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**The emergence of the Finnish edible insect arena: The dynamics of an 'Active Obstacle'**

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## ABSTRACT

In the current debates on sustainability of food edible insects have been suggested as one alternative source of protein that could respond to the urgent need to decrease global meat consumption. However, in many countries rearing of insects for human food has been restrained by regulatory measures, such as the EU Novel Foods Regulation. This paper analyses the emergence of the edible insect arena in Finland. In spite of the official compliance to the existing EU regulations, a lively startup scene has grown around edible insect production since 2014. The analysis is based on interviews of the central actors of the insect scene and media data. The performances of actors, such as producers, retailers, authorities, researchers, newspaper articles, insects, regulations, and technologies, constituted a network connecting different geographical locations on a common arena of development. The emergence of an innovative arena is shown to be a result of conflicts and negotiations, resumed in three strategies used by the network-builders in order to normalize a forbidden product: media promotion, trials, and consumption. These strategies gathered actors and networks around an 'active obstacle', formed by the authorities' interpretation of the EU law, which, as we argue, has influenced the dynamics of the arena in its formative stage. Implications for the debates concerning technological transitions are discussed.

## KEYWORDS

Edible Insects
Novel Food
Sustainability
Arena of Development
Strategies of Normalization
Active Obstacle

*1. Introduction*

Sufficient protein production is a core issue in the debate on food sustainability (see FAO 2013; van Huis 2013; 2016). The issue has gained even greater gravity due to the threats of climate change, which itself has received increased attention in the latest comprehensive IPCC report (2018) and the EAT-Lancet commission's report on sustainable food systems (2019). Public policies aiming to enhance new entrepreneurship in the emerging alternative protein arena are slowly starting to take shape, and particularly plant-based proteins are already well established: innovations, buzz, and social and other media activity have surrounded the arena already for some years (see e.g. Jallinoja et al. 2019; Fuentes & Fuentes 2017). For example, Nordic nutrition recommendations emphasize the need to decrease meat consumption (Nordic Council of Ministers 2014). In recent years, insects have also been framed as one potential solution to unsustainable patterns of food production and consumption (e.g. van Huis et al. 2013; van Huis 2013; 2016).

Insects have been part of the human diet in many tropical countries for several thousand years, but their consumption in Western countries has been infrequent. A substantial body of research explains this in terms of resistance (see van Huis 2013, introduction; Farb & Amelagos 1980, 43) and feelings of disgust (Hartmann et al. 2015; Ruby et al. 2015). In recent decades, different regulatory barriers have also effectively obstructed the development and diffusion of insect-based food (see Lähteenmäki-Uutela et al. 2018). Like in most Western countries, insects were not categorized as edible in Finnish food culture until very recently, and the contemporary interest in insect food did not really begin until the 2010s.

Finland has a reputation for a high level of food safety, and new foodstuffs are strictly regulated and monitored by the Finnish Food Authority (known before 2019 as the Finnish Food Safety Authority – EVIRA). The Finnish policy on insects has complied with the EU Novel Foods Regulation, which, until the beginning of 2018, practically forbade the selling of insects as human food. However, some European countries – like the Netherlands, Belgium, France, the United Kingdom, and more recently also Denmark – have interpreted the EU law in a more permissive manner, which enabled the sale of some insect species for human consumption in these countries even before 2018.[1] The Finnish case is interesting because regardless of the regulatory restrictions, a very lively startup scene has grown around edible insect production since 2014, and a lot of media hype has surrounded it.

In this article, we focus on the process by which insect production emerged as a new developing field in a particular context. This context is characterized by two factors. First, the operational environment of the enterprises is undergoing a major change because of the threat of climate change and the ensuing search for more sustainable methods of protein and food production. Second, the product itself was developed for a market that did not exist at the time of our study: in 2017, when we collected our data by interviewing the actors in the field, insects were not yet permitted to be sold for human consumption in Finland. In other words, the whole insect production sector emerged in a situation that involved normalizing a practice and an idea for which there was no legal market – it was uncertain when exactly the products could be sold to consumers.

[1] The new regulation on novel foods (EU) No 2015/2283 was announced in 2015 and entered into force on 1 January 2018, replacing regulation (EC) No 258/1997. The earlier regulation had left insects in a juridical grey area, which gave the member states the opportunity to interpret insects as fitting the category of ‘novel foods’, i.e. foodstuffs that had not been consumed to a significant degree in Europe before May 1997, but which may be accepted on the condition that they have a demonstrated history of safe use as a ‘traditional food’ outside of Europe. (For a concise account of the EU regulation and its major changes regarding insects, see House 2018b; Lähteenmäki-Uutela et al. 2018.)

Our interest lies in how visions, practices, networks, conflicts, uncertainties, and boundary-makings were constructed by the actors in this precarious situation: what sort of actors, networks, tensions, and negotiations have shaped the *dynamics* of the arena and its borders in a situation where the final product was not yet allowed to be sold? Moreover, the process not only involved producers, but also all sorts of other actors, such as retailers, authorities, the media, researchers, consumers, and also non-human actors, such as insects, regulations, financial instruments, technologies, expertise, and visions. Together these actors – or more precisely, their performances – constitute a field with constantly moving boundaries.

However, since the outcome of the process is still open, it is difficult to talk about a 'transition' in the conventional sense of the term as adopted in so-called 'transition studies' or to judge the exact role and weight the insect arena will play in the eventual change in the prevalent protein production regime. Everything depends on whether consumers will adopt insects as part of their habitual diet: will the edible insect phenomenon be able to last beyond the hype created by producers and the media? (On this, see also House 2018b.) What makes the Finnish case particular is the relatively small size of the network; furthermore, nearly all the relevant human actors involved in making the arena at the time have been interviewed. An orthodox actor-network theory (ANT) approach would not in any way privilege this human-centred data, which is why we have adopted a more 'mixed' methodology, combining insights from ANT and more traditional content analysis along with perspectives from the field of transition theories, notably the arena of development model (see Jørgensen & Sørensen 1999; Jørgensen 2012).

Our central point of comparison in this article will be the Netherlands, which has a pioneering status in the research and development of edible insects and insect-based

products, and which has also benefited from express state-initiated policy and financial support for the development of the arena (see House 2018b; Anderson 2015). Beside the fact that the Dutch edible insect network has had a direct influence on the birth of the Finnish arena, the Netherlands also constitutes an interesting counter-case for Finland, where the government strategies of sustainable development have targeted mostly bioeconomy and forestry[2] and where the official position of the authorities concerning edible insects has been one of strict compliance with existing EU legislation. Hence, it could be claimed that the situation of the actors in the Finnish arena has been almost diametrically the opposite of that of their Dutch counterparts. This, as we claim, has also had important consequences on the concrete dynamics of the arena.

*2. Data*

Our data consist of interviews, website material, and media articles. Eighteen interviews were conducted between April and October 2017 – i.e. they were for the most part collected before the new interpretation by the Finnish authorities of the then-valid EU Novel Foods Regulation (EC No 258/97) on 20 September 2017. The interviewees included most of the relevant actors operating in the arena at the time: representatives of four companies producing farming solutions for insects meant for human consumption[3] (N1, N2, N3, N4) and one part-time farmer using such a solution (N5); researchers in three research institutes with insect-related projects (N15, N16, N17); two authorities responsible for food regulation and safety (N18, N19); an event organizer (N14); two chefs (N6, N12); two retailers (N7,

[2] See for instance 'Agenda for the implementation of the key measures and reforms of the strategic Government Programme for 2015–2019'.

[3] All the representatives of the companies were either the founders or co-founders of their enterprises.

N11); two consultants (N8, N9); the vice-president of an insect-promoting association (N13); and a graphic designer involved designing packages for insect foods (N10). In the following, the references to the interviews are indicated using the codes in brackets. A more detailed account of the interviewees is presented in Figure 1 and the two following sections. The website material include the sites of the interviewed companies and institutions.

Media articles published between 1 January 2015 and 19 September 2017 were collected from the internet archives of two nationwide media, the newspaper *Helsingin Sanomat* and Finland's national broadcasting company, Yle. As regards Yle, we included only articles published on the website www.yle.fi. The searches were made using the keywords 'insect food', 'insects', 'insect nutrition', and 'insect eating' (in Finnish). Between 2015 (the media hype started) and 2017 (the interviews were made) there were in total 17 articles published about eating insects in *Helsingin Sanomat* and 32 features or shorter news pieces on the Yle website. We also used the websites of companies and institutions as a background material, although no systematic content analysis was applied to them.

## *3. Methodology and Theoretical Framework*

A rather popular analytical model in research on technological transitions is the multi-level perspective (MLP), which conceives of each technological transition as a process of interaction across three levels: the large macro-environment ('landscape'), the dominant technological paradigm ('regime'), and the micro-level of small networks ('niche') acting as an incubator for radical novelties (see e.g. Geels 2002; Geels & Schot 2007). Another widely used model to address the question of how a 'niche' is constituted is the theory of strategic niche management (SNM; see Kemp, Schot & Hoogma 1998). The problems with these models are i) the MLP is designed to explain relatively rare long-term macro changes

that have already reached their alleged closure (see Geels 2011), and ii) the SNM is made for managerial and policy purposes, aiming at furnishing policy makers with tools for governing and managing niche creation. In our study, we are targeting a short time frame in the middle of an ongoing process – i.e. the moment during which a new niche is being formed – and the point of view examined is that of the actors themselves.

A promising candidate for an emerging field like insect production is the 'arena of development' (AoD), a concept proposed by Ulrik Jørgensen. AoD is intended as an alternative approach to MLP – it shares the same 'flat ontology' as ANT while explaining change with explicit attention paid to the important tensions and temporal situations involved. Change in AoD is a heavily conflict-ridden process. An AoD designates a cognitive and material space with moving boundaries that is constituted around a specific technological (and, in our case, commercial) problem, and it brings together heterogeneous actors and locations. It comprises a heterogeneous set of entities, which include humans, technologies, institutions, visions, and practices. It is a virtual (cognitive) space in the sense of being independent of geographical locations, but it contains many different locales through a process of translation by which the heterogeneous elements are brought together (a cognitive space cannot exist without reference to objects and situations which are local and material). Companies enter this space when they start developing technologies and products; however, the boundaries of the space are in continuous movement, since they are dependent on the performances of actors enrolled into the space by a unifying idea, but the actors also possess different and often conflicting interests, scenarios, and visions, and hence try to affect (stabilize, transform, or destabilize) the existing boundaries of the arena. The arena itself operates inside a socio-material configuration, a changing environment

constituted by several actor-networks, involving, for example, authorities, research institutes, media, clients, and sponsors (see Jørgensen & Sørensen 1999; Jørgensen 2012).

In its original form the AoD is destined to provide a spatial notion for developments in competing and developing representations (the 'actor-worlds' – see Jørgensen & Sörensen 1999, 417-418; on the original notion, see also Callon 1986a, 21-24). As such, it is more structured than ANT, but less hierarchical than MLP. It offers a way of sketching out the boundaries of actor-networks by mobilizing the idea of 'actor-worlds' and their interaction with the arena. The actor-worlds are essentially contextual (developed around concerete situations); they are constituted around scenarios, utopias, narratives and translations through which an actor-network is mobilized and the roles therein assigned. (See Jørgensen 2012, 1001).'Arena' is a fluent metaphor which emphasizes the moving, unstable character of the whole it denotes. Along with the spatial dimension there is a temporal window which opens into an ongoing process instead of taking a retrospective macro-view to a transition process already terminated. The emphasis is on the relational, the heterogeneous and the ongoing.

Like ANT-inspired models in general, the AoD is best suited for grasping a reality that is heterogeneous and changing. Its emphasis lies on the intermediary performances of actors, which makes it suitable for our purposes. At the same time, we focus particularly on the micro-actions and the constitution of the network itself in a specific context and historical situation – i.e. before the new EU Novel Foods Regulation 2015/2283 entered into force in January 2018, clarifying the position of insects as potential human food in the EU.

In addition, since our principal data are based on expert interviews, we will give more space to human actors and their views and visions than an orthodox ANT method would do. Our approach is thus admittedly eclectic and pragmatic. It opens a window onto

the constitution of a small niche-like network in a situation where the operational environment, i.e. the dominant mode of protein production (or in MLP-terms, the 'regime'), is undergoing a change, but there is no clear view of the eventual magnitude or speed of this transition. However, whereas the AoD model stresses the role of competing scenarios, narratives, translations (or 'actor-worlds'), tensions, and competition between actors, we will underline the significance of what we call an 'active obstacle' – here, the performances of the authorities – in creating the constitutive dynamics of the arena. This is the case especially in the early phases of the arena's formation, when the competition between the principal actors, i.e. the companies starting to develop insect farming solutions, is still minimal.

In the following, we will first describe briefly the historical process during which the arena came into being, including the first actors, incentives, and the context. Next, we will sketch out the network by including the other actors whose performances created the dynamics of the arena. These dynamics will then be analysed more concretely by unfolding the strategies adopted by the actors in their efforts to normalize a forbidden product and by shortly describing the change in the dynamics of the arena after September 2017, when the Finnish authorities suddenly decided to modify their interpretation of the EU regulation. Finally, we will discuss the results with a particular emphasis on the theoretical and methodological implications of our analysis – the idea of an 'active obstacle' that has shaped the dynamics of a nascent arena and the affordances of the AoD in analysing a period of time that has been selected from an ongoing transition process.

## *4. The Emergence of a New Arena: The Beginnings of a Network*

Unlike the Dutch edible insect network, which has its roots in long-standing university research on the subject and only afterwards evolved into small business sector (see House 2018b), the Finnish edible insect scene started to take shape when a handful of students coming from business management and marketing, natural resource economics, food sciences, and biotechnology – unbeknownst to each other – came up with a similar idea around the same time (2014–2015). Although the interviewees who had started businesses got their inspiration for engaging in the insect field from different sources and life events, several of them were affected by one central actor, namely the FAO report (2013), which brought together the existing knowledge on edible insects at the time. The FAO report also constitutes a link between the Finnish and the Dutch edible insect network: the leading expert behind the report is Arnold van Huis, who also played a prominent role in the Dutch scene (see House 2018b) and later inspired one of the Finnish insect-related research projects.[4] On the other hand, van Huis' TED talk on YouTube was directly responsible for what one interviewee called his personal 'revelation', which made him bet his future on insect farming. Another interviewee had stumbled on the FAO report when studying nutrition in France. The report thus acted as a mediator, bringing together different geographical locations and several heterogeneous actors in an open-ended cognitive space we call here an arena of development.

On the other hand, two other factors – the media and the already strong Finnish startup scene – also played an important part in the development of the arena. Many Finns encountered the idea of eating insects on a television programme called 'Madventures', which features two young globetrotters travelling around the world, coming across 'weird' cultural habits, and engaging in shocking eating experiences. Two of the insect-producers

[4] The Entolab project, which started at the end of 2016.

explicitly mentioned the show in their interview. The media has also played a central role in publicizing the edible insect message after the creation of the first companies – an issue that will be further discussed shortly.

The strong presence of different startup events, hubs, and courses in university and student environments distinguishes the Finnish edible insect network from its Dutch counterpart. The Finnish startup scene is lively; it is headed by one of the world's leading startup events, Slush, and it is actively supported not only by private companies and investors, but also by different public financing institutions and official government policy (see, for instance, 'The Guidelines for Research and Innovation Policy 2011–2015'; one interviewee called this the 'Finnish startup fetish'). Of the seven entrepreneurs (of five companies) interviewed, all but one were university or university of applied sciences students, and five explicitly mentioned some sort of startup connection, either by direct funding provided by an angel investor, or by participating in the same startup course. The significance of the student initiative in the process was further accentuated by the creation of Unibugs, the Academic Association of Insect Economy, a common platform and network for university students and others interested in insect research. Unibugs was founded by a group of students from the University of Helsinki in 2015. Some of the young entrepreneurs were also active on this platform. The Finnish edible insect production scene was thus formed largely as an uncoordinated student-initiated effort in which startups played a key role.[5] They kept in contact with each other and started to enrol other actors – enthusiasts, students, chefs, and farmers – into the network.

[5] On the other hand, the startups cooperated with the researchers right from the start, and some researchers still act as partners in startup companies. In this sense, one could speak of the same type of 'circuit of exchange' seen in the Dutch case, although it is a much smaller one (see House 2018b).

As a result, several new companies were created in 2014–2015. Three of these concentrated on developing ready-made farming solutions and one opted for farming. Of the farming technology and service enterprises, one provided pig farmers in western Finland with a new source of livelihood by selling them a starter pack for insect farming and offering to buy the insects from them, another concentrated on building turnkey-based containers and cubes for insect farming, while a third mainly operated in Asia by selling the concept (technology + expertise) to farmers and buying their produce. One company was practicing the part-time farming of house crickets in the southern part of Finland with a rearing-container. One company, which started later in 2017, worked solely on insect-based products and their development.

At the time of the interviews, all the companies were still operating on a relatively small scale, with typically two to five employees per enterprise. Thus, in 2017 the Finnish edible insect production arena was constituted mainly by small, handicraft-style enterprises whose farming and testing activities were strictly local (two of them actually operated in their founder's backyards), but who also sold their products and expertise actively on the web, even though their clientele was mainly domestic.

Interestingly, during the development of the arena of edible insects the interest in the Finnish discourse was almost solely on insects meant for human consumption. The potential of insects for animal feed were occasionally mentioned in media discussions, but this field was not contested the same way as insects for food, probably partly because the regulation for insects as feed was already more permissive. Based on the interviews and discussions with the actors, in Finland the arena for insects as human food started to develop ahead of the feed sector. One potential reason for this is that in the food sector the investments

needed were much lower due to the relatively small production volumes at the early stages of the arena.

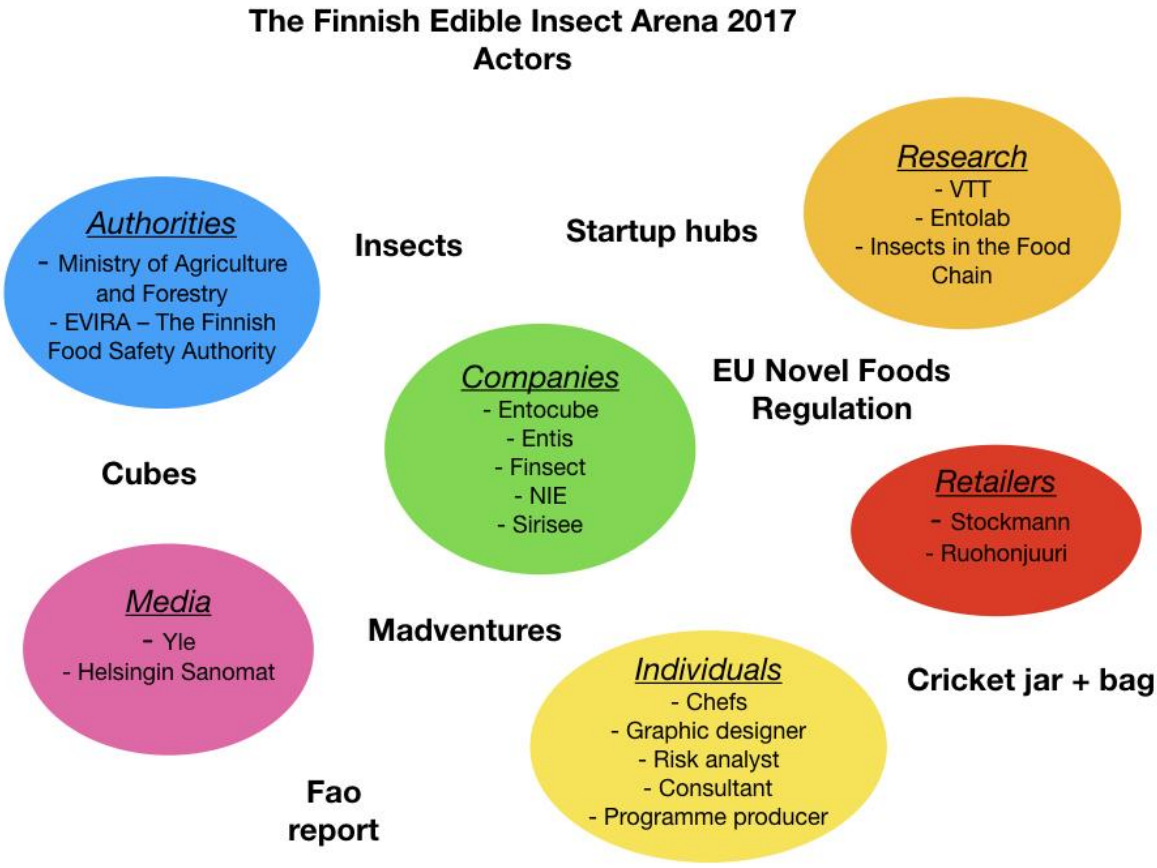
Ideas and concepts travel across the borders, but so do materials, technologies – and insects. The insects used by the companies were originally imported from the Netherlands, where the edible insect scene was already well-developed. Moreover, all the Finland-based companies concentrated on one species only, namely the house cricket (*acheta domesticus*). Besides the general availability of the insect and the existing expertise and research on the farming of the species (the house cricket has a long breeding history in Europe as pet food; see House 2018a), the reasons given for this quasi-unilateral choice was the belief that the cricket might be more acceptable to the average consumer than, for instance, the mealworm, which was considered by some producers but eventually excluded. Thus, the house cricket was intended to act as a 'gateway insect', familiarizing people with the idea of eating something not part of their habitual diet. In some cases, the choice was also influenced by the availability of ready-made farming systems. However, no considerations on the technically more demanding side of cricket-farming were expressed (e.g. the extra heat required and the 'energetic' behaviour necessitating more hands-on work than, for instance, the mealworm), although this has a direct impact on the cost of production and the retail price of the end product (cf. House 2018b).

Some producers instead mentioned that they liked to experiment with the effect of different types of feed on the taste of the insects. It seems crickets are particularly amenable to this sort of testing, because the nutrition they are given directly influences their taste. Thus, the affordances of crickets for food production were determined not only by their technical 'rearability' and their ensuing 'enrolability' in the existing networks of food production, but also by the assumed cultural and culinary acceptability of the species

relating to their appearance, as well as the need to develop farming practices that produce good-tasting insects.

All in all, the process well illustrates the manner in which an arena of development is constituted: an actor-world starts to build up around a specific problem which is usually connected to a new technology, but also to questions concerning its implementation, the commercialization of new products, the way in which the markets, customers, costs and the related factors are represented and visioned, and other problems linked to the field (artefacts, standards, legislation etc.). In the beginning, when the competition for attention and power between the enrolling actors is still scarce, the arena and the actor-world are more or less identical (see Jørgensen & Sörensen 1999, 418). This homogeneity of common visions, missions and narratives is further accentuated if there is a well established, stable actor resisting the attempted new translation. This is precisely the case with the arena we are studying, as will be demonstrated in the next sections.

Figure 1. The Finnish edible insect arena in 2017. The coloured bubbles indicate actors from whom data were systematically collected for the study.




*5. The Other Elements of the Arena*

By the end of 2017, the year when the interviews were conducted, the companies in the arena were few, and at least two aspiring firms had already given up, finding the market too small, the processes too slow, and the challenges too big. However, what happens in an arena is not only affected by the companies developing technologies and products, but also by other actors and actor-networks that operate in and around it, constantly reshaping its boundaries. In the present case, such actors include the research institutes working on insect-related projects; the media, consumers, and the audience; the authorities (Finnish Food Safety Authority, Ministry of Agriculture and Forestry); individual human actors who might be called 'enthusiasts', like chefs and retail store marketing managers; sales and risk

experts; and program producers who have strongly contributed to making the arena and creating its dynamics.

Actors outside Finland obviously play a role too, by inspiring the Finnish actors and providing information on developments in the international arena. Of the start-up companies interviewed, NIE operated mainly outside Finland, Entocube had contact with NASA, and Finsect kept in touch with foreign companies. The three companies also considered joining the lobbying organisation International Platform of Insects for Food and Feed (IPIFF) together, but concluded it was too expensive (personal communication with Sami Lähde, CEO of Finsect, Sept. 11, 2019).

Together these actors and networks constitute what might be called a temporary 'socio-material configuration' in which the arena is immersed, and of which it also forms a part. The dynamics of the arena must be situated in this configuration, since the arena is essentially a web of relations, performances, and interactions of and between the actors.

The most important research projects intertwined with the Finnish edible insect arena started around 2015–2016. The projects included the Entolab project linking together three research institutes (Luke Natural Resources Institute Finland in Seinäjoki, Ruralia Institute at the University of Helsinki, and Seinäjoki University of Applied Sciences) and the 'Insects in the Food Chain' research project at the University of Turku. In addition, researchers at the VTT Technical Research Centre of Finland were interested in testing different processing technologies on insects to see how the ingredients extracted behaved during cooking. The two other projects focused more on the general aspects of insect rearing in both a local and global context, and commercial actors (small insect companies as well as larger firms in the Finnish food industry) were involved either in financing or as partners, although even in these cases most of the funding came from public sources.

The media enrolled in promoting the edible insect message included a variety of newspapers and magazines in Finland, but those reaching the widest audiences were the largest and oldest subscription newspaper in Finland, *Helsingin Sanomat*, and the national broadcasting company, Yle. Between 2015, when the media really got hold of the subject, and 2017, when the interviews were made, there were in total 17 articles published about eating insects in *Helsingin Sanomat* and 32 features or shorter news pieces on the Yle website. Of these 49 stories and news pieces, only two were critical or negative in their approach: one warned allergic people of the risks, while the other considered the ethical side of insect rearing. Otherwise, the articles were all overwhelmingly positive; they promoted the opportunities of insect production for the Finnish agriculture and food industry, interviewed farmers and entrepreneurs, or tested different dishes made of insects.

Along with these willing and even enthusiastic actors there was a third group of institutional actors who entered the arena *ex officio*, so to speak, and whose immediate interest was not to promote but to control. However, the impact of these actors for the concrete micro-dynamics of the arena was a crucial one – they constituted what we have called an 'active obstacle', bringing other actors together, creating connections between them and affecting the moves they made. This group of actors consisted of the Finnish authorities responsible for the regulation of the edible insect sector: the Ministry of Agriculture and Forestry and the Finnish Food Safety Authority (EVIRA). In 2017, the Finnish authorities, like those in most other EU countries, maintained a strict interpretation of the existing EU legislation, which forbade selling insects as human food. The handful of companies operating in Finland were all waiting for the new EU legislation to take effect at the beginning of 2018 – the new law was expected to liberate the market, but only after a burdensome and expensive application procedure for each new species aiming to be entered

onto the market.[6] In other words, until October 2017 when the final interviews were made, all the technical and commercial development accomplished in the startups and research institutes was in fact carried out in a field that was formally forbidden to sell its end product.

Along with these institutional actors were a number of individual actors whose role in the dynamics of the arena cannot be ignored. They included two retail store marketing managers, one working at Helsinki's most prestigious department store (Stockmann), the other at the headquarters of a vegetarian/organic retail chain (Ruohonjuuri); two chefs specializing in insect dishes; a risk expert contributing to the creation of the arena and working in the business as a consultant; a consultant in a small company conducting market analysis, web courses, and live workshops on the insect economy; a graphic designer responsible for the visual image of a cricket jar and a cricket bag sold at the Ruohonjuuri stores as a 'kitchen decoration' in 2016–2017 (these episodes will be analysed in further detail shortly); and a programme producer at Heureka, the Finnish Science Centre, who organized a thematic event on edible insects at the centre in 2017. In addition, although we do not focus on consumers in this article, we should not forget the role they played as participants in different events organized by the producers and as buyers of a forbidden product.

In the next section, we will analyse in more detail those actors who were directly enrolled by or acted in cooperation with the companies and producers. In particular, we will

[6] The new Novel Foods Regulation (EU No 2015/2283) set a two-year transition period for those insect species that had been allowed on the market before 2018, but it imposed a bureaucratically heavy and expensive testing procedure for all the novel species aiming for legal status as human food after 2018. On the other hand, once a species is accepted in one member country, it is accepted for all other members. Hence, the smaller firms waited for the larger ones with the necessary financial resources to make the application.

concentrate on the micro-dynamics created by the position and the moves of the 'active obstacle'.

*6. Dynamics of an 'Active Obstacle': Strategies of Normalization*

The Finnish authorities' interpretation of the EU regulation on novel foods had various material and performative effects on the other actors in the arena, starting with the different ways of utilizing the insects produced and ending with the various *strategies* that aimed at normalizing a forbidden product. In this sense, it can be seen as a mediator in a very classical or Latourian meaning, that is, a relation that brings together actors and makes them do unexpected things (see Latour 2005, 39). The performances of the actors, their interaction, and the translations that shaped the borders of the arena must all be situated in this context. As Jørgensen (2012, 1008) points out, transition processes are usually influenced by complex interventions that are outcomes of conflicting interpretations of challenges, aims, measures, and anticipated outcomes. In our data, these conflicting assessments translate into a complicated choreography of moves and counter-moves performed by the companies and the authorities. Their strategies are not only the result of their opposite positions in relation to the existing legislation (the EU Novel Foods Regulation), but also of their differing interpretations concerning the significance of each parties' actions.

The strategies used by the companies and individual actors trying to advance the edible insect cause targeted the product, its material form, and the representations/values attached to it (efforts of stabilization), as well as the arena itself, attempting to enlarge its borders by enrolling new actors, audiences, and elements into it (efforts of destabilization).

This is also how the ANT theories proper see the process of getting an innovation accepted – strategies are implemented that aim to enrol human and non-human allies in a network. This is done by negotiations, by imposing definitions and roles onto others, and by translating the problem at hand in terms proposed by the enrolling actors (see e.g. Callon 1986b; Latour 1986). What counts is the network dynamics and the strength of the bonds formed. We use the term 'stabilization' in this context to denote a situation where several actors are trying to legitimate a state of things or its representation. In our data, this state of things or representation concerns the edibility of insects and their place among food substances destined for human consumption. To achieve their aim, the enrolling actors (the companies) used different strategies. The most important of these were media promotion, trials (testing the limits), and consumption.

The first strategy, promotion in the media, involved mobilizing the media in the process of enhancing the visibility of edible insects and consolidating visions of a coming social change. In April 2015, *Helsingin Sanomat* published a multi-page feature story in its monthly supplement. It reported about an adventurous young man who had landed himself in the insect rearing business in Singapore; he boldly stated that insects would save the world.[7] The article also featured a chef specializing in insect cuisine, some of the young man's colleagues, and a famous Madventures journalist as an actor setting the scene. The general tone of the article was one of exhilaration: insects were the new ICT, a revolution was being prepared in the basement of a small house in southern Finland, and the taste of the insects was pleasant, even delicious. As it came out in our data, the incentive for the

[7] https://www.hs.fi/kuukausiliite/art-2000002813546.html. The monthly supplement reaches almost one million Finns, whereas the number of daily readers of the printed newspaper proper was 690,000 in 2017.

2015 original feature story came from the subjects themselves; they had contacted some journalists they knew, and from there on the hype grew with a snowball effect.[8]

The article acted as a starting point for a whole range of similar stories, both in *Helsingin Sanomat* and on the websites of the national broadcasting company, Yle. In these pieces, insect production was generally presented as a new upward trend, the ecological advantages of which were many and undisputed compared to industrial livestock production. Furthermore, it was argued, the products taste good. Some articles also interviewed former Finnish livestock farmers who had become insect producers. On the whole, the media stories presented insects as sustainable and nutritious, providing economic opportunities for farmers, startups, product developers, restaurants, and later perhaps also larger food manufacturers. In the pieces, insects are an exciting, pleasurable, and aesthetic food amenable to various dishes. The only obstacle in the way of a new Finnish success story, it seemed, was the Finnish authorities' strict way of interpreting EU regulation. The key actors (the companies) thus managed to enrol journalists into the network, where the companies (the enrollers) were allowed to act as spokespersons for the whole network, and their translation of the problem (the edibility of insects) was adopted as a plausible and desirable scenario for the future. By contrast, the authorities resisting this translation were symbolically isolated (see e.g. Callon 1986b).

The second strategy, trial, or testing the limits, was connected to media promotion, and it involved two retail stores situated in the centre of Helsinki. The first, Stockmann, is the oldest and arguably the most prestigious department store in Helsinki, and its food market bears a special reputation for luxury and stocking a wide selection of goods that

[8] N3 (CEO, startup company): '[…] And the fact that there were a lot of newspaper articles, it was like all manufactured. We got a lot of help from these half-acquainted media people who then recommended us to their colleagues. And then the Madventures guys got all excited, and they beat the drum for it on social media. And with the puff many media people then got hold of it.'

cannot be found elsewhere. In February 2017, the department store organized two demonstration events on the same day; the start-up companies, an insect farmer, a nutritionist and a chef specializing in insect dishes made short presentations and talked with the audience, and insects were cooked and served to those willing to taste 'at their own risk' (no plying or active encouragement was allowed).

The events were advertised by a newsletter sent to about 100,000 clients of the department store, a Facebook event, a preceding blogger event, and audio advertising in the department store. The authorities were contacted beforehand, and according to the marketing director they advised the organizers about the measures to be taken so that there would be no infringement of the law (for instance, using verbs like 'experiencing' instead of 'tasting' in advertising).[9] However, this is where the interpretations of the central actors diverge: the representative of the department store felt that the authorities 'helped' and 'instructed' the organizers about the concrete measures to be taken. By contrast, the representative of the Finnish Food Safety Authority said that they knew about the occasion and 'informed' the organizers about the existing law, who then modified their marketing by removing all reference to food and eating. As the authorities emphasized in the interview, from their point of view organizing such an event was by no means a recommendable course of action.

Thus, the contrasting interpretations that the actors made of the authorities' utterances resulted in a curious double standard where the forbidden was allowed if only certain cue words were avoided. Each case had to be negotiated separately, though, and

[9] Very similar strategies of evasion were also used in the thematic event organized by the Finnish Science Centre: not to urge people to taste (tasting was one's own responsibility), not to let children taste without the authorization of their parents, nor to advertise 'eating', even though the event was named 'Would you eat a cricket?'

there was no certainty about the result even if the habitual protocol was followed – the very same occasion prohibited one year might be permitted the next.

Another, more direct form of trial was adopted by one of the startup companies. This was done in close cooperation with another retail store, Ruohonjuuri ('The Grass Root'), the biggest vegetarian, organic, and superfood retail chain in Finland with stores in the capital area and other large cities. Compared to Stockmann, the public image of Ruohonjuuri makes it a more 'natural' niche for this sort of product to begin with, since the ideology of the chain is openly based on vegetarianism, sustainability, and overall wellness. The strategy adopted in this case was more upfront, because the store advocates its status as a 'bold pioneer', which also entails consciously testing limits. In the autumn of 2016, Ruohonjuuri launched a small glass jar filled with house crickets and muesli ingredients arranged in decorative layers under the label of 'kitchen decoration'. The jar was developed by the company producing farming cubes for house crickets, and the crickets in the jar came from such cubes. The label on the jars stated that the objective was to 'stir up ideas about insects as part of our food culture' and cautioned the potential buyer against consuming it 'before house crickets are accepted as human food' (a special warning for allergic people was added below the text). The jar became a popular Christmas present in certain trendy circles, and, in spite of the obvious provocation, the authorities let it pass.

At the beginning of April 2017, the store and the company launched another similar type of product, a cricket bag. This time the house crickets and the muesli ingredients were sealed in an opaque plastic bag with a label 'Cricket Bag' and in a smaller font 'A Kitchen Decoration'. On the reverse side, the label listed the ingredients under the heading 'cricket granola', provided the information on the protein and iron content of house crickets compared to beef and spinach respectively, and provided a text where 'good food' was

claimed to be ‘sustainable, local, and above all, delicious’. The label also stated that the buyer could ‘enjoy the product’ as it is, but immediately thereafter pronounced a warning that the product was ‘not intended as a foodstuff’ and gave an additional notice for allergic people.

This time the authorities reacted: within two weeks of the launch, the store was ordered to remove the product and the company was asked to change the labels and remove any reference to the ‘edible’ qualities of the product. The authorities failed to see any ‘decorative’ aspect in the bag, which the marketing manager of the store also judged as ‘ugly’ later in our interview: the bag did not sell, because it could not be interpreted as a ‘statement’ in the same way as the jar could, and its overall appearance was less ‘instagrammable’. The company changed the labels and some of the contents of their website, and by the end of April the bag came back on the market with a new rear label.

Although the bag failed to sell, it succeeded perfectly as a mediator: it modified the meaning of the material (the house crickets) it was carrying, transforming a decorative into an edible, thus blurring or even ‘carnivalizing’ the food/non-food distinction upon which the regulative prohibition was based. This happened when the bag was furnished with label describing the kitchen decoration in ‘edible’ terms. By the same token, the crickets put into the bag ceased to be a neutral material and started to *do* things – they transformed the inedible (decoration) into the edible (food), and forced another actor (the authorities) to change its behaviour (from the former semi-tolerance of different small acts of violation). Moreover, they incited a third actor (the media) to react: At the beginning of May, *Helsingin Sanomat* published an article describing the authorities’ point of view on banning

the cricket bag.[10] Two months later, Yle published a major online article in which a representative of the company involved was interviewed. There, he expressed his frustration at the policy adopted by the authorities, and claimed that this policy was an obstacle to the development of the sector.[11]

Both the cricket jar and the cricket bag opened up possibilities for action, thus creating new affordances for the material they were carrying. By doing so, they also shifted the border between the permitted and the forbidden. However, their performances as mediators varied from one audience to another. Whereas the jar incited the consumers to react (the jar sold very well), it created no change in the behaviour of the authorities; and respectively, the bag that made all the difference for the authorities did nothing for the consumers. On the other hand, the consumers possibly reacted also to the *aesthetic* aspect of the jar: they bought it, whereas the plain bag containing crickets mixed with other ingredients did not sell very well. Moreover, for the consumers, the pioneering 'statement' quality had been exhausted at this stage: the insect bag was just what it claimed to be, a bag containing insects. Hence, the affordances of the jar and the bag were directly dependent on the actor-network in which they participated.

The third strategy exploited to legitimate the product and enlarge the borders of the arena were different events where insects were *consumed*. An important question faced by the producers was how to benefit from a 'harvest' that could not be legally sold. A house cricket population grows 10- or 20-fold larger per generation (about 45 days), so the

[10] On the same day, *Helsingin Sanomat* also published an article on the potential of edible insects to improve global food security and described the author's visit to a food fair organized for journalists by the Natural Resources Institute Finland. Thus, although *Helsingin Sanomat* let the authorities have their say, at the same time it contributed to bringing forth the benefits of insect eating. https://www.hs.fi/tiede/art-2000005198932.html.

[11] https://yle.fi/uutiset/3-9746071.The bag also generated a lively discussion on social media, which, although it cannot be analysed here, should be included among the actors affecting the arena.

problem of space becomes imminent very quickly. The issue was solved basically by selling insect dishes at public festivals and private occasions or annexing insect-tasting to other activities, such as art exhibitions or beer tasting events. These occasions also offered an important channel for promoting edible insects and familiarizing consumers with the idea while the producers were waiting for the partial liberation of the market by the new EU law.

In a similar manner to Stockmann and Ruohonjuuri, the sellers needed to use a certain type of rhetoric when selling the insects. At Helsinki Night Market in 2015, the authorities, who were informed of the situation, did not allow insects to be sold as food. However, the organisers decided to sell insects as non-food and the authorities chose to look the other way: all reference to food and eating was removed, and the potential clients were even advised against it, while the statement from EVIRA concerning edible insects and the current interpretation of the EU regulation was displayed next to the stand where the 'non-food' insect dishes were sold. However, most of the insects produced were sold at private occasions organized by individuals or collectives. Since the legislation only applied to commercial activity, the authorities were not concerned. In this way the resisting actors were excluded by strategies of camouflage and by turning their own standards against them.

The strategies identified above – promotion in the media, trial, and consumption – bear some resemblance to those identified in the UK by Stock et al. (2016) in their analysis of a London-based insect food startup that used experimental tasting events, communication and re-education, and material transformation from whole insects to processed ones as their key strategies for advancing insect eating. The difference to our case is in the regulatory environment: in Finland, more effort was needed to persuade not only the public but also other actors about the potential of insects as food. On the one hand, together the different actors in the arena managed to create and stabilize a public representation of insects as a

new and exciting opportunity whose development was obstructed by EU bureaucracy and the Finnish authorities. On the other hand, in their effort to destabilize (enlarge) the borders of the arena, the companies forced the authorities to react, thus enrolling them into the arena as actors in a public spectacle that enhanced the visibility of the common cause. In this sense, the authorities functioned as an 'active obstacle', creating coherence between the other actors in the arena and strongly shaping their performances. The role of the authorities as a centripetal force in the dynamics of the arena is further accentuated by the fact that all but one of the companies included in the present study also emphasized their role as an ally: in fact, some actors had agreed upon a common policy of not *saying* anything too negative about the authorities. This can be seen as a further way of implicating the authorities as an *actor*, not just as a passive obstacle in the arena. Hence, through popular articles and media hype, selling and marketing campaigns, and different public and private events, the companies in the insect arena not only created public interest and expectations for insect foods long before they could enter the market; they also engaged the authorities in the game and built up pressure to allow the selling of insects as food.

On 20 September 2017, a major transformation in the composition of the arena occurred as the active obstacle suddenly disappeared: the Ministry of Agriculture and Forestry announced that it would change its interpretation of the EU Novel Foods Regulation and allow the sale of insects as human food (similarly to the Netherlands, Belgium, the UK, Denmark, and Austria). The decision was justified by food safety: the Secretary of Agriculture and Forestry noted in a press release that the insect industry and insect foods, which had emerged 'on the quiet', could now be regulated and monitored under the food law. One can speculate about the reasons behind the decision – after all, it did give the Finnish entrepreneurs a certain market advantage because insect products that

were on the market before the implementation of the new Novel Foods Regulation in January 2018 could remain on the market during the two year transition period lasting until the end of 2019 (see also Lähteenmäki-Uutela et al. 2018).

After this regulatory change, the whole centripetal constellation changed, actors were dispersed and started to form fresh connections. The arena quickly expanded and new translations between the existing regime of food industry and the emerging niche of insect production took place: established food manufacturers and innovative entrepreneurs adopted ideas from each other, developing larger networks, and testing out concepts (cp. Jørgensen 2012). In November 2017, Fazer, a major Finnish food manufacturer, launched a cricket loaf, and several new products came to the market, most of them offering insects in familiar food formats by either mixing them into existing foods or enriching foods with insects. The insect-producing startup company formerly operating mainly in the Asian market announced it would open up the 'largest food-grade insect rearing facility in Europe' in Loviisa, southern Finland, with the aim to 'increase production during 2018 to expand into hundreds of tonnes per annum' (http://nie.fi/, 28 November 2017). At the same time, a consumer survey showed about half of Finns would now potentially eat insects (Niva 2019).

However, as House (2016) has noted, the willingness to taste insects does not necessarily translate into the adoption of insects as part of the habitual diet. This seems to have been the case in Finland, too; at the end of 2018 and start of 2019, several newspaper articles announced that the 'insect boom' had faded.[12] Fazer stopped manufacturing the cricket loaf and the entrepreneur responsible for the insect rearing facility in Loviisa

[12] https://www.maaseuduntulevaisuus.fi/politiikka/artikkeli-1.351597, https://www.satakunnankansa.fi/a/201416966, https://yle.fi/uutiset/3-10595151.

announced a shutdown in early 2019 because of technical problems and insufficient demand.

Of the companies interviewed, two formerly focused on ready-made farming solutions have now expanded their business also into insect-based products, while the only company selling consumer products has extended its range of insect foods. The formerly Asian-based enterprise has expanded its business in Finland and is looking for new markets, whereas the part-time farmer who reared crickets in a cube in her backyard decided to shut down after the authorities announced their change of heart, because she wasn't interested in starting as a professional farmer. At the moment, the market seems to be in a quiet phase: the large manufacturers are in an expectant mood, while the smaller firms are hanging on, hoping that change – albeit slower than expected – is still on its way.

## *7. Conclusions: Towards a new research agenda*

The process analysed in this study can be linked to various sustainability problems in agriculture, such as greenhouse gas emissions, biodiversity loss, land use, water supply, and the need for feed. All of these issues are connected to the contemporary crisis of meat farming, as evidenced by public debates over the ecological burden of meat production and consumption (e.g. IPCC 2018, Nijdam et al. 2012; Ripple et al. 2017) and the consequently increasing interest in alternative – particularly plant-based – proteins (Jallinoja et al. 2019). The alternative protein arenas, which focus on developing vegan, insect, and laboratory-grown foods, are characterized by hype around startups and novel products. Hence, despite the fact that various alternative protein arenas suggest different solutions to the challenges of protein production (and their approaches to the use of animals in food production

collide), their environmental justifications nevertheless share a common basis, suggesting that they may feed each other in advancing alternative protein production and consumption.

However, the main focus of our paper has been on the concrete micro-dynamics through which a new 'arena of development' has been created in a specific historical and social context. Looking more closely at this process, the Finnish case is immediately striking due to the largely spontaneous manner in which the arena emerged, highlighting the often unstable and heterogeneous character of development processes (see Jørgensen & Sørensen 1999, 411). Whereas in the Netherlands, the various enterprises that appeared after the publication of the FAO report (2013) were established on an already existing network of research, business, and policy measures (see House 2018b), in Finland the arena evolved largely around startups that only then started to seek partners in research[13] and found ways of resisting and circumventing the official government policy.

This process can be described as an alignment of heterogeneous elements and actors (insects, technologies, media representations, knowledge, institutions, and practices) behind a common vision (promoting a product and creating a market) in the same manner as in the Dutch case (see House 2018b). However, a notable difference in the Finnish case is that the ensuing dynamics of the arena has revolved around an 'active obstacle', which has been assigned a role as both an obstructor and an ally. An 'active obstacle' in our sense does several things. Firstly, it brings together actors, but does this specifically by *preventing* them from deploying their planned trajectories. Secondly, by so doing it creates new bonds and connections among other actors. Thirdly, it canalizes action towards short-term strategies of opposition, circumvention and defiance instead of realization of long-term

[13] Of the companies interviewed, notably NIE and EntoCube have also participated in funding the 'Insects in the Food Chain' project that started in 2015 at the University of Turku and included larger commercial actors in the Finnish food production.

ideas and goals (i.e. it affects the immediate dynamics of an arena). The active obstacle resembles the 'mediator' in ANT: it is a connection which makes others do unexpected things, but it does this specifically by blocking, obstructing and deviating.

In our case, this active obstacle was constituted by the Finnish authorities' interpretation of the EU law and their concrete actions when supervising the compliance with it. Thus, in addition to the 'actor-worlds' (visions, scenarios, narratives, translations and distribution of roles, designed by the principal actors) emphasized in AoD, the affordances of insect food in the Finnish context have essentially depended on the position of this actor/entity, which has functioned like a valve, blocking possibilities, but at the same time opening up others. This obstacle has also incited the other actors to adopt a policy of cooperation with each other instead of competition, thus creating a sense of a common mission in a situation where the arena has been in a formative stage.

The zoom on the micro-dynamics of the transition process also brings out other slight differences of emphasis compared to AoD. Thus, although the conflict aspect stressed by AoD is well present in our case too, it doesn't reside where the original model would have it, that is, between conflicting interests, visions and ideas of the principal actors (the companies). Instead, in our case the conflict is found between the companies and the authorities which in the AoD would represent the socio-material environment. Also, it is not a conflict between competing ideas, at least not mainly, but between different assessments of the prevailing regulatory measures, the concrete situation and the meaning that each interested party attributes to the other's actions. These conflicting interpretations and assessments in turn influence the strategies adopted by the actors, thereby shaping the living dynamics of the arena at a given moment.

As a result, the status of the socio-material configuration as an independent level is somewhat contested by the dynamics of the arena. Although one can see the point in distinguishing this macro-level analytically from the arena itself, the concrete dynamics of the arena has a tendency to blur the distinction and engage the infrastructural 'environment' as one more actor-network in the play. Thus, the difficult question of what confines networks, which the AoD approach intended to answer by re-mobilizing the Callonian idea of actor-worlds (see Jørgensen 2012, 1001), is still left somewhat open, even though the analysis of the micro-dynamics of the arena hopefully gives a better sense as to how boundaries are created, stabilized and de-stabilized. From this point of view, our analysis takes the AoD model again one step closer to ANT.

All in all, the context in which the edible insect arena emerged in Finland can be seen as a network of actors that has shaped the 'horizon of possibility' of insect-based foods (see also House 2018b). However, unlike the Dutch network, the Finnish context has been marked by tensions and conflicts between the producers and the authorities, meaning that both the boundaries of the arena and the affordances of insect-based foods have been shaped by negotiations, micro-rebellions, the testing of limits, and media publicity. The companies in the arena have exploited different strategies of stabilization, aiming at normalizing the idea of consuming an end product whose actual use was juridically restricted. As a result, the producers have been obliged to disperse their product and use different tactics of circumvention (semi-illegal events, private occasions, and demonstrations). On the other hand, in the process of enrolling new actors, the companies have also developed these navigational strategies by establishing visions of societal change, engaging in technological innovation and changes in institutional frameworks, advising new patterns of use practices, and participating in micro-political actions targeted at all levels. These new actors –

researchers, the media agents, retailers, and enthusiastic individuals – have all contributed to shaping the boundaries of the arena (see also Jørgensen 2012, 1008).

From a more macro-oriented perspective, the regulatory frame of insect production and marketing has been analysed in other studies as a system that reflects social values, such as safety, nutritional quality, and animal welfare, but at the same time affects the marketing efforts of the firms and the selection of products available (Lähteenmäki-Uutela et al. 2018). In the Finnish case, the impact of larger government policies in the arena should not be forgotten either; the heavy public investment in startups has significantly contributed to the emergence of the edible insect arena, the development of which has then been obstructed by the strict policy adopted on questions of regulation. In future studies, it could be fruitful to focus in more detail on the visions, scenarios, and narratives in the actor-worlds and networks constituting the arena to shed more light on their potentially conflicting interpretations of the arena and the implications of these eventually contrasting ideas for its development. Also, the competing ideas, translations and scenarios between actor-worlds are probably more pronounced now that the dynamics of the field has changed. The rearing technologies, still very much on a developing stage, would also offer a fascinating subject for a more directly ANT-inspired study.

On the other hand, our emphasis on the micro-dynamics of the arena has illuminated the strategies exploited by actors in a situation characterized by resistance and conflicts, but also brought about by the strongly *unifying* role that an active obstacle can create in a network. In this situation, the strategies used by the actors are not only aimed at enrolling more allies into the network, but also at *making moves* around the obstacle: circumventing, carnivalizing, and even engaging in the dynamics instead of merely excluding or isolating. Indeed, the strategies used by the actors to cope with resisting elements seem to be more

varied than sometimes presumed in the ANT-inspired research constellations (see for instance Callon 1986b). As a result, interests and actions are aligned and the network itself becomes consolidated and stabilized.

In this sense, our analysis looks closer at the concrete small scale network-dynamics than does the AoD model from which we have drawn inspiration: although the original model emphasizes 'transitions in the making' (Jørgensen 2012, 996), the concrete examples given all seem to concentrate on big macro scale processes which have stretched over a long period of time and have already come to an end (see for instance Jørgensen 2012, 1003-1008). Hence, our application also concentrates on a much narrower time-slice than the original AoD model does. However, we hope that the analysis of a 'cross-sectional cut' could encourage our readers to see transitions also through a more powerful lens, targeting the process *à vif*, cut into slices, and without any certainty of its future outcome. This, we think, also corresponds to the original spirit of the AoD as expressed by Jørgensen (2012, 1009) – i.e. it pays explicit attention to the tensions and temporal situations involved in a transition process, facing the basic challenge of a situation where the boundaries are fluid and the result of the analysis is 'a fragmented picture rather than a complete theory'.

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