government failures into problems of vested interests and information constraints and provide a typology to minimize these failures. We then continue with answering the question of how industrial policy should be designed and governed (cf. Aghion et al 2011; Rodrik 2004). Our three-fold contribution provides novel insights into both the *why* and *how* of industrial policy.

In this article, we set out with a critique of existing industrial policy approaches and make a plea for a "backing challengers" industry policy, which enables the creation of innovative start-ups and Schumpeterian creative destruction. This "backing challengers" policy is least likely to fall prey to the usual information and vested interest problems of industrial policy. We construct an entrepreneurial ecosystem approach to policy, which provides a synthesis of scientific insights into entrepreneurship and economic development, and a more adequate complex system perspective on the economy. We also offer diagnostics for developing policy in consultation of and collaboration with public and private stakeholders. In this way the design and implementation of policy is informed by scientific knowledge on entrepreneurial ecosystems, but also local knowledge about the context-specific bottlenecks, and involvement of the relevant stakeholders that is necessary for a successful implementation of policy.

2. Industrial policy: a taxonomy

Industrial policy aims to enable economies to diversify their productive structures so that they can sustain economic growth in the long run. Structural change is the central process in economic development: the process of pulling the economy's resources from low-productivity activities to high-productivity activities (Rodrik 2008) – Schumpeter's (1934; 1942) creative destruction. It is the goal of industrial policy to stimulate investments in new activities, especially those in which the economy

may achieve a comparative or competitive advantage (Rodrik 2008). The assumption is that this will raise productivity and employment in the economy (Foster, Haltiwanger and Krizan 2001). Industrial policy is further legitimized by market failure (Rodrik 2008; Jacobs and Theeuwes 2005) and system failure reasoning (Cooke 2001).

Despite the renewed attention for industrial policy, major problems remain for industrial policy. Two prominent types of government failures are the limits of government information about the most efficient and effective allocation of (public) resources in the future, and the government's liability to rent seeking by vested interests (Olson 1982; Mueller 2003). The two types of government failures in industrial policy can be used as two dimensions to classify (targeted) industrial policies (see figure 1).

The 'worst' of all worlds is the quadrant of 'backing losers' in which the government is liable to vested interests of industries that risk the danger of being eliminated by more efficient competitors or alternatives. These industries will state the need to be supported because they have been of strategic importance, and with industrial policy will regain competitiveness. This demand for backing losers is not an unlikely situation in the process of economic progress, as innovation (potentially in other regions or nations) makes incumbents redundant, but with the promise of improving overall societal welfare on a global scale. This is the globally uneven process of creative destruction (Schumpeter 1934; 1942). Governments are however imperfectly informed to make an optimal choice between the multiple candidates that demand public support to regain competitiveness, if possible at all.

The government can improve on this situation by either using "the market" as a mechanism to discover the best industries (revealed competitive advantage), or by making itself immune to vested interest by betting on a future winning industry or technology: globally emerging industries or technologies (cf. Mazzucato 2015). The so-called "infant industry" argument provides economic rationales for the "picking winners" industrial policy. The government should step in to stimulate a (potentially) winning industry or technology, because (1) some of these new activities involve high costs at the beginning but learning by doing will reduce these costs over time; (2) there are knowledge externalities between these activities and the rest of the economy; (3) and there may be positive dynamic externalities from temporarily protecting and/or subsidizing the new activities.

The latter type of industrial policy – "picking winners" – does not solve the lack of information by governments to make a sufficiently informed choice about the best allocation of (public) resources for future value creation. It is one step to recognise the technologies and industries of the future, but the fundamental uncertainty about how these will develop and how to allocate scarce public means over a large set of new technologies and industries will make the second step of selecting one or a limited number of industries problematic. One solution for this information problem is to take the government's responsibility in tackling grand societal challenges as a starting point for industrial policy (cf. Foray et al., 2012; Coenen et al., 2015). The articulation and implementation of policies to tackle grand societal challenges is likely to involve both public and the private sector actors (George et al. 2016).

A "backing winners" industrial policy seems a solution to the information problem: these industries will state that they need to be supported because they are of strategic importance, as is revealed by the high productivity and/or export intensity of these industries. In practice, the vested interest problem is aggravated, because every self-respecting industry representative will do everything to make clear that this industry has revealed to be competitive and would be the 'best bang for the (government) buck' spend (see Nooteboom and Stam 2008; Moe 2009).

Finally, "backing challengers", can be an industrial policy that solves the information problems and problem of being liable to vested interests, and also enable economic progress (cf. Audretsch et al. 2001; Nooteboom and Stam 2008). This type of industrial policy does not assume that governments are perfectly informed about the best direction of the economy, but that it is likely to be realized by newcomers (Schumpeter 1942) and not by incumbents that have more to lose by embarking into new directions (Arrow 1962; Tushman and Anderson 1986; Langlois and Robertson, 1995). These

newcomers are also less likely to be well-organized to disproportionally claim their interest in government circles, due to their nascent state. In addition, these newcomers are most likely to face 'market failures' in capital markets and labour markets due to the highly uncertain nature of their projects (Hall, 2002) and unclear perspectives of their industry (Aldrich and Fiol, 1994).

How could such a "backing challengers" industrial policy be implemented? A necessary element is to make sure that the context for challengers to emerge is optimal. The government's role is to identify bottlenecks in the economic system that constrain the emergence and growth of innovative start-ups that drive creative destruction. Policy should be agnostic about which industries to target, the challengers are key in discovering the region or country's new productive specializations (cf. Hausmann and Rodrik 2003; Rodrik 2008). The recent entrepreneurial ecosystem approach (Stam, 2015; Mason and Brown, 2014; Stam and Spigel, 2018) provides a framework for such a "backing challengers" type of industrial policy.

		Information problems: +	Information problems: -
Vested interests	+	Backing losers	Backing winners
	-	Picking winners	Backing challengers

Fig. 1. Types of industrial policy and two key problems of industrial policy

3. Creative destruction and entrepreneurial ecosystems: a conceptual model

Creative destruction is the central process for structural change and productivity growth in the economy. Creative destruction takes place at the micro level, with the entry and growth of innovative firms, and the decline and exit of non-innovative or unsuccessful innovative firms. This micro-level creative destruction has been shown to increase productivity at the meso level: in regions (Bosma et al 2011; Andersson al. 2012) as well as industries (Bartelsman and Doms 2000; Bartelsman et al. 2005). Creative destruction also takes place at the macro level, with the emergence and growth of new industries and the decline and extinction of established industries. This macro level creative destruction is an emergent property of an economic system in which the micro level processes of creative destruction takes place.

We construct a conceptual model including key concepts and mechanisms involved in the context of creative destruction. We focus on the elements of the enabling environment, making use of a long-established literature on the environment for industry emergence (Van de Ven, 1993; Forbes and Kirsch, 2011) and on entrepreneurship and economic development (Fritsch, 2013; Stam and Bosma, 2014), which is integrated in the entrepreneurial ecosystem approach (Spigel, 2017; Stam, 2015; Stam and Spigel, 2018). This entrepreneurial ecosystem approach builds on previous economic development approaches, including the industrial district, cluster and innovation system approaches, but is also distinct, with taking entrepreneurship center stage (see Acs et al., 2017; O'Connor et al., 2018; Stam and Spigel, 2018).

Three key subsystems revolve around the production factors knowledge, capital and labour. Empirical research has shown that these are key subsystems enabling entrepreneurial activity and industry emergence. Knowledge is an important source of opportunities for entrepreneurship, knowledge from both public and private organizations (see e.g. Audretsch and Lehmann, 2005). Capital, access to financing – preferably provided by investors with entrepreneurial knowledge – is crucial for investments in uncertain entrepreneurial projects with a long-term horizon (see e.g. Kerr and Nanda,

2009). The presence of a diverse and skilled group of workers has also been shown to be a key condition in many empirical studies (see e.g. Acs and Armington, 2004; Lee et al., 2004; Qian et al., 2013).

There are multiple actors involved in ecosystems to create, adapt, allocate, and coordinate finance, knowledge and human capital. These actors and their interactions are enabled and constrained by the social (informal and formal institutions) and physical conditions of economic action: infrastructures. A key connection between resource endowments and these infrastructures is governance: "the use of institutions, structures of authority and even collaboration to allocate resources and coordinate or control activity in society or the economy" (Bell 2002, p.4). Governance in entrepreneurial ecosystem involves how networks and leadership coordinate resources in such a way that productive entrepreneurship is enabled, and industry emergence is likely to happen. Recent studies have shown the positive effects of the quality of governance – measured as a composite of control of corruption, rule of law, government effectiveness, voice and accountability - on knowledge production (Rodríguez-Pose and Di Cataldo, 2014), entrepreneurship (Nistotskaya et al., 2015), employment (Di Cataldo and Rodríguez-Pose, 2017), and productivity (Olson et al., 2000). No direct effect of these formal institutions on industrial diversification (macro level creative destruction) has been found, while informal institutions, like the level of generalized trust in regions seems to enhance industrial diversification (Cortinovis et al., 2017).

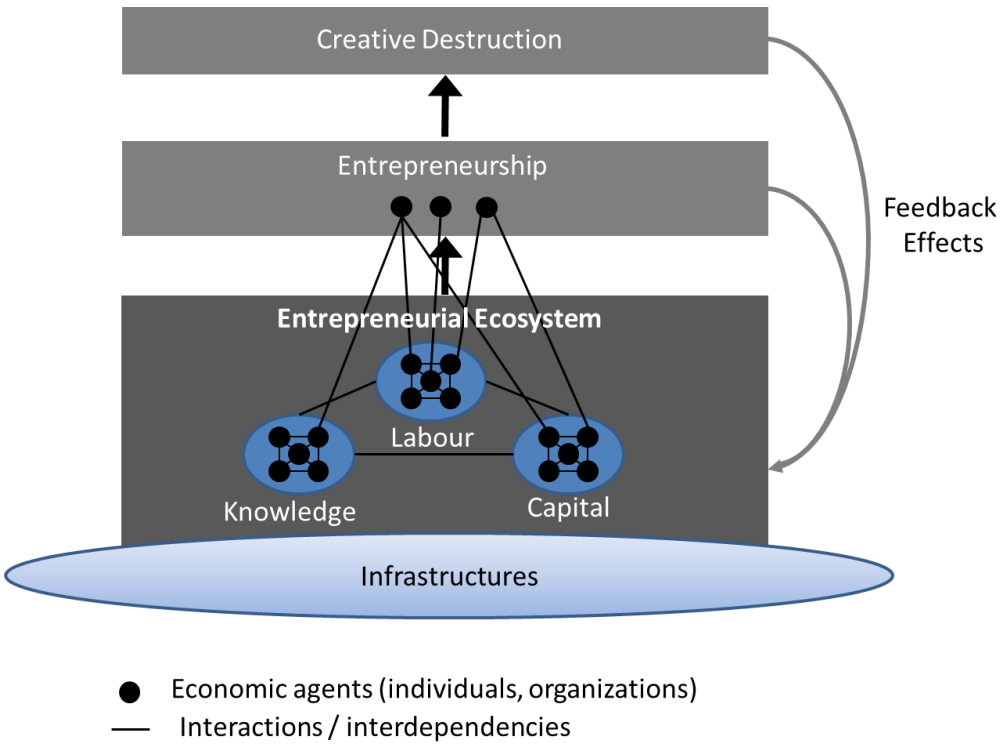

Fig. 2. Entrepreneurial ecosystems and creative destruction: a conceptual model

4. Entrepreneurial ecosystem policy process

The entrepreneurial ecosystem approach squarely focuses on Schumpeterian entrepreneurs, driving the process of creative destruction. This improves entrepreneurship policy in three ways. First, it triggers a transition from pushing up the quantity of entrepreneurship (e.g. new firms and self-employment) to pushing up the quality of entrepreneurship (e.g. growth and innovation-oriented entrepreneurship) (cf. Fritsch, 2011). Second, it necessitates a shift in thinking about the rationales for policy. The textbook "market failure rationales" for government intervention are externalities, abuse

of market power, public goods and asymmetric information. Markets are an important mode of governance in economic systems. And in the context of innovation and entrepreneurship, the failure of that mode of governance may also be a reason for government intervention (see section 2). This mode of governance, however, also has substantial constraints for innovation and entrepreneurship policies (Nooteboom and Stam, 2008). Market failure plays a role, but not everything in the economic system can be reduced to market contexts: the non-market interaction is seen not only as market failure, but often also as a necessity for the realization of innovations (Teece, 1992). For innovation and knowledge sharing in general, especially non-codified knowledge, informal interaction is of great importance. Cooperation makes it possible to exchange much more knowledge than can be specified contractually. This was the reason to create a wider framework for this type of policies: the innovation system approach. The focus of this approach is the so-called system failure: the lack of sufficient elements in the innovation system (e.g. certain types of financing or knowledge), or a non-optimal interaction between these elements (e.g. between companies and knowledge institutes). An innovation system works well if there is a sufficient variety of organizations that fulfil the required functions in such an innovation system, and as a result create an optimal interaction between these elements. The innovation system approach examines organizations and their interaction, and not only through market interaction, but also otherwise. However, in the innovation system approach, the role of entrepreneurs remains a "black box", just like in the market failure approach, for that matter. This makes the entrepreneurial ecosystem approach necessary, which is able to solve the shortcomings of the market failure approach and the system failure approach, and seems equally applicable to the industrial policy. This brings us to the third improvement, moving away from entrepreneurship policies per se, to policies for enhancing the entrepreneurial economy, improving entrepreneurial ecosystems to enable creative destruction.

Entrepreneurial ecosystem policies involve the co-creation of a context for productive entrepreneurship: a flourishing entrepreneurial ecosystem. An entrepreneurial ecosystem is a set of interdependent actors and factors governed in such a way that they enable productive entrepreneurship within a particular territory (cf. Stam 2015; Stam & Spigel 2018). These policies do not suffer from the information and vested interest problems of the other types of industrial policy, as it does not assume perfect knowledge about the optimal future structure of the economy and is targeted on economic agents that are not well positioned to lobby for government attention. In this section we will focus on the practicalities of policy led by such an entrepreneurial ecosystem approach.

The entrepreneurial ecosystem approach presents elements and relationships that provide a grammar for the debate about how to improve a particular economic system. Such debates can be productive if they are fine grained – stakeholders can move past areas of agreement, focus on areas of disagreement, and analyse why they hold different beliefs about the ecosystem and its elements. The stakeholders either achieve a consensus on where bottlenecks are in the system or make explicit where and why they disagree. In the case of disagreement, the debate will highlight critical assumptions that stakeholders should be particularly mindful of as the entrepreneurial ecosystem further evolves. This debate is input into the decision of the policy target and the policy instrument, and these stakeholders are likely to be of relevance again in the policy implementation phase.

The policy process is depicted in figure 3. The main logics are that diagnosis should precede policy prescription and support prioritization of policies (Rodrik, 2008; 2010), and that policy implementation is not just a one-off event, but a process of continuous monitoring and learning (Bravo-Biosca, 2013; OECD, 2014).

Phase			Monitoring
I	Diagnosis of the entrepreneurial ecosystem	Objective data of the ecosystem elements, its overall strength, output and outcomes	T0
II	Debate on the diagnosis	Conversation with stakeholders about the strength of the ecosystem and its elements	
III	Selection of policy target(s)	Focus policy attention on leverage points, weakest links	
IV	Selection of policy instrument(s)	Consult policy catalogue of available policy instruments to achieve policy target	T1
V	Implementation of policy instrument	Stakeholder engagement for implementation	T2
VI	Impact evaluation		T3

Fig. 3. Phases in the entrepreneurial ecosystem policy process

The process starts in phase I with a diagnosis of the strength of the ecosystem and its elements, its output and outcomes, with as much objective data as possible. This diagnosis includes retrieving data on the elements of the ecosystem (formal institutions, culture, physical infrastructure, demand, networks, leadership, knowledge, finance, talent, intermediate services) (cf. Stam, 2018). The output of the entrepreneurial ecosystem can be measured with different entrepreneurship indicators, including the rate of innovative start-ups.

This diagnosis provides a 'snapshot' of the situation, and starting point for the next phase II, a debate with stakeholders on the strengths and weaknesses of the ecosystem. These stakeholders should be representatives of the different entrepreneurial ecosystem elements, and entrepreneurs active in the system, to get as much as possible local knowledge on the constraints in the system and potential leverage points. There is potentially a problem of vested interests in this phase as well, just as for the "backing losers" and "backing winners" types of industrial policy. However, this problem is less likely to occur, because the actors that are targeted are not dominating the debate in entrepreneurial ecosystem policy. This phase II will enrich and modify the objective facts from phase I in an intersubjective manner.

Phase I and phase II provide the necessary input for selection of a policy target, a measurable change in the system and its output (phase III). Once this policy attention is focused towards a limited set of targets, a policy catalogue of available policy instruments to achieve the policy targets can be consulted (see e.g. Stam and Nooteboom, 2011; Stam and Bosma, 2015; Elert et al., 2017). This might lead to copying or adapting existing policy instruments, or as a source of inspiration for a completely new policy instrument.

Ultimately, a policy instrument (or policy mix) needs to be selected (phase IV), before policy action will start. To maximise the effectiveness of the policy implementation, stakeholders should be engaged with the implementation of the particular policy (phase V). Here the debate in phase II will evolve into a dialogue. This will both provide insight in the local context in which the policy will be implemented and increase commitment of the parties involved in the implementation of the policy.

The end of the process, and possibly the start of a new policy cycle is the evaluation of the impact of the policy, including not only the evaluation of the policy process, and the achieved change within the ecosystem and its outputs, but most importantly the effect on the outcome of the ecosystem: a reallocation of resources and activities from low productivity to (potentially) high productivity activities (industrial diversification). Throughout the policy process there are several monitoring moments: T0 at the snapshot of the system, T1 before the policy is implemented, and T2 directly after the implementation, and monitoring on the longer term to see whether the impact is achieved (T3). Given that the economy is constantly evolving, this policy process is not a one-off process, but also continuous, with policies running simultaneously and in sequence, and continuous monitoring to learn about the policy effects and the nature and change of the ecosystem.

5. Discussion and conclusion

Ideally, diagnosis would lead to insight in the root problems of the system, and a policy priority to tackle this root problem with a suitable policy instrument. However, in practice human beings are limited in their access to and processing of information (Simon 1947) and problems are often hard to isolate, they are interdependent on other problems (complex). In practice, policy will often be developed in small steps, not with an optimal policy instrument, but with the currently available means, and on priorities that may be at best close to the "objective" needs (Lindblom 1959; 1968). Notwithstanding these practical constraints, one needs to have a framework to optimize the policy process.

While arguments exist for and against industrial policy, and a policy of backing challengers seems least problematic, our understanding of what kind of innovation and entrepreneurship policy works and how it works is quite limited (see Chatterji et al 2014; Rigby & Ramlogan 2013). The best path forward probably involves extensive experimentation and careful evaluation (Bravo-Biosca 2013). However, to make such experimentation and evaluation a policy framework is needed. The aim of this article was to provide such a framework. We provided a scientifically grounded policy approach to effectively stimulate innovative start-ups at the micro level and creative destruction at the macro level. In spite of its regained popularity, industrial policy is likely to suffer from information problems and to be liable to vested interests. Based on these two types of government failures, we have provided a taxonomy of industrial policies and show why a "backing challengers" type of industrial policy might be least problematic, as it is suffering the least from these two types of government failures. We provide a conceptual model on entrepreneurial ecosystems as a fundament to "backing challengers" type of industrial policy, delivering insight into the causal mechanisms involved in stimulating creative destruction. Finally, a detailed outline of the entrepreneurial ecosystem policy process is given.

Efforts to improve entrepreneurial ecosystems are admittedly less glamorous than announcing a new biotech/big data/clean tech initiative (picking winners), or supporting highly successful incumbents with their innovation efforts (backing winners), but a backing challengers policy is more likely to have sustained effects.

Scaling down on ineffective industrial policies might already help challengers, as Acemoglu et al (2018) show: while policies like R&D tax credits to entrants can help and may encourage growth of start-ups, their impact pales in comparison to removing (artificial) support for inefficient incumbents.

It has for a long time been questioned whether or not we should forbid or preclude industrial policy: why should we have industrial policy? We acknowledge and specify government failures into problems of vested interests and information constraints and provide a typology to minimize these failures. Our entrepreneurial ecosystem approach to policy provides a framework for enhancing innovative start-ups and creative destruction in particular regions or nations, based on novel insights into both the why and how of industrial policy.

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