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Between Here and There. The Role of Social Entrepreneurship in Restoring the Supply Chain of Face Masks During the COVID-19 Crisis

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Abstract: As a cross-border, transboundary crisis, the COVID-19 pandemic affected societies worldwide, compromising socio-technical systems across geographical, judicial, and administrative borders. The outbreak can be considered a health crisis, but due to the measures taken to control the spread of the virus, it also exposed the global medical supply chain’s vulnerability. Formal authorities struggling to restore the supply chain caused serious problems in the crisis response as the supply of vital medical equipment was scrutinized. However, unexpected allies including social entrepreneurial initiatives provided bottom-up solutions to restore the broken supply chain. This paper seeks to bring attention to how social entrepreneurs respond to a crisis alongside the formal crisis governance system and generate resources related to product development and logistics. By presenting a case study about how Refugee Company’s “Mondmaskerfabriek” (Face Mask Factory) engaged with the cross-border dimension of the COVID-19 crisis, we show how a social enterprise was able to establish a supply chain and domestically produce personal protection equipment. As the article shows, both crisis management scholars and policy makers should pay more attention to the potential of social entrepreneurial activities during crisis.

Keywords: COVID-19 crisis response; supply chain; personal protection equipment; social entrepreneurship; resilience from below

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1 Introduction

The COVID-19 crisis, which was officially declared a pandemic on 11 March 2020 by the World Health Organization (WHO) (Cucinotta and Vanelli 2020), has deeply affected societies around the world. From a crisis management viewpoint, it can be considered a slow-burning, creeping crisis, implying that it causes “a threat to widely shared societal values or life-sustaining systems that evolves over time and space, is foreshadowed by precursor events, subject to varying degrees of political and societal attention, and impartially or insufficiently addressed by authorities” (Boin, Ekengren, and Rhinard 2020, p. 7). Indeed, the COVID-19 crisis had a long incubation time, and unlike a fast-burning protracted crises, it has no clear beginning or end, which means that it will remain undefined for a long time. It is also a cross-border, transboundary crisis. Societies worldwide have been affected, and the crisis has compromised complex socio-technical systems that stretch across geographical, judicial, and administrative borders (Boin, Ekengren, and Rhinard 2014).

The cross-border, transboundary dimension of the crisis became visible in many ways as it affected virtually all aspects of society. Perhaps the most striking problem during the first wave of the pandemic (January–May 2020) was the severe impact on supply chains, production lines, and manufacturing in various economic sectors (Burger 2020; De Sousa Jabbour et al. 2020). The outbreak revealed the vulnerability of the global medical supply chain, especially for testing materials and personal protection equipment (PPE) (Gereffi 2020; Illahi and Mir 2021; Ivanov and Dolgui 2020; Mollenkopf, Ozanne, and Stolze 2020). The global supply chain clearly lacked resilience as it had become too dependent on a small number of PPE producers, particularly from China, with hardly any domestic production of PPE occurring in most European countries (Kovács and Falagara Sigala 2021). Because of its lean-and-mean nature, the chain lacked the buffers (i.e. PPE stockpiles) that are crucial for a crisis situation requiring a sudden increase in demand (Esper 2021; Iyengar et al. 2020; Kovács and Falagara Sigala 2021; Rowan and Laffey 2020). Though the supply chain in ‘normal’ times functions effectively and efficiently, its lack of high reliability, for which building in redundancy to compensate for disruptions is necessary (Peters et al. 2023; Weick and Sutcliffe 2011), caused a bottleneck in the crisis response.

While formal authorities struggled to restore the supply chain, and in the process caused serious problems (Barr 2020; Ji et al. 2020; Livingston, Desai, and Berkwits 2020), other actors came into the field, creating unexpected alliances with formal authorities to mitigate the effects of the crisis. Industrial enterprises, for example, joined forces to produce needed products outside their normal scopes of operation (Attaran 2020; Hoekstra and Leeflang 2020; Vordos et al. 2020). Independent entrepreneurs successfully produced respiratory ventilators, face masks, and hand sanitizers domestically...
through companies that did not traditionally belong to the field of medical equipment producers. Such entrepreneurial and industrial initiatives took place in various parts of the world during the first months of the pandemic.

This paper focuses on the value of bottom-up generated initiatives in relation to top-down policies during the COVID-19 crisis (Boersma et al. 2022a). It highlights the role that social entrepreneurs played in restoring the complex cross-border ecosystem of PPE. In presenting innovative social entrepreneurial activities (Christensen, Raynor, and McDonald 2015) in the production of PPE, particularly face masks, we aim to contribute to the growing attention on the private sector’s overlooked role in harnessing resources in response to crises (Horwitz 2009, 2020). By using the notion of societal resilience in relation to meaning-making and concrete social-entrepreneurial activities we would like to emphasize the strengthening capabilities of local organizations in response to crises (Aldrich 2002; Comfort et al. 2010).

Our main research question is: How did social entrepreneurs give meaning to the cross-border dimension of the COVID-19 crisis to set up (domestic) production of PPE to restore the broken supply chain from the bottom up?

To answer this question, we first elaborate on the meaning making process of social entrepreneurs in relation to the broken PPE supply chain during the COVID-19 crisis. Next, we will present our methodological approach and research methods. We then present an in-depth case study from the Netherlands: why and how “Refugee Company” – a social enterprise – set up a production line for the production of face masks. We will end by discussing the broader implications of this research to highlight the importance of social entrepreneurs in crisis response.

2 The Broken Supply Chain and the Potential Role of Social Entrepreneurs in Crisis Response

The diffuse nature and inherent complexity of the COVID-19 crisis meant that coordination and decision-making had to cut across various working processes (Wolbers and Boersma 2018; Wolbers et al. 2016), institutional designs (Boersma and Wolbers 2021) and organizational networks (Boersma et al. 2021; Treurniet, Boersma, and Groenewegen 2019). However, restoring the supply chain as part of the crisis response was not just a matter of integrated actions coordinated by a central authority; it also involved emergent, innovative actions from the bottom up (Van Fenema and Romme 2020).

In April 2020, EU countries started to report PPE shortages: China, the main producer of PPE, had drastically decreased its exports of such materials (Campbell and Doshi 2020). This situation became problematic in various member states, including Italy, Spain, France, and the Netherlands, countries with very high numbers of patients
in intensive care units. In response, the EU Commission launched joint public procurements through which its member states hoped to address their PPE shortages. These initiatives aimed to procure a range of essential items from masks to laboratory equipment to medical ventilators and other respiratory equipment. However, the Commission struggled to utilize its potential as a crisis manager (Boin, Ekengren, and Rhinard 2013) and to take a coordinating role. As a result, individual member states began purchasing equipment and making bilateral agreements with suppliers. Furthermore, the EU Commissioner for Internal Markets reported that national purchasers were facing immense pressure to guarantee PPE availability.

In this context, social entrepreneurs played an important role with their willingness to solve social problems and effect social change (Dacin, Dacin, and Tracey 2011; Mulgan 2006; Nicholls, 2008; Nyssens 2006; Phillips et al. 2015). The characteristics ascribed to (social) entrepreneurs in the literature – *bricolage* (applying the resources at hand to new problems and opportunities), *improvisation* (performing unplanned activities not governed by routines), and *effectuation* (taking available means as given and focus on selecting between possible effects that can be created by those means) (Archer, Baker, and Mauer 2009; Sarasvathy 2008) – make them potentially useful allies for formal crisis response organizations and authorities.

To study social entrepreneurship at times of the COVID-19 crisis, we conducted an in-depth case study into the Dutch Refugee Company’s “Mondmaskerfabriek” (Face Mask Factory – referred to in this article as MMFactory). The Refugee Company is a social enterprise established in 2015 that took an active role in the Dutch crisis response and management, supporting refugees during the so-called refugee crisis of 2015–2017 (Boersma et al. 2019; Larruina, Boersma, and Ponzoni 2019). Since then, it has adjusted its mission to assist asylum seekers in reception centers and status holders (asylum seekers who have obtained the legal status to remain in the country) with their socioeconomic inclusion. Refugee Company’s mission is to enable refugees to move toward social and economic independence by gaining experience and getting acquainted with the labor market, training, and education opportunities. Through its commercial subsidiaries (restaurants), making the organization economically independent and sustainable.

In presenting the case, we build on the notion of *societal resilience* by recognizing the potential for the adaptation and transformation of a crisis management system and a global supply chain through the self-organizing activities of a social enterprise. In the 1970s, the term became increasingly used in resource management, engineering, and ecology. More concretely, the concept has been used to understand processes of adaptation and transformation due to the work of the Canadian ecologist Holling (1973, 1986), who saw resilience as a lens to study how natural systems could reach stability after an unforeseen and severe shock. Ever since, this notion of resilience has been used to explore the responses of individuals, organizations, and communities when confronted with challenges (Van Trijp, Boersma, and Groenewegen 2018, 2019). However, it also
became contested because it became part of neo-liberal narratives and policies (Anholt 2022; Chandler and Reid 2016; Hall and Lamont, 2013; Joseph 2013). In the context of a crisis, this means that formal authorities are encouraging and sometimes mandating that local communities and stakeholders become self-reliant without providing them the proper support and resources (Anholt and Boersma 2018; Walker and Cooper 2011).

While we recognize the neo-liberal bias in the way societal resilience has been used by policy makers and politicians, by focusing on the Refugee Company’s *meaning-making* and bottom up activities in this article, we want to do justice to the actions of communities and stakeholders that aim at strengthening the adaptive capacity of a social system (i.e. the supply chain) during a critical period/situation. We refer to meaning-making rather than sense-making. While these concepts are often used interchangeably, they have different meanings. Sense-making (Weick 1995) is the ability to make sense of a situation and be aware of it to make decisions, while meaning-making is the process by which an individual gives meaning to situations based on previous knowledge and experiences (Park 2010, 2016).

Meaning-making happens when individuals interpret, understand and contextualize life events given their beliefs (Park and Folkman 1997). Individuals hold a global meaning, which offers motivation and an interpretation framework for their life experience. When a situation threatens the global meaning, a situational meaning emerges as individuals assess and assign meaning to the (new) situation (Park 2010, 2016; Yang et al. 2021). Meaning-making is particularly significant in adverse circumstances because when facing negative situations, individuals are likely to cope by reassessing these situations and looking for a more positive understanding of the situation and its consequences.

### 3 Methods: an Interpretative Case Study Approach

Our research used a qualitative, interpretative approach (Schwartz-Shea and Yanow 2013; Yanow and Schwartz-Shea 2015). This methodology implies inductive reasoning, whereby statements/premises are considered as evidence of, but not a guarantee of, the conclusion’s veracity (Bryman 2012; Rainbolt and Dwyer 2014). It builds on the idea that we should understand social reality through meaningful actions and interpretations of events. The interpretive approach allows us to focus on the description and understanding of “the actual human interactions, meanings and processes that constitute real-life organizational settings” (Gephart Jr. 2004, p. 455). Throughout the whole process of data collection we were particularly interested in the process of *meaning-making* and the concrete activities of the actors involved.
To combine different data collection methods and adapt to the dynamic situation studied, we used a qualitative, in-depth case-study (Yin 2011). The case study allowed for continuous description and comparison of data and theory by zooming in and out (Nicolini 2009). By zooming in on Refugee Company’s actual practices, we were able to understand how it succeeded in setting up a production line for the manufacturing of PPE, and by zooming out, we were able to recognize the role of entrepreneurship (especially in restoring the medical supply chain) during a crisis. For this case study, we utilized qualitative research methods including interviews, primary data collection, and document analysis (Mason 2017). These methods were used to deconstruct and reconstruct important moments and events in Refugee Company’s response to the COVID-19 crisis.

We interviewed key actors in the setup and running of the factory. Three of them were from external stakeholders that played a vital role in transporting the first machines and materials (KLM Royal Dutch Airlines), financing the factory (Philips Foundation), and installing and monitoring the machines (Qing Engineering and Consultancy). Next, we interviewed professionals working ad honorem. Those included experts in food production, “inward/outward” logistics management (in particular an expert formerly from Bol.com, the largest online store in the Netherlands). We also had several conversations and interviews with the Refugee Company (and MMFactory) director.

Semi-structured interviews were used to deconstruct and reconstruct the case study, allowing relevant themes to surface, and to take advantage of unique opportunities that might occur during an interview. Document analysis involved the study of press releases and publicly available material (social media, media appearances) and confidential material, providing data to complement the interviews’ findings (Bryman 2012). We analyzed the data to create a narrative about Refugee Company’s initiative. This narrative provides details about the company’s contribution to restoring the PPE supply chain from the bottom up. It also reveals how the company managed to establish a production line and successfully produce face masks.

4 Refugee Company in Action

In the Dutch context, the National Institute for Public Health and the Environment (RIVM) has played a significant role in response to COVID-19 (particularly infectious disease experts but also behavioral experts to a lesser extent) and in the development of knowledge on infectious diseases and the effectiveness of measures. In the event of a nationwide infectious disease outbreak, the RIVM’s Center for the Control of Infectious Disease plays a coordinating role in controlling that disease. The RIVM convenes an
Outbreak Management Team (OMT) with specialists and experts with different medial backgrounds and knowledge about the disease and its control. However, the actual decision making in such cases is done by the Dutch government (the state) as the formal responsible authority (Boersma, Kyratsis, and Wolbers 2022b; Van Duin et al. 2020). During the COVID-19 crisis the Dutch Ministry of Health, Welfare and Sport founded the Landelijk Coördinatiecentrum Hulpmiddelen (the National Consortium for Medical Supplies; LCH) in collaboration with the healthcare sector (hospitals, academic centers) and suppliers and manufacturers of medical aids. The LCH was set up for the joint procurement of medical supplies, monitored the national daily need for medical supplies, and arranged distribution. Refugee Company was one of their new PPE suppliers.

One month after the first lockdown in the Netherlands, Refugee Company announced the beginning of operations in their new mask factory in the Dutch city of Arnhem. They aimed to produce certified surgical masks locally in a factory operated mainly by status holders living in that municipality. The press release shared with 250 media outlets read: “Status holders are working hard to reduce the face mask shortage in the Netherlands” (translated from Dutch). In March 2020, Refugee Company had two subsidiaries: Makerspace (clothing design and production) and Beautiful Mess (restaurants in three different locations). Starting that March, however, those activities were severely impacted by the pandemic. The protective measures established in the Netherlands (physical distancing, working from home, etc.) meant that they – like so many other enterprises – had to develop online activities or temporarily cancel their operations.

In February 2020, with the impending outbreak of COVID-19 in the Netherlands, the management team began to consider the possibility of producing masks. The Refugee Company considered the COVID-19 crisis as an opportunity to start the MMFactory and contribute to the restoration of the broken supply chain by producing face masks domestically. It was supported by the Philips Foundation (financial support) and Qredits (micro financing; financial support). The Ministry of Economic Affairs and Climate Policy and the Ministry of Health, Welfare and Sport also played a large role in providing financial support and in creating the market/distribution. The LCH, responsible for coordinating the distribution of PPE in the Netherlands, guaranteed the purchase of 1 million face masks per week. Another important governmental partner was the Municipality of Arnhem, with whom Refugee Company collaborated in creating jobs for refugees/status holders.

The following quote from their blog (23rd February, 2020) suggests some of the early steps taken and the maneuvering of social capital (the networks and relationships of individuals who live and work in a given society or community) that was needed to make the factory a reality (translated from Dutch):
I am thinking along with Naz Kawan (co-initiator), who, along with the atelier team, is developing face mask samples. Different models are being tried out, and we are looking into whether they can be certified in conjunction with De Waag1.

Once Refugee Company had the idea to initiate a factory, they needed funding, material, and machines to turn their ideas into action. Furthermore, due to the dynamics of the pandemic, the factory needed to start running and delivering as soon as possible.

This whole venture cannot go on unless someone lends us three or four tons [a serious amount of money] in the next few days. That doesn’t seem like much in such a crisis, but that usually takes a few months as a social entrepreneur. We are not a big organization, which is also good. We are not doing this out of commercial interest. We genuinely believe that we can do something about the enormous protective equipment shortages in healthcare. And it is precisely the small, flexible social entrepreneur with guts who can speed things up and get this project going. However, setting up a factory in three weeks is a bit absurd. (MMFactory director, blog entry, 31st March 2020)

The company relied on its network of business and social contacts to finance its project. This is clearly expressed in the following quote.

We have a good relationship with donors and various parties, so we have started calling around in our network. We have developed a good business case. Philips Foundation is the first party to believe in this plan. They have been brainstorming with us for the past two weeks about how to best source raw materials, and an expert provided us with the know-how of the technology and the market. We already obtained €100,000, so now we are looking for another €200,000 to €300,000. (Blog MMFactory director)

Once they created a business plan and obtained initial support from the Philips Foundation, they presented their plan to funding organizations and obtained the amount needed.

Qredits has told us that they can support our project with a loan of €250,000. This is unbelievable, especially as they told us that they have never pledged such a large amount in three days. (MMFactory director, blog entry, 2 April 2020)

Getting (financial) support from the Dutch government for such a project usually requires serious negotiation. The COVID-19 crisis, however, proved to be a powerful ‘opportunity window’ that enabled the MMFactory’s director to speed up the process.

1 https://www.mondmaskerfabriek.nl/updates/kdm-last-minute/. De Waag is a knowledge institute in Amsterdam operating at the intersection of science, technology, and the arts. It focuses on technology as an instrument of social change and is guided by the values of fairness, openness, and inclusivity: https://waag.org/en.
5 Setting up the Production Line

After establishing MMFactory, the next step was acquiring, installing, and correcting the functioning of the relevant equipment. Because setting up a production line for fabricating face masks was complicated and outside the scope and expertise of Refugee Company, Qing Engineering and Consultancy collaborated with the company, offering engineers who could advise them on how to set up and operate the production line.

We are an engineering company. And what we do is we help companies optimize their production facilities […] because the machines, when they arrived here from China, they did not comply with European regulations regarding safety. Not on any level. […] It was just, it was a hazard. So, the first thing we had to do was modify the machines to make them comply with European regulations. (Respondent from Qing Engineering and Consultancy)

Refugee Company had to build the production line from scratch. With help from the company founder’s sister who works as a KLM pilot, they were able to import the production machines from China in cargo space offered by the airline (See Figures 1 and 2).

At the beginning of its operation, MMFactory employed 20 status holders living in Arnhem, enabling the factory to expand its working hours and production. To be considered for this position, status holders had to have completed their Dutch residence exam or be in the latter stages of preparation. Thus, this social initiative brought together the production of certified masks and the recruitment of status holders living in Arnhem, enabling the factory to expand its working hours and production. To be

Figure 1: Machines being loaded onto the KLM cargo flight from Shanghai (Captions are from the video blog, with authorization from KLM’s Communication and Marketing department).
holders, who gained experience and learned essential skills for their socioeconomic inclusion in Dutch society. The following statements from press releases agree:

- We are proud that we can contribute to a social enterprise that can make a difference in these times. Our form of social credit is a perfect fit for social initiatives such as these, which also create work experience places for refugees in the Netherlands. (Commercial director of Qredits)

- It is great that there will be a factory in Arnhem where face masks are produced. […] Thanks to the good collaboration between our municipality and Refugee Company, they were able to switch quickly and they managed to achieve this in a very short time. It is great that in this way, inhabitants of Arnhem with a refugee background can contribute to fighting the Corona crisis. (Alderman for the Municipality of Arnhem)

6 Creating the Masks

As important as setting up the production line was the question of which type of mask to make and what was needed to make it. From the beginning, MMFactory focused on making certified 3-layer surgical masks, type IIR, which are suitable for regular hospital care, elderly care in nursing homes, home care, and oral care (Mondmaskerfabriek 2020; Philips 2020). This type of PPE was chosen because it has a relatively easy certification process, and it is widely used in public transport, private venues, and the streets. Its wide use also provided more chances to find potential buyers and guarantee a more sustainable business model. It is important to note that the contract with the Ministry of Health, Welfare and Sport was not completed until July (three months after starting operations and deciding which type of mask to produce).
So, the initial thought with Refugee Company was to produce FFP2 and FFP3 masks, which are high-grade masks where you need a lot of certification, a lot of audits. [...] So, we said, do not do that. Make what we call surgical masks. They are less regulated. And these will always be needed because, guys, you’re also both sitting in Amsterdam. If you go to the tramways or the subways, you have to wear a face mask. That need will always be there. [...] Everybody is wearing the surgical mask. So, if you want to have a sustainable business model that is also a part of COVID-19, you have to have a product portfolio that lasts beyond that. (Respondent from the Philips Foundation)

However, setting up a face mask production line from scratch was not easy. Medical masks have a sophisticated fabrication process. Their filtering and protecting capacity rely mainly on multilayered structures made of non-woven fabric. The standard material used is polypropylene, which is “melt-blown” to form fibers that can catch small particles in the air that passes through, possibly thanks to electrical charges (electret treatment) (Chellamani, Veerasubramanian, and Vignesh Balaji 2013). Refugee Company’s concern, therefore, was to obtain good quality raw material:

And then I called Jaap,² who’s also my shareholder here in the restaurant. And I know he used to live in China. And I called him and I said, well can’t we arrange something from China so we get the right filter material and can at least work with the right materials here. (MMFactory director)

Refugee Company arrived in the PPE production ecosystem with the motto “To reduce dependency on factories on the other side of the world” (MMFactory press release) and with the aim of responding to the medical face mask shortage in the Netherlands. They were one of the first factories to produce PPE domestically. Production began with filter material obtained from Philips intermediates.

The Philips Foundation has been involved from the start. It is great to see how we can use the knowledge from Philips intermediates and convert it to filter material crucial for ensuring the quality of these medical face masks. (Respondent from the Philips Foundation)

However, obtaining high-quality material was difficult, not only to start but also to maintain a steady production of masks. The main challenge was finding reliable and stable suppliers, which were not available in Europe at that time.

What you saw during the COVID-19 crisis is that you saw a lot of fake suppliers coming into the markets. Companies who never produced PPE before, all of them had millions available at horrendous pricing without the right certification [...] an interesting Wild West business today. (Respondent from the Philips Foundation)

The MMFactory logistics manager described the difficulty of obtaining raw material for the masks and the lack of European suppliers in the following:

² Independent entrepreneur who co-founded MMFactory.
We don’t have a fixed supplier, so we buy what we can buy. But it’s pretty ad hoc, pretty chaotic. We work sometimes with companies that don’t speak English. So, Jaap’s wife, she is Chinese. She then does the communication. I, myself, I’m not able to communicate yet with the parties involved. So that makes it a bit difficult to structure this in a way I would like too. But that’s the reality of where we are at the moment, is that there’s a big scarcity, and we buy what we can get our hands on […] But there’s a big risk that this whole venture could run out of supply if we cannot secure a more structured supply, supplier for our base, base materials.

Once the obstacles to obtain materials were temporarily fixed, the question became how to transport those materials to the Netherlands.

We have quickly come to realize that the necessary raw materials are not easy to obtain. […] My sister is a pilot for KLM and flies the 747 airplanes. She is coincidentally flying to Shanghai today to pick up respiratory equipment for the ministry. I will call her to ask if she can bring back a roll of cloth. I will explain to her what it is for. I will also call Jaap, as he is always willing to think along. He lived in China for 5 years, and together with his wife Ling, he spent some hours calling around and close to Shanghai. They found a factory that can supply 25 kilos non-woven meltblown, which is good for 25,000 masks. (MMFactory director)

The following quote shows how it was just by chance that the KLM pilot could bring the sample material needed to start operations.

I was involved because on the 23rd of March, I had a flight from the 747, I was flying for KLM from Amsterdam to Shanghai to pick up medical needs and cargo […] I text my sisters, I have four sisters, one of them is Fleur [MMFactory director]. So, I text them, I am going to Shanghai to get medical supplies and then Fleur asked me, “Okay. Oh, that is nice. Can you pick up some fabric, filter fabric to do it by hand [to make masks]…”?

As part of China’s measures to control the spread of COVID-19, foreign airline personnel could not leave their hotel or even their room. Furthermore, they were accommodated in a state-run hotel, which meant the staff spoke very little to no English, making the possibilities for communications almost non-existent.

We are staying in a Chinese hotel. We are not in a fancy Crown Plaza or easy to find Hilton… you know what I mean? I am in a state hotel in Shanghai. I do not know where. […] Everything was surreal. Because at that time, it was just starting [the pandemic], you know, in the Netherlands. So, like, it was surreal. And then after three hours, we were in the hotel, and it was a really Chinese hotel. They did not understand any English. And I went to my room, and my WhatsApp did not work… […] And then after two hours I was asleep, and Fleur woke me up by phone, and she said, there is a Chinese guy downstairs with 25 kg of fabric. (Respondent from KLM)

7 Certifying the Masks: The Last Hurdle

Despite setting up its production line, knowing which type of product they wanted to make, and having the material they needed to make it in May 2020, MMFactory could not
start producing fully certified PPE until October 2020. The six-month delay was due to the certification process – the preparation, application, and final approval of the relevant certification necessary to sell their product to the Ministry of Health, Welfare and Sport.

Every machine needs to be certified. Every packaging you do needs to be certified. Every fabric you work with needs a specific certification. So, if you change a supplier to another one, you need to certify this whole product again. (MMFactory director).

The product needs to be tested on several parameters and that needs to be done at an accredited test lab, which is not available in the Netherlands. (MMFactory production manager)

This delay was worsened because certification of medical products no longer takes place in the Netherlands. Furthermore, because of the pandemic, there were long queues at laboratories and test centers all over Europe. Some of these places were declining to certify more products due to their huge backlogs. Moreover, certification is a long process that can take up to two years. To get the quality of their masks approved, Refugee Company sent batches of the masks to accreditation institutes in Austria and Spain.

We were working with Austria because there is no certification in the Netherlands possible, the knowledge is not here. [...] So, we have sent it in now to Austria and to Spain. And in Spain it takes 12 working days. And in Austria, they said 10 working days, but they’re already 20 working days busy with our products. So that takes a longer time. And they also told us, yeah, the whole world wants this now [certification of PPE]. So, yeah, you just have to wait. And the thing is, now we’ve sent in things, we don’t have the fabric anymore from that supplier. So, Monday we will maybe get something back, but then we need to start all over again because it’s a different supplier. (MMFactory director)

The MMFactory director also reported that “after tests, it turned out that something was still not 100 percent in order.” This was a shock to the director. The factory had applied strict quality control requirements from the beginning of its operations because it aimed to produce PPE suitable for hospitals and other clinical care. The failure to pass the first round of tests was mainly due to small dust particles found in some of the masks. This issue was corrected by setting up a white room (a type of clean room). Once certification was obtained, the MMFactory was ready to produce and deliver masks to the LCH, honoring its contract with the Dutch Ministry of Health, Welfare and Sport for 50 million masks. “It is great that it worked out [the whole venture]. Everything we make now, we will deliver to healthcare” (MMFactory director, quoted in Heller 2020).

8 Producing Masks in a Dwindling Market

The factory remained in its original location until March 2021, when it moved to a larger space with room for eight machines that could produce up to two million masks per week.
The MMFactory, a producer of medical masks in Arnhem, has moved to the IJsseloord business park. About 2 million masks per week will be produced at the new location in the short term. The MMFactory had been looking for a new, larger factory hall for some time, with space for eight face mask machines. [...] They are currently making 1 million face masks per week for the Dutch government. By the end of April, they expect to make 2 million per week. (Gelderlander, 21 March 2021)

By March 2021, almost a year after starting its operations, the MMFactory was the third-largest mask producer in the Netherlands. However, with the reduction in COVID-19 cases and the increase in vaccinations envisaging the end of the pandemic, stockpiling more masks was becoming unnecessary. This development extinguished any possibilities of extending MMFactory’s contract with its sole customer, the Ministry of Health, Welfare and Sport. The minister clearly explained this during her visit to the newly opened factory:

The government supported the manufacturers and ensured that the masks ended up at hospitals and nursing homes. “But we actually have to go back to the situation in which healthcare organizations buy their medical devices directly from the manufacturer again.” (Gelderlander, 26 March 2021)

The ending of the contract with the Ministry of Health, Welfare and Sport meant that MMFactory would need a new strategy to remain sustainable and in business.

The purchase and sale of masks will, therefore, soon take place through the free market again. This is a reason for the MMFactory to “reinvent its own company,” says Stelwagen [business partner]. So far, we have been in calm waters, but after the 1st of June, a kind of abyss will follow. We also see a challenge in that. We have to look for new customers for our masks, but we will also see if we can make other disposable medical products. For example, aprons. Or IV bags. We are also open to developers of medical devices or products who want to outsource part of the production. (Gelderlander, 26 March 2021)

According to the MMFactory director, the contract ending 1 June 2021 had been extended to 1 September, which gave them three extra months to deliver the 50 million masks agreed to in the contract. Simultaneously, she began to look for new business opportunities for after the COVID-19 crisis:

Last year we produced at a cost price with a margin on it. Prices are now lower due to improvements in our production process. Our price is commercial, but it is much lower than the prices I read in the stories about other face masks. We now have one customer, the LCH, and the contract expires in September. After that, we will be a start-up again that aims for 30 % of the Dutch face mask market – that is around 150 million pieces outside Corona time, especially for dentists and hospitals.3

The MMFactory's face mask production indeed helped restore the broken supply chain. Their future may be uncertain, especially because China is increasing its production of PPE again and offering face masks at competitive prices. Still, the factory has many potential customers who have already inquired about possible supply contracts, primarily healthcare providers and organizations willing to buy masks for their staff. The Dutch government has expressed the desire to have face masks permanently produced domestically as an answer to the vulnerability of global, cross-border PPE supply chains. It therefore follows a growing consensus that producing face masks at the community or national level is a way to overcome and prevent local shortages during crises, thereby maintaining supply chains and making them more resilient (Missoni, Armocida, and Formenti 2021). This possibility, however, is by no means something that can be taken-for-granted.

As MMFactory was finalizing its contract with the Ministry of Health, Welfare and Sport, former civil servant and opinion maker Sywert van Lienden, along with his two business partners Camille van Gestel and Bernd Damme, started to supply medical masks from China. The Minister of Health, Welfare and Sport agreed to a €100 million deal, allowing Van Lienden and his partners to import millions of face masks. While Van Lienden claimed it was a non-profit arrangement enabled by a charity (Stichting Hulptroepen Alliantie) in reality the face masks were imported via a limited company (called Relief Goods Alliance) that Van Lienden and his partners set up for that express purpose.

The Dutch investigative journalist platform Follow the Money discovered that the three had earned about €20 million on the deal. This caused outrage in the House of Representatives and in Dutch society. Commissioned by the ministry, the professional services firm Deloitte published an extensive report in which one of the conclusions was that the ministry pushed through the transaction with Van Lienden and his partners (Deloitte 2022). In the report, the Deloitte researchers stated that the National Consortium of Resources (LCH) felt pressured by the ministry to cooperate with Van Lienden’s company. Despite the fact that in a response to the report Van Lienden and his business partners stated that no irregularities had taken place because the ministry knew that a commercial agreement was being made, dissatisfaction persisted that they had deliberately caused confusion about the connection between their non-commercial and their commercial initiatives.

The MMFactory director responded to this affair in a public interview: “I find the stories about Sywert van Lienden saddening. If it is true that he said they were not purchasing face masks from China to make a profit, but then ultimately earned a lot from it, that is of course not good. However, I also recognize the madness of that time in those stories. Everyone was trying to get [a] hold of the machines and raw materials for the production of face masks.”
Indeed, it was not just social entrepreneurs such as the MMFactory director who saw both a business opportunity and an opportunity to contribute to mitigating the crisis. Yet, whereas “cowboys” and less scrupulous people appeared in the market aiming at short-term profit, social entrepreneurs were motivated by adding value to the system by starting up the domestic production of face masks.

9 Conclusions

In this paper, we provided an in-depth case study on an innovative contribution, meaning-making process, and concrete actions of a social enterprise to contribute to the discussion on the promising role of emerging, bottom-up initiatives in response to crises. Refugee Company gave meaning to the cross-border dimension of COVID-19 by responding to the crisis alongside the formal crisis governance system. It did not stand by as passive spectators, but brought to the core of their operation the most pressing issue that society faced at that time, the production of PPE during the pandemic. Refugee Company’s ability to apply resources at hand to the problems of PPE shortage (bricolage) and their ability to set up activities not governed by previous routines (improvisation) made them crucial government allies in restoring the broken supply chain.

The case study we presented shows that social entrepreneurial activities can play a valuable role in strengthening supply chains to make them more sustainable and resilient. Refugee Company brought together different actors and domains to obtain funding and the material to create the factory. While they were dependant on China to buy the machinery needed for the production of face masks, they were able to gain some independence after importing the machinery to the Netherlands. At that point, Refugee Company was able to start working with local engineering firms to set up the production line. By making the production happen in collaboration with local actors, it became less dependent on the expertise from China.

Our analysis provides important lessons for both practitioners and policymakers. At the policy-making level, formal authorities and agencies should invest in building and sharing capabilities and recognizing the value and potential of societal resilience. In addition, different actors need to work together at the civil protection level to mitigate the impact of future (health) crises. Investing in collaboration is needed to manage the presence of many actors and allow them to connect with concurrent initiatives. This would contribute to avoiding overlapping activities, preventing and resolving conflicts, and answering questions that arise from the crisis and its effects. In order to create and foster activities from the bottom-up during crises, communication among actors should be based on feedback and multi-lateral interactions and not a top-down process.

The complexity of cross-border, cross-boundary crises such as COVID-19 calls for collective ownership that would allow all actors in society (from individuals to
organizations) to contribute to the amelioration (and eventual solution) of the problem so that they can all benefit in the immediate, medium, and long term.

The challenges in maintaining the global supply of PPE during the COVID-19 crisis have shown that building more resilient supply chains and diversified resource channels is crucial. Given the cross-border and cross-boundary nature of current crises related to global risks and challenges, including climate change, rapid urbanization, poverty and vulnerability, (forced) migration, mass tourism, animal welfare, and loss of biodiversity, global supply chains will likely be under constant pressure in the future. Refugee Company’s entrepreneurial initiative to develop a supply chain, set up a production line, and begin the production of face masks during the COVID-19 crisis shows what an important asset such an initiative can be.

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