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ABSTRACT

Novel strategic alliances have been emerging quickly in response to the Covid-19 crisis. We know much at alliance and firm-level about the benefits and challenges associated with different types of alliance configurations, however there are still gaps in our knowledge about the connection between alliances and impacts on society and the environment. In this paper, we use a novel dataset of 217 strategic alliances that have emerged between January and April 2020 in response to the Covid-19 crisis. We analyze which alliances have emerged and how these alliances are tackling different needs related to the crisis. We find that alliances focus on three main categories of needs: core healthcare, pandemic management, and underlying social needs. We explore and categorise the types of alliance approaches associated with different needs. By doing so we provide a structure for identifying the connection between alliances and systemic challenges. We also identify drivers for the acceleration of inter-industry alliances including a close connection to user needs. We provide implications for the current crisis and for the period post-pandemic when there is a global opportunity to rebuild collaboratively in ways that can foster sustainable development.

¹ *Keywords:* strategic alliances; Covid-19; healthcare innovation; sustainable innovation;



Introduction

The Covid-19 crisis began as a global health emergency and is now becoming a global economic and social crisis, due to the infection control measures imposed around the world ([Kuckertz et al., 2020](#)). In response to the multi-faceted nature of the crisis, we are witnessing rapid growth in novel alliances to address different needs as they have emerged. From alliances that focus on developing vaccines to those that tackle shortages in personal protective equipment (PPE), there are examples of intra-industry, inter-industry and cross-sector alliances emerging quickly around the world. The literature on alliance formation provides a solid foundation for understanding the benefits and challenges of alliances between different partners. For instance, complementarity between knowledge from the partners is an important feature of successful alliances ([Dooley et al., 2016](#); [Sandulli et al., 2017](#)). Partner diversity is an important driver of alliance outcomes, and yet alliances between partners that are cognitively distant for example from different industries or sectors can be challenging to manage. At the same time, these types of alliances are also likely to lead to novel innovation outcomes ([Filiou and Massini, 2018](#); [Nooteboom et al., 2007](#)).

Studies to date have focused mainly on understanding the implications of strategic alliances for the success of alliances or for individual partners ([Doblinger et al., 2019](#); [Jacob et al., 2013](#)). The connection between strategic alliances and impacts on society and the environment, however, are less well understood ([Ahn et al., 2019](#)). In this paper, we use a novel dataset of 217 strategic alliances with a focus on response to Covid-19 to understand two questions: First, which types of alliances have emerged? And second, how are these alliances tackling different needs? The current crisis offers a unique window to study the mechanisms that enable alliances focused on societal impact to emerge and to scale. We find three main categories of needs driving the emergence of strategic alliances, starting with those closest to the immediate health emergency (core healthcare); and evolving to include management of the pandemic (management, operational and infrastructure); and finally underlying social needs. We provide a qualitative analysis of the types of alliance approaches associated with these categories of needs. We find for example that alliances close to the implementation and diffusion of innovations (scaling of manufacturing and supply chain coordination) feature several novel inter-industry configurations.

Our study contributes in two ways to the literature at the intersection between innovation and global challenges. First, we provide a means of categorizing the connections between needs and alliance approaches which can be adapted to other global challenges. Second, we identify several drivers for the acceleration of novel inter-industry alliances including a close connection to user



needs. Using our categories of needs and alliance approaches, we develop practical implications for supporting alliances for the immediate crisis and for the period post-pandemic when there is an opportunity to rebuild economies in ways that address multiple sustainable development challenges.

1. Background

In this section, we discuss the literature at the intersection between strategic alliance formation, innovation, and the emerging studies which focus on alliances in response to grand societal challenges. Through this exercise, we lay a foundation for understanding and explaining the dynamics of strategic alliances which seek to address the multi-faceted challenges that emerge from the unfolding Covid-19 pandemic.

Innovation scholars have long acknowledged the shift from a closed, technology push-based model of innovation to an open and collaborative innovation model, in which the formation and management of strategic alliances is key ([Dooley et al., 2016](#); [Gassmann et al., 2010](#); [Powell et al., 1996](#)). Innovation in this context refers to both innovation outcomes as well as the processes employed to achieve these outcomes ([Ahn et al., 2019](#); [Huizingh, 2011](#)). Numerous studies document that this open innovation model, which is heavily reliant on partnerships, seeks to combine knowledge and capabilities from different actors towards both developing and exploiting innovation (Ahn et al., 2019). Knowledge spillovers generated through strategic alliances have a crucial role in assisting organisations to overcome their own knowledge, resource and competency deficiencies (Audretsch and Feldman, 1996; [Bianchi et al., 2011](#); [Dooley et al., 2016](#); [Sandulli et al., 2017](#)).

Besides knowledge spillovers, there are other benefits that come with strategic innovation alliances, which stem from the heterogeneity of partners, ranging from commercial organisations, governments, universities and research institutes to NGOs and industry associations ([Bianchi et al., 2011](#); [Doblinger et al., 2019](#)). These include economic benefits, enhanced value creation opportunities, reputational benefits, enhanced relational capital for future endeavours, and increased likelihood of innovation adoption particularly for alliances that incorporate users in the innovation development process ([Baldwin and von Hippel, 2011](#); [Jacob et al., 2013](#); [Jolink and Niesten, 2020](#); [Karamanos, 2012](#); [Sandulli et al., 2017v](#)).



There are however numerous challenges that also come with forming and managing the dynamics of strategic alliances. These include challenges related to the integration of different cultures and routines of the partners, as well as managing the cognitive distance between diverse inter-industry or cross-sector partnerships ([Filiou and Massini, 2018](#); [Nootboom et al., 2007](#)). Alliances with diverse partners have the potential to generate high returns. Filiou and Massini (2018), however, show that cognitive distance between companies from different industries or sectors can initially be a liability, which, if overcome, can translate into superior partnership innovation performance. On the other hand, intra-industry partnerships are likely to display reduced rates of return to innovation outcomes as management effort increases, given that intra-industry knowledge tends to be more efficient. Dooley et al. (2016) further document that innovation alliances face further challenges including: i) financial / organisational risks, ii) partial loss of decision autonomy, iii) antitrust / anticompetitive implications, and the authors conclude that decisions to enter alliances should be based on multiple strategic considerations and not only economic value to individual organisations.

These insights have however been limited, in that they focus predominantly on individual partners or the alliances as a whole, but they do not consider how both individual and portfolios of strategic alliances address systemic issues and societal challenges. This has partially been addressed by the timely special issue published in R&D Management in 2019: “Leveraging open innovation to improve society: past achievements and future trajectories” ([Ahn et al., 2019](#)), in which the editorial team and published articles make a strong case for open innovation models, underpinned by strategic alliances, to be a key solution towards tackling the world's most pressing challenges.

We draw from the insights of the special issue as well as from the broader literature on alliance formation for the Sustainable Development Goals (SDGs) as a foundation for our interpretation of alliance formation towards solving the spread and consequences of the SARS-COV-2 virus.

Strategic innovation alliances for the SDGs have a unique “double externality” feature which distinguishes them from traditional strategic alliances which are limited to the pursuit of economic or financial goals. For example, environmental innovations stemming from environmental technology alliances, create value for broader stakeholders outside the immediate alliance (e.g. through reducing the environmental impact of the energy sector, providing clean water, reducing air pollution etc.) ([De Marchi, 2012](#); [Jolink and Niesten, 2020](#))



but also through enabling knowledge spillovers that extend beyond the alliance, the industry and even the sector itself ([Cojoianu et al., 2020](#)).

However, valuing environmental and social impact is often in the eye of the beholder, and hence it can mean different things to different alliance partners but also to different societal stakeholders ([Ahn et al., 2019](#)). Furthermore, the structure and composition of strategic alliances and the profit versus social orientation of partners may be a source of tension with respect to the extent to which social or environmental goals are pursued as part of the alliance as opposed to economic goals ([Ahn et al., 2019](#); [Doblinger et al., 2019](#); [Jolink and Niesten, 2020](#)). However, nonpecuniary motives of partners in strategic alliances can benefit organisations through lowering the cost of inputs that are provided by intrinsically motivated partners involved in the innovation co-creation process ([Chesbrough and Brunswicker, 2014](#); Harhoff et al., 2003).

Both NGOs and universities are types of organisations who tend to have non-pecuniary motives which are reflected in their engagement strategies. They also confer legitimacy to their more commercially oriented partners and represent valuable sources of both local tacit and formal knowledge (Ahn et al., 2019; [De Silva and Wright, 2019](#)). Entrepreneurs themselves can also start innovative ventures and influence alliances where the goals, values and culture are closely aligned to the nonpecuniary motives of the entrepreneur ([York et al., 2016](#)).

Although the literature on responsible innovation has documented that companies, NGOs and universities have an important role to play in solving grand societal challenges, governments around the world still have a strong mandate to ensure economic, social and environmental well-being ([OECD, 2010](#)), mostly through their policy regimes. In heavily regulated, capital-intensive industries which can deliver significant positive environmental or social impacts, such as clean technologies or healthcare (GIIN, 2019; PRI, 2018), governments have also emerged as a key partner for strategic alliances as they have a mandate to contribute to societal wellbeing over long periods, a strong mandate to ensure technology transfer to private organisations and to encourage innovation and commercialization ([Doblinger et al., 2019](#)).

Given that strategic alliances which aim to deliver both social and financial returns require multidisciplinary skills (including technical, scientific and soft skills) ([Fabrizi et al., 2018](#)), we expect that strategic alliances that deal with the spread and consequences of the coronavirus will feature a wide array of partnerships within and across industries and sectors which deal with the multifaceted challenges that this global pandemic brings. Similarly to Cojoianu et al. (2020) and Feldman et al. (2019) we employ an exploratory research design that allows for a detailed



investigation of the emerging Covid-19 strategic alliance landscape, without committing to specific hypotheses, but by discussing our findings in light of this theoretical background.

2. Methods

To understand the emerging distribution, focus and innovation aims of strategic alliances that directly address the spread of the SARS-COV-2 virus or the consequences of the COVID-19 disease, we retrieve a global dataset of strategic alliances from the CapitalIQ database. The CapitalIQ Key Developments database contains over 100,000 global strategic alliances announcements and press releases and updates daily from over 20,000 news sources.

Our strategic alliance search strategy includes the following steps. First, we search for strategic alliances announced between 1st January 2020 and 27th of April 2020, which include at least one of the following keywords in their announcement headline or the full-text of the press release: COVID, coronavirus, flu pandemic, COVID-19, SARS, severe acute respiratory syndrome or SARS-COV-2.

Our search process results in 272 strategic alliances containing the text of the alliance announcement, the partners involved, their founding date, industry, sector and country. For each of the 272 strategic alliances we conduct further manual searches, including reverting to the original news announcement, and consulting the Open Corporates, Dun & Bradstreet and Crunchbase databases to complete any missing datapoints about the organisations involved in strategic alliances.

Finally, through a careful examination of the announcement, we code the gap or need that the strategic alliance is seeking to fill, the specific Covid-19-induced problems they are trying to address and the means through which they seek to address these problems. These top-level categories have emerged from a bottom-up mapping of the themes and details of strategic alliance announcements. Through our research process, we identify several alliances which do not address the Covid pandemic, but only mention one of our selected keywords to describe the current business environments they face. We exclude these partnerships and remain with a final dataset of 217 strategic alliances.



We link alliances with societal challenges by coding i) the overall needs and gaps that have emerged in light of the pandemic, which strategic alliances seek to address; ii) the relevant clinical applications that the strategic alliances are targeted towards and iii) the approach that alliances take in accomplishing their goals towards mitigating the impacts of the pandemic.

Two of the co-authors have coded the partnership dataset and the third co-author has ensured the validity of the coding and emerging concepts and findings. We have conducted several coding iterations until we have been satisfied that coding consistency has been achieved on the entire dataset of partnerships.

3. Results

3.1. Emergence of alliances

Figure 1 shows the main problems being addressed by alliances since the pandemic started in January 2020. Our coding revealed three main categories of problems: 1. Core healthcare; 2. Management and operational; and 3. Social needs. Although only 4 months have passed, we see a temporal pattern in these categories emerging, starting with a focus on the first, then the second and third particularly from March onwards. The largest category throughout the period and in each individual month is core healthcare. By April, however, the category of alliances focused on management and operational problems reached just over 20% of all new alliances. The third category focused on social needs, emerged in March and is small but growing.

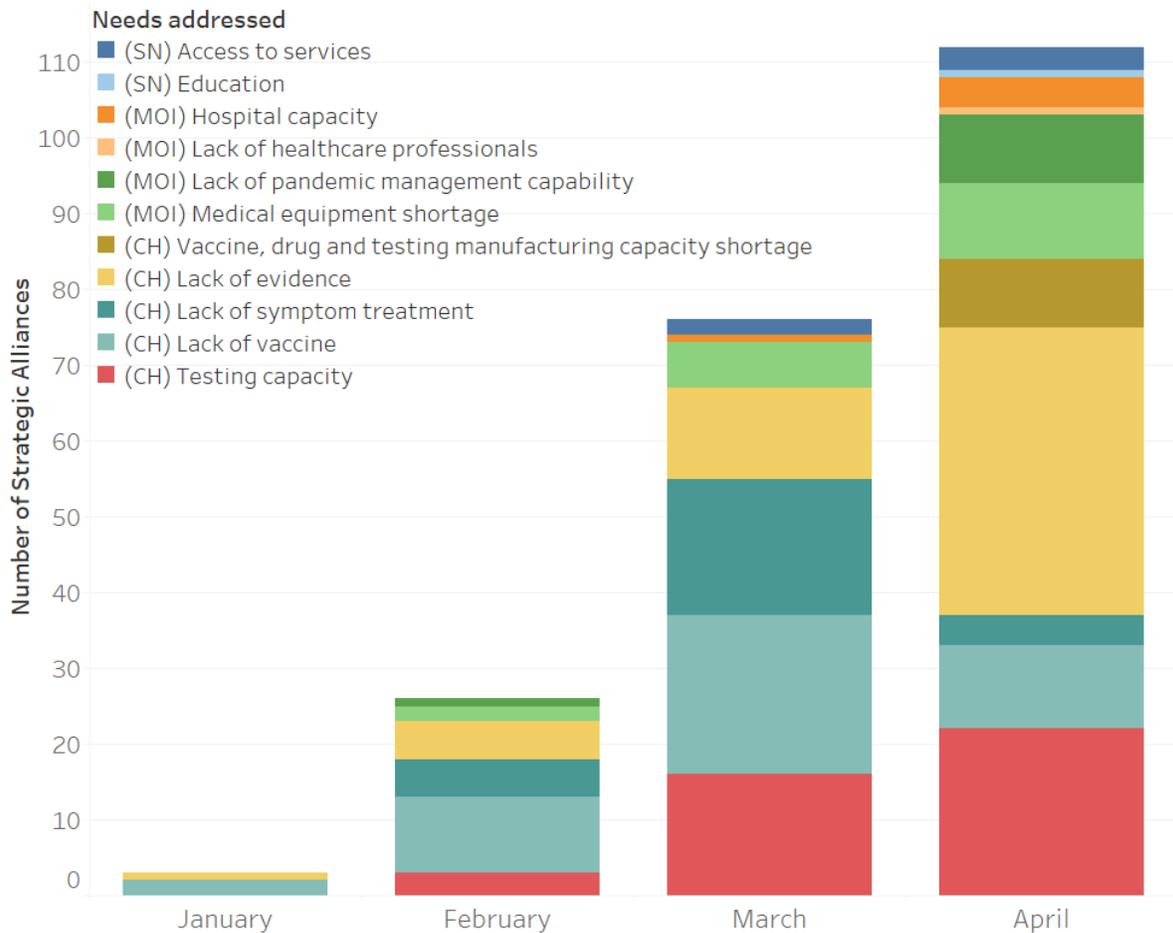
Different sub-categories of core healthcare have emerged over time. Each of the sub-categories focuses on healthcare problems specific to the virus, including treatment, testing and vaccine development. In January, the focus of the few alliances was on the immediate problems of developing a vaccine and treating symptoms. As the pandemic spread and worsened in specific countries during February and March, we see expansion of alliances related to the problem of testing for the virus, for example several agreements between healthcare companies and universities to develop faster means of diagnostic testing in order to assist with “flattening the curve” including one initiative using a 3D printed nasal swab to quickly respond to shortages of testing in hospitals. In March, we see the emergence of alliances targeted at symptom detection and monitoring to assist with decisions for example related to ending periods of



isolation. There are also two partnerships focused on improving means of providing remote care in order to reduce the risk of spreading the virus. The growth of this category of testing capacity, which includes both virus and symptom testing, brings in new partnerships between healthcare and information technology (IT), and some intra-industry IT partnering. For example, a partnership announced between Northern Data AG and Innoplexus AG in Germany in April 2020 focuses on using high-performance computing to perform epidemiological simulations, with the ultimate goal of accelerating drug discovery and development.

Figure 1: Number partnerships by needs (SN – Social needs, MOI – Management, operational and infrastructure needs/challenges, CH – Core healthcare needs)

Note: We count each alliance as one, regardless of the number of partners in any given alliance.



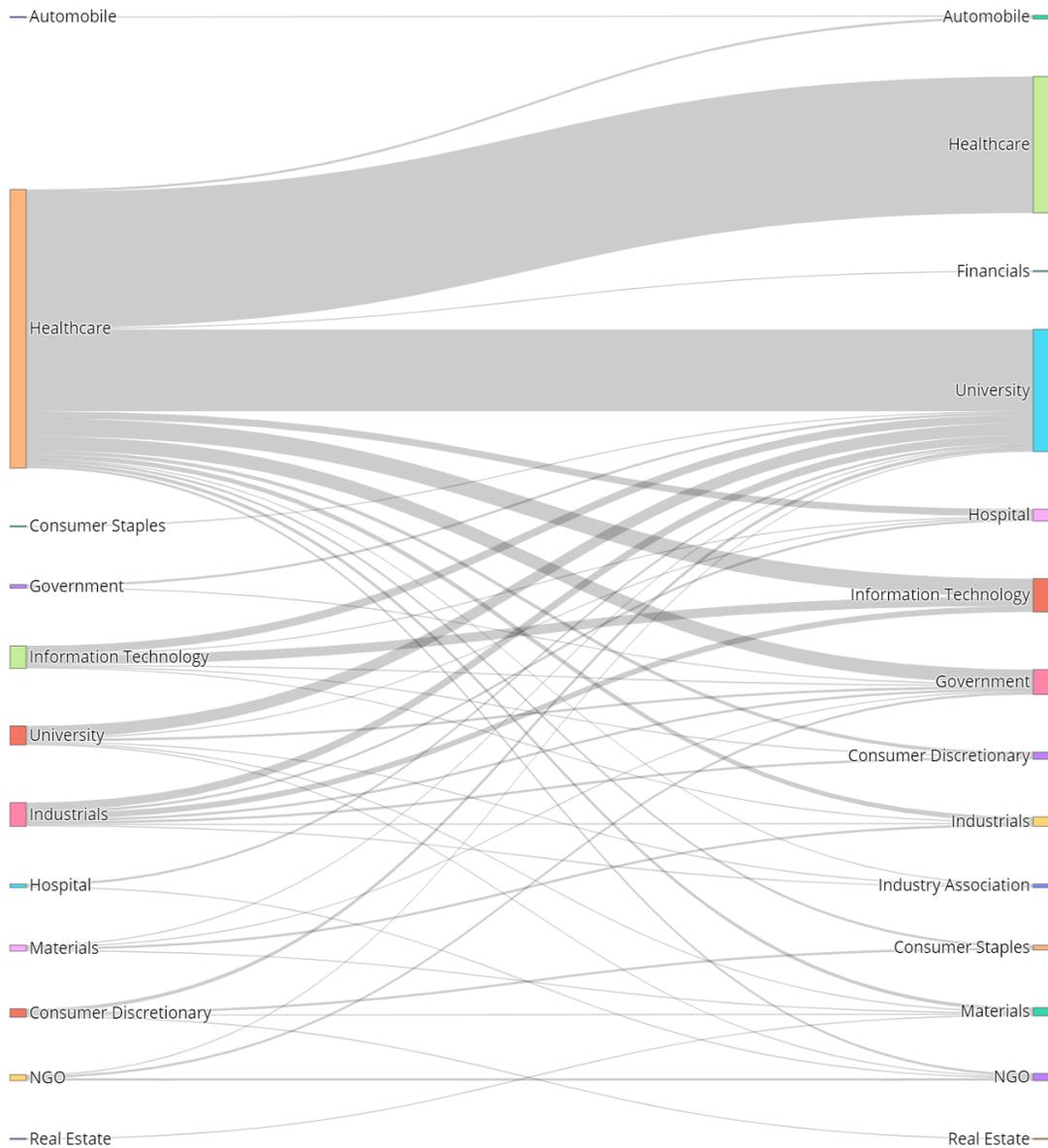


The second category, management and operational, started to emerge in February with two alliances focused on shortages in medical equipment. Each of the sub-categories focuses on problems that result from the virus but affect the management and operational dimensions of healthcare systems. In March for instance, we see the first alliance focused on issues related to hospital capacity with an alliance for the development of products and services such as modular medical units, and drive-through testing facilities. In April, the category expands to include several alliances focused on tracking the spread of the virus within healthcare facilities and also more broadly in society. For example, Apple and Google announced an alliance for a new automatic contact tracing system using bluetooth technology on mobile devices. The third category, social needs, appears towards the end of March with five new alliances announced in April. These alliances all go beyond dealing with the virus directly, or the management and infrastructure supporting healthcare systems. They focus instead on certain people and communities affected by the pandemic, including vulnerable groups such as those with underlying healthcare conditions, low-income communities and low-income countries.

Figure 2 illustrates the relationships underpinning the alliances in our sample. We can clearly see that the majority of alliances involve partnering within the healthcare industry and between healthcare and universities. Most of the partnering between these actors focuses on the core healthcare category. The alliances involving universities focus in particular, as expected, on building an evidence base for vaccine, treatments, and testing. In the management, operations and infrastructure category, the types of partners are more diffuse across industries including IT, industrials and materials, as well as across sectors with government and NGOs. There are a small number of alliances emerging in March and April, 13 in total, that include a hospital or medical centre directly as a partner. For example in India, Infosys Foundation are working with Narayana Health to launch a quarantine facility specifically for low-income patients. There are several hospital- university partnerships launching studies on specific types of patients. And there are company-hospital partnerships including one announced between Johnson & Johnson and a health centre in Israel to accelerate the vaccine development and trials.

Figure 2: Strategic alliances by industry and sector (Jan – Apr 2020)

Note: We quantify the strategic alliances between industries and sectors by counting each link as one between two organisations that are linked by strategic alliances of two or more partners.





5.1. Innovation approaches of alliances

Figure 3 illustrates the connections between the needs being addressed on the left through the specific application to Covid-19 in the middle, to the approach of the alliance on the right. The two main alliance approaches related to the CH category are joint research initiatives and product development alliances. These alliances focus on the basic research and development required for vaccines, treatment of symptoms and testing. In April, there have been several announcements of product development alliances that are focused on the systems for pandemic management, with a focus on non-medical solutions for infection prevention. For example, several alliances have emerged to assist in the development of systems for virus tracking. The Apple and Google alliance is an example of competitors partnering towards the goal of providing an automatic contact tracing application that reaches as many users as possible. The impact of such an application is dependent on other services and partners, particularly virus testing and authorization by public health authorities.

For a minority of the CH category and for the majority of MOI and SN alliances, we see alliances focused on the diffusion of existing products through scaling manufacturing, the development or acceleration of existing knowledge repackaged in novel ways to address supply chain disruptions, and two types of alliances focused specifically on the development of complementary products and services namely social innovation and IT innovation.

The alliances focused on scaling manufacturing include several inter-industry partnerships that have emerged quickly in response to the crisis. For example, there are three alliances featuring Ford Motor Company, an automaker. One of the alliances is between Ford, TI Fluid Systems and 3M to produce a component for a product that provides respiratory protection for healthcare workers. Another is between Ford and 3M to produce face shields, face masks and reusable gowns. The third alliance is between Ford and GE Healthcare for the production of ventilators. The role of Ford in these alliances is specifically focused on designing for scale, the application and embedding of existing manufacturing knowledge with partners, and the use of facilities to assist in the assembly of equipment. The partners to these alliances in their communications emphasize two aspects of the problem that have driven cooperation across industries. First, the immediacy of the problem has spurred quick efforts to explore and rethink uses for existing components. In the Ford and 3M alliances, for example, the companies are collaborating on designs for respiratory systems using components from both including fans from Ford trucks. The second driver is a local connection to the problem. Although the global nature

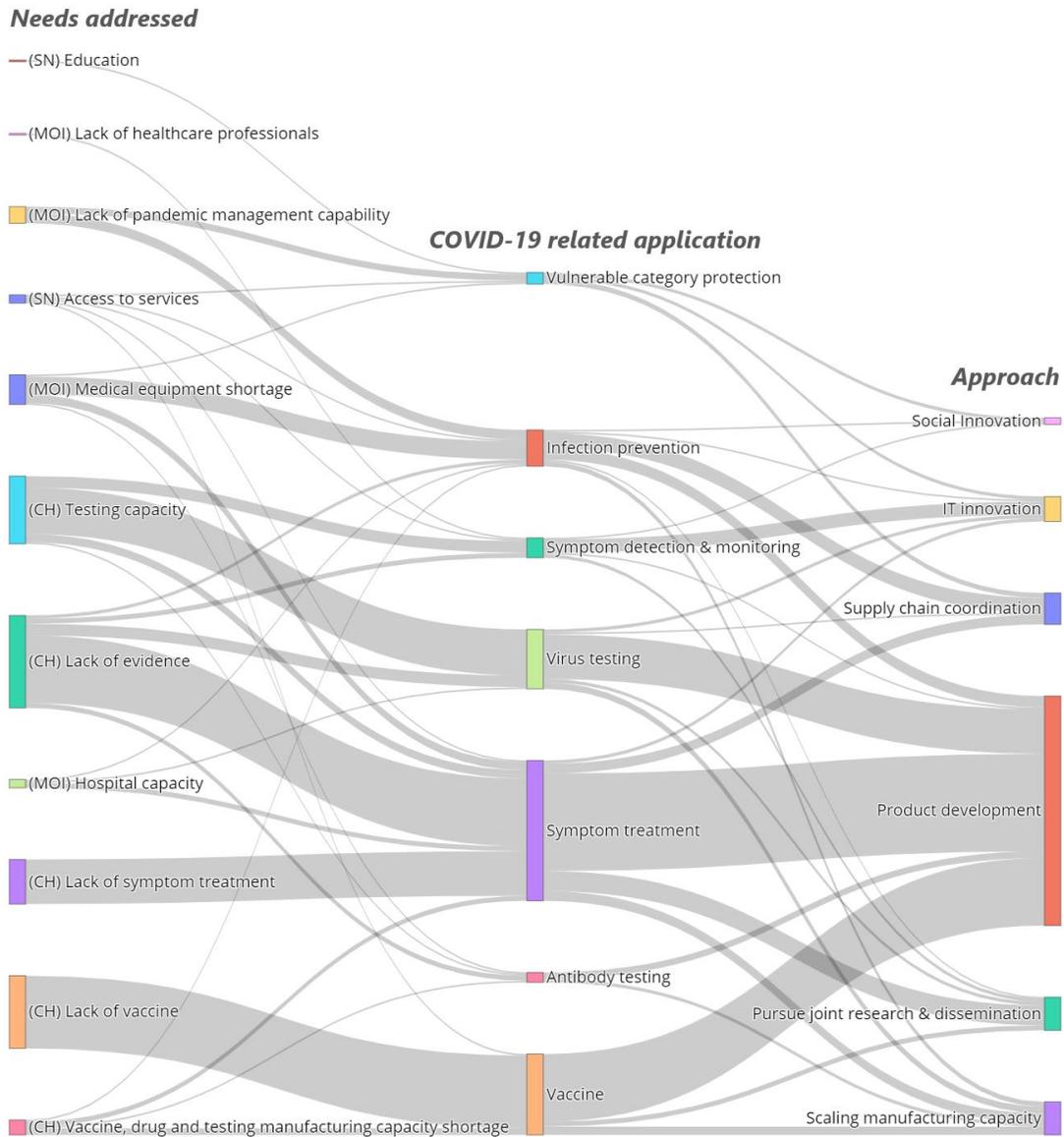


of the crisis is acknowledged by companies, the ability to produce at scale locally is highlighted as an important aspect of the alliance. The companies are also responding to particular locations with severe shortages, for example the Ford and GE alliance emerged after New York's governor asked the Trump administration in March to intervene in response to ventilator shortages.

For the supply chain alliances, the focus of the partnerships is on improving the deployment of different solutions rather than solely on design and manufacturing. For example, an alliance between Boston Scientific, United Health Group, Medtronic and the University of Minnesota announced in April centers on emergency ventilators and tackles the issue of matching these ventilators to the locations where they are in urgent need. An alliance between Aden Group, an environmental and facilities services company, and Dassault, a software company, focuses on the problem of hospital capacity by combining existing concepts for fast, modular hospital construction with a software application for simulating and adapting the concept for design and use throughout its lifecycle in different locations. A final example in this category points to the need to consider supply chains beyond the context of healthcare. An alliance between Aarp Foundation and the United Health Foundation for example is responding to the problems experienced by vulnerable communities and healthcare workers as a result of disruptions to food supply chains. The Aarp foundation's core focus is on helping low-income families. The alliance thus represents a partnership across the thematic domains of poverty and healthcare.

The social and IT innovation alliances include examples with a focus on complementary products, services and platforms mostly aimed at preventing the spread of Covid-19 and its impacts on vulnerable people. These alliances, in contrast to new product development, focus on applying and repurposing existing capabilities of the partners in the social and IT domains to deliver new applications specific to Covid-19. For example, alliances include partnerships to exchange information and evidence-based educational resources for patients, and those that enable new models for the delivery of certain packages of existing products and services to assist remote healthcare.

Figure 1: Needs addressed by and approaches of 217 alliances around the world (Jan – Apr 2020)





6. Discussion and Conclusion

Our findings show that the emergence of alliances for Covid-19 started with those closest to the immediate experience of the problem (CH), and then developed to focus on complementary equipment and infrastructure (MOI). Most recently there have been some limited examples of alliances going beyond healthcare, by tackling underlying systemic issues such as poverty and inequality (SN). This final category is the smallest, although there are also examples in the MOI category of alliances that target disruptions to other systems such as food thus also going beyond healthcare. We find that as the needs being addressed shift to those related to management and infrastructure, the types of partners involved expand with both intra-industry and inter-industry alliances emerging. Only a small number of alliances to date officially include users such as hospitals and health centres or governments. Our results also show that alliances close to implementation and diffusion of solutions (scaling of manufacturing and supply chains) feature several novel inter-industry configurations.

From these exploratory results, we suggest two main implications for research at the intersection between innovation and global challenges. First, we suggest that there is an opportunity to develop theoretically and empirically the connection between strategic alliances and impacts on societal challenges through further mapping and analysis of the connections between needs and alliance approaches. We have identified some initial categories of needs starting with those that are core and immediate to a specific system, then encompassing the system infrastructure and finally those needs that connect to other systems. This categorization could be a useful starting point for comparing alliance emergence and alliance impacts across different global challenges and contexts. The connection to needs enables a systemic approach to considering entire categories of alliances rather than the impact of characteristics of alliances on the alliances themselves or the performance of individual partners. It also allows for a differentiation between global challenges in terms of the types of alliances required depending on the extent to which needs are focused on the short-term or long-term, and depending on the scope and type of connections to other systems ([Ahn et al., 2019](#); [Jolink and Niesten, 2020](#)). Second, there is an opportunity to observe alliances with different degrees of cognitive distance emerging in response to the needs of the current crisis. Tracking these alliances over time and measuring their impacts on providing solutions to the needs addressed could yield important insights for future crises and for responses to sustainable development challenges including climate action. For example, the climate crisis is already disrupting supply chains, with these



disruptions predicted to increase in frequency and impact (reference). Studies that focus in more detail on the supply chain coordination alliances for Covid-19 could provide lessons for the public and private sector in dealing with future climate-related disruptions and preparing supply chains to be resilient. Alliances focused on scaling manufacturing capacity provide a window into inter-industry partnerships, particularly with a focus on understanding how scale can be accelerated through novel alliances and repurposing of capabilities. Our initial results suggest that a local connection and a strong connection to user needs have driven these types of alliances in response to Covid-19. Exploring the connection between local and global drivers for novel inter-industry alliances would add to the literature on the challenges and opportunities of bridging cognitive distance ([Nooteboom et al., 2007](#); [Sandulli et al., 2017](#)).

There are two main practical implications of our results. First, although the pandemic and associated economic and social crises have indeed led to the accelerated emergence of an ecosystem of novel alliances, there are several important gaps. The most visible gap is the lack of alliances involving governments. The alliances emerging around the world in response to the crisis demonstrate huge potential for voluntary activities of companies within and across industries to adapt to emerging needs in society. In the next phase of managing the pandemic and particularly preparing for recovery, more attention is required to ensure that these voluntary efforts are targeted in ways that enable a long-term focus. There are existing mechanisms that would enable activities of entire industries to be guided in ways that support long-term societal goals for climate action and poverty reduction. For example, the subsidy schemes for employment in different countries and industries could be connected to conditions that provide a foundation for specific short-term and long-term needs to be addressed. In addition, corporate bailouts can be awarded conditional on them cooperating towards tackling the effects of the pandemic but also conditional on them being more transparent towards their sustainability performance in a post-Covid world. For example, Canada has made reporting climate risks a condition of receiving its Covid-19 bailout funding ([Environmental Finance, 2020](#)). There are also lessons to be drawn from the experience to date with innovation in clean technologies where government alliances for technology development have been critical to innovation outcomes ([Doblinger et al., 2019](#)).

The second practical implication is the need for open information and transparency in the relationship between public, private and civil society partners. Several alliances refer to issues that require changes to underlying rules, for example privacy issues associated with the development of new applications for virus tracking and even calls for governments to intervene



in mandating industries to produce certain types of equipment. There have also been examples of competition rules being relaxed in order to allow for novel collaborations in response to the crisis. For example, the UK government relaxed competition rules for retailers in order to enable collaborations for data sharing that could improve services to people during the crisis ([Haney and Drobac, 2020](#)). Governments, even if they are not directly involved in alliances, need to set best practice examples for sharing information in ways that can enable short-term and long-term needs of society to be addressed by innovation alliances.

The pandemic has disrupted the lives of most people and businesses around the world and has led to the emergence of urgent and immediate needs that cannot be addressed without innovative approaches. While there are many positive examples of strategic alliances that aim to respond to these emerging needs, there are opportunities to improve the extent to which these alliances combine to fundamentally change the course of the crisis. In particular, the role of governments is key as alliance partner and in guiding the overall vision for innovative approaches that tackle both the immediate and long-term needs on the road to a sustainable recovery. Future research on the relationship between governments within alliances and governments guiding the connection between alliances and social/environmental needs is critical in order to respond to the current crisis and to build resilient systems in the decades to come.

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